City Council
June 29, 2015
Monday

Worksession 4:00 P.M.
Committee of the Whole 5:00 P.M.
Special Meeting 6:00 P.M.

City Hall
Cowles Council Chambers
491 E. Pioneer Avenue
Homer, Alaska

Produced and
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June/July

Monday 29th: **CITY COUNCIL**
Worksession 4:00 p.m., Committee of the Whole 5:00 p.m., and Special Meeting 6:00 p.m.

Wednesday 1st: **PUBLIC SAFETY BUILDING REVIEW COMMITTEE**
Meeting 5:30 p.m.

Friday 3rd: **CITY OFFICES CLOSED**
In observance of Independence Day.

Tuesday 7th: **LIBRARY ADVISORY BOARD**
Regular Meeting 5:00 p.m.

Tuesday 14th: **ECONOMIC DEVELOPMENT ADVISORY COMMISSION**
Regular Meeting 6:00 p.m.

Wednesday 15th: **PLANNING COMMISSION**
Worksession 5:30 p.m. and Regular Meeting 6:30 p.m.

Wednesday 22nd: **PORT AND HARBOR ADVISORY COMMISSION**
Regular Meeting 6:00 p.m.

Thursday 23rd: **CANNABIS ADVISORY COMMISSION**
Regular Meeting 5:00 p.m.

Monday 27th: **CITY COUNCIL**
Worksession 4:00 p.m., Committee of the Whole 5:00 p.m., and Special Meeting 6:00 p.m.

Regular Meeting Schedule
City Council 2nd and 4th Mondays 6 p.m.
Library Advisory Board 1st Tuesday with the exception of January, April, August and November 5:00 p.m.
Economic Development Advisory Commission 2nd Tuesday 6 p.m.
Parks and Recreation Advisory Commission 3rd Thursday with the exception of July, December and January 5:30 p.m.
Planning Commission 1st and 3rd Wednesday 6:30 p.m.
Port and Harbor Advisory Commission 4th Wednesday 5 p.m. (May-August 6:00 p.m.)
Public Arts Committee Quarterly 2nd Thursday 5:00 p.m. Upstairs in the Conference Room
Permanent Fund Committee Quarterly 2nd Thursday 5:15 p.m.

MAYOR AND CITY COUNCILMEMBERS AND TERMS
BETH WYTHE, MAYOR – 16
FRANCIE ROBERTS, COUNCILMEMBER – 15
BRYAN ZAK, COUNCILMEMBER - 16
DAVID LEWIS, COUNCILMEMBER – 17
BEAUREGARD BURGESS, COUNCILMEMBER – 15
GUS VAN DYKE, COUNCILMEMBER – 16

CATRIONA REYNOLDS, COUNCILMEMBER – 17

City Manager, Katie Koester
City Attorney, Thomas F. Klinkner

http://cityofhomer-ak.gov/cityclerk **for home page access, Clerk's email address is:**
clerk@ci.homer.ak.us **Clerk's office phone number: direct line 235-3130,**
other number 435-3106

HOMER CITY COUNCIL
491 E. PIONEER AVENUE
HOMER, ALASKA
www.cityofhomer-ak.gov

WORKSESSION
4:00 P.M. MONDAY
JUNE 29, 2015
COWLES COUNCIL CHAMBERS

MAYOR BETH WYTHE
COUNCIL MEMBER FRANCIE ROBERTS
COUNCIL MEMBER DAVID LEWIS
COUNCIL MEMBER BRYAN ZAK
COUNCIL MEMBER BEAUREGARD BURGESS
COUNCIL MEMBER GUS VAN DYKE
COUNCIL MEMBER CATRIONA REYNOLDS
CITY ATTORNEY THOMAS KLINKNER
CITY MANAGER KATIE KOESTER
CITY CLERK JO JOHNSON

WORKSESSION AGENDA

1. CALL TO ORDER, 4:00 P.M.

2. AGENDA APPROVAL (Only those matters on the noticed agenda may be considered, pursuant to City Council's Operating Manual, pg. 5)

3. BEACH POLICY RECOMMENDATIONS – PARKS AND RECREATION ADVISORY COMMISSION

Memorandum 15-102 from Parks and Recreation Advisory Commission as backup.

Page 3 Worksession Packet

4. COMMENTS OF THE AUDIENCE

5. ADJOURNMENT NO LATER THAN 4:50 P.M.

Next Regular Meeting is Monday, July 27, 2015 at 6:00 p.m. and Committee of the Whole 5:00 p.m. All meetings scheduled to be held in the City Hall Cowles Council Chambers located at 491 E. Pioneer Avenue, Homer, Alaska.

HOMER CITY COUNCIL
491 E. PIONEER AVENUE
HOMER, ALASKA
www.cityofhomer-ak.gov

COMMITTEE OF THE WHOLE
5:00 P.M. MONDAY
JUNE 29, 2015
COWLES COUNCIL CHAMBERS

MAYOR BETH WYTHE
COUNCIL MEMBER FRANCIE ROBERTS
COUNCIL MEMBER DAVID LEWIS
COUNCIL MEMBER BRYAN ZAK
COUNCIL MEMBER BEAUREGARD BURGESS
COUNCIL MEMBER GUS VAN DYKE
COUNCIL MEMBER CATRIONA REYNOLDS
CITY ATTORNEY THOMAS KLINKNER
CITY MANAGER KATIE KOESTER
CITY CLERK JO JOHNSON

COMMITTEE OF THE WHOLE AGENDA

1. CALL TO ORDER, 5:00 P.M.

2. AGENDA APPROVAL (Only those matters on the noticed agenda may be considered, pursuant to City Council's Operating Manual, pg. 6)

3. Ordinance 15-08, An Ordinance of the Homer City Council Amending Subsection (C) of Homer City Code 21.50.020, Site Development Standards – Level One, and Subsection (A) of Homer City Code 21.50.030, Site Development Standards – Level Two, to Require Revegetation of Exposed, Cleared, Filled and Disturbed Soils Within 9 Months. Planning. ***Page 629***

Memorandums 15-048 and 15-098 from City Planner as backup. ***Pages639/685***

Ordinance 15-08(S), An Ordinance of the Homer City Council Amending Subsection (C) of Homer City Code 21.50.020, Site Development Standards – Level One, and Subsection (A) of Homer City Code 21.50.030, Site Development Standards – Level Two, to Require Revegetation of Exposed, Cleared, Filled and Disturbed Soils **by August 31st or** Within 9 Months**, Whichever Comes First**. City Manager/Planning. ***Page 635***

4. Ordinance 15-23, An Ordinance of the Homer City Council Amending Homer City Code 21.40.070, Requirements, Regarding Standards for Impervious Coverage in the Bridge Creek Watershed Protection District. Planning. ***Page 65***

Memorandum 15-100 from City Planner as backup. ***Page 69***

5. CONSENT AGENDA

6. REGULAR MEETING AGENDA

7. COMMENTS OF THE AUDIENCE

8. ADJOURNMENT NO LATER THAN 5:50 P.M.

Next Regular Meeting is Monday, July 27, 2015 at 6:00 p.m. and Committee of the Whole 5:00 p.m. All meetings scheduled to be held in the City Hall Cowles Council Chambers located at 491 E. Pioneer Avenue, Homer, Alaska.

CALL TO ORDER
PLEDGE OF ALLEGIANCE
AGENDA APPROVAL

HOMER CITY COUNCIL
491 E. PIONEER AVENUE
HOMER, ALASKA
www.cityofhomer-ak.gov

SPECIAL MEETING
6:00 P.M. MONDAY
JUNE 29, 2015
COWLES COUNCIL CHAMBERS

MAYOR BETH WYTHE
COUNCIL MEMBER FRANCIE ROBERTS
COUNCIL MEMBER DAVID LEWIS
COUNCIL MEMBER BRYAN ZAK
COUNCIL MEMBER BEAUREGARD BURGESS
COUNCIL MEMBER GUS VAN DYKE
COUNCIL MEMBER CATRIONA REYNOLDS
CITY ATTORNEY THOMAS KLINKNER
CITY MANAGER KATIE KOESTER
CITY CLERK JO JOHNSON

SPECIAL MEETING AGENDA

Worksession 4:00 p.m. and Committee of the Whole 5:00 p.m. in Homer City Hall Cowles Council Chambers.

1. CALL TO ORDER, PLEDGE OF ALLEGIANCE

Department Heads may be called upon from time to time to participate via teleconference.

2. AGENDA APPROVAL

(Addition of items to or removing items from the agenda will be by unanimous consent of the Council. HCC 1.24.040.)

3. PUBLIC COMMENTS UPON MATTERS ALREADY ON THE AGENDA

4. RECONSIDERATION

5. CONSENT AGENDA

(Items listed below will be enacted by one motion. If separate discussion is desired on an item, that item may be removed from the Consent Agenda and placed on the Regular Meeting Agenda at the request of a Councilmember.)

A. Homer City Council unapproved Special meeting minutes of June 15, 2015. City Clerk. Recommend adoption. ***Pages 25/29***

B. **Memorandum 15-101,** from Deputy City Clerk, Re: Liquor License Transfer and Application for Best Western Bidarka Inn/Otter Room. ***Page 47***

C. **Ordinance 15-20,** An Ordinance of the City Council of Homer, Alaska, Accepting and Appropriating an Alaska Department of Environmental Conservation Municipal Matching Grant in the Amount of $1,922,577 and Authorizing a 30% Matching Requirement From the Homer Accelerated Water And Sewer Fund (HAWSP) in the Amount of $576,773.10 for the Purpose of Completing the Water Distribution/Storage Improvement Project and Authorizing the City Manager to Execute the Appropriate Documents. City Manager/Public Works Director. Recommended dates: Introduction June 29, 2015, Public Hearing and Second Reading July 27, 2015. (Postponed from June 15, 2015.) ***Page 59***

D. **Ordinance 15-23,** An Ordinance of the Homer City Council Amending Homer City Code 21.40.070, Requirements, Regarding Standards for Impervious Coverage in the Bridge Creek Watershed Protection District. Planning. Recommended dates: Introduction June 29, 2015, Public Hearing and Second Reading July 27, 2015. ***Page 65***

Memorandum 15-100 from City Planner as backup. ***Page 69***

E. **Ordinance 15-24,** An Ordinance of the Homer City Council Enacting HCC 2.52.080, Correctional Officer Qualifications, Regarding the Qualification and Certification of City Correctional Officers. City Manager. Recommended dates: Introduction June 29, 2015, Public Hearing and Second Reading July 27, 2015. ***Page 347***

Memorandum 15-090 from Police Chief as backup. ***Page 351***

F. **Ordinance 15-25,** An Ordinance of the City Council of Homer, Alaska, Re-Appropriating the 2003 Allocation From the Alaska Department of Community and Economic Development as Fisheries Revitalization Aid for the Purpose of Refurbishing a Fish Dock Crane. City Manager/Port and Harbor Director. Recommended dates: Introduction June 29, 2015, Public Hearing and Second Reading July 27, 2015. ***Page 353***

Memorandum 15-089 from Port and Harbor Director as backup. ***Page 357***

G. **Resolution 15-052,** A Resolution of the City Council of Homer, Alaska, Approving and Accepting the Renewal of the Special Services Contract for FY 2016 with the Alaska Department of Public Safety in the Amount of $36,000.00 and Authorizing the City Manager to Execute the Appropriate Documents. City Manager/Police Chief. Recommend adoption. ***Page 369***

Memorandum 15-093 from Police Chief as backup. ***Page 371***

H. **Resolution 15-053,** A Resolution of the Homer City Council Awarding the Contract for the Refurbishment of Homer Fire Department Apparatus Tanker 2 to U.S. Fire Equipment LLC of Sumner, Washington, in the Amount of $154,375.01 and Authorizing the City Manager to Execute the Appropriate Documents. City Manager/Fire Chief. Recommend adoption. ***Page 373***

Memorandum 15-094 from Fire Chief as backup. ***Page 375***

I. **Resolution 15-054,** A Resolution of the City Council of Homer, Alaska, Authorizing Lease Negotiations for Lot 19 on the Homer Spit Between the City and Jose Ramos, dba Harbor Grill, and Finding That Awarding a New Lease to the Current Lessee Without a Competitive Bidding Process is in the Public Interest. City Manager. Recommend adoption. ***Page 383***

Memorandum 15-096 from Lease Committee as backup. ***Page 385***

J. **Resolution 15-055,** A Resolution of the City Council of Homer, Alaska, Directing the Administration to Issue a Request for Proposals for Janitorial Services. City Manager. Recommend adoption. ***Page 417***

Memorandum 15-103 from City Manager as backup. ***Page 419***

6. VISITORS

7. ANNOUNCEMENTS/PRESENTATIONS/BOROUGH REPORT/COMMISSION REPORTS

A. **Mayor's Proclamation,** July as Parks and Recreation Month ***Page 425***

B. Borough Report

C. Commissions/Board Reports:

1. Library Advisory Board

2. Homer Advisory Planning Commission

a. Minutes of June 3, 2015 ***Page 427***

3. Economic Development Advisory Commission

a. Memorandum 15-097 from Deputy City Clerk, Re: Recommendation Regarding Affordable Housing ***Page 435***

b. Memorandum 15-099 from Deputy City Clerk, Re: Recommendation Regarding Special Assessment Districts Levy of Assessment After Subdivision ***Page 471***

4. Parks and Recreation Advisory Commission

5. Port and Harbor Advisory Commission

6. Cannabis Advisory Commission

8. PUBLIC HEARING(S)

A. **Ordinance 15-18(S),** An Ordinance of the City Council of Homer, Alaska, Amending the FY 2015 Capital Budget by Appropriating ~~$613,000~~ **$621,500** From the General Fund Fund Balance to the Public Safety Building Project Account to Fund the New Public Safety Building to 35% Design. Mayor. Introduction May 26, 2015, Postponed to June 29, 2015 for Public Hearing and Second Reading. ***Page 487***

Memorandum 15-074 from City Manager as backup. ***Page 493***

B. **Ordinance 15-19,** An Ordinance of the Homer City Council, Amending Homer City Code Chapter 9.16 to Revise HCC 9.16.040, HCC 9.16.100, and Add HCC 9.16.110 Repealing the Seasonal Sales Tax Exemption as Applied to Certain Categories of Nonprepared Foods, Including But Not Limited to Cakes, Cookies, Ice Cream, Candy, Chips, and Frozen Pizzas. Lewis. Introduction June 15, 2015, Public Hearing and Second Reading June 29, 2015. ***Page 513***

C. **Ordinance 15-21,** An Ordinance of the City Council of Homer, Alaska, Amending the FY 2015 Operating Budget by Appropriating $277,335.45 to Pay for Homer Natural Gas Special Assessment District Assessments of 85 City Lots From Various City Reserve Funds. City Manager. Introduction June 15, 2015, Public Hearing and Second Reading June 29, 2015. ***Page 531***

D. **Ordinance 15-22,** An Ordinance of the City Council of Homer, Alaska, Declaring That Lillian Walli Estates Subdivision Lots 57-60, 65-67, and 70 No Longer Need to Be Retained For a Public Purpose as No Public Need Exists For Retaining the Property and Releasing HM0880016 T06S R14W S24 Lillian Walli Estate Sub Lot 60, 65, 66, 67, 70, 57,

58, 59 For Sale Subject to Land Disposal Proceedings Under the Homer City Code. City Manager. Introduction June 15, 2015, Public Hearing and Second Reading June 29, 2015. ***Page 545***

Ordinance 15-22(S), An Ordinance of the Homer City Council Determining That a Public Purpose Does Not Exist for Lots 57, 58, 59, 60, 65, 66, 67 and 70, Lillian Walli Estate, and Authorizing Their Sale. City Manager. ***Page 549***

9. ORDINANCE(S)

10. CITY MANAGER'S REPORT

A. City Manager's Report ***Page 567***

1. Memorandum 15-107 from City Manager, Re: Budget Work Session follow-up. ***Page 569***
   a. Memorandum 15-108 from Library Director as backup. ***Page 587***
2. Memorandum 15-104 from Assistant City Manager, Re: Budget Issues Survey. ***Page 609***
3. Memorandum 15-106 from Planning Commission, Re: Recommendation on Waddell Way. ***Page 611***

11. CITY ATTORNEY REPORT

12. COMMITTEE REPORT

A. Public Arts Committee

B. Permanent Fund Committee

C. Employee Committee Report

D. Public Safety Building Review Committee

E. Vessel Haul-Out Task Force

13. PENDING BUSINESS

A. **Ordinance 15-08,** An Ordinance of the Homer City Council Amending Subsection (C) of Homer City Code 21.50.020, Site Development Standards – Level One, and Subsection (A) of Homer City Code 21.50.030, Site Development Standards – Level Two, to Require

Revegetation of Exposed, Cleared, Filled and Disturbed Soils Within 9 Months. Planning. Introduction April 13, 2015, Referred to Planning Commission April 13, 2015. Recommend Public Hearing and Second Reading July 27, 2015. ***Page 629***

Ordinance 15-08(S), An Ordinance of the Homer City Council Amending Subsection (C) of Homer City Code 21.50.020, Site Development Standards – Level One, and Subsection (A) of Homer City Code 21.50.030, Site Development Standards – Level Two, to Require Revegetation of Exposed, Cleared, Filled and Disturbed Soils **by August 31st or** Within 9 Months**, Whichever Comes First**. City Manager/Planning.
Page 635

Memorandums 15-048 and 15-098 from City Planner as backup. ***Pages 639/685***

B. **Resolution 15-043,** A Resolution of the City Council of Homer, Alaska, Urging the U.S. Navy to Change Training Exercises in the Gulf of Alaska. Zak/Roberts. Recommend adoption. Postponed from June 15, 2015. ***Page 687***

C. **Resolution 15-048,** A Resolution of the City Council of Homer, Alaska, Noting the Sufficiency of the Petition for the Lillian Walli Fairview Avenue Road Reconstruction and Paving and Sewer Improvements Special Assessment District and Setting the Public Hearing Date for September 14, 2015. City Clerk/Public Works Director. Recommend adoption. Postponed from June 15, 2015. ***Page 701***

Resolution 15-048(S), A Resolution of the City Council of Homer, Alaska, Providing for the Submission of a Revised Petition to Form the Lillian Walli Fairview Avenue Road Reconstruction and Paving and Sewer Improvements Special Assessment District.
Page 703

Memorandum 15-086 from Public Works Director as backup. ***Page 705***
Memorandum 15-105 from City Manager as backup. ***Page 709***

14. NEW BUSINESS

15. RESOLUTIONS

A. **Resolution 15-049,** A Resolution of the City Council of Homer, Alaska, Awarding a New Twenty-Year Lease, With Two Five-Year Options, on a Portion of Lot 11, Homer Spit Subdivision, No. 5 to SPITwSPOTS (SWS), Inc. of Homer, Alaska, and Authorizing the City Manager to Negotiate and Execute the Appropriate Documents. City Clerk.
Page 733

Memorandum 15-091 from Lease Committee as backup. ***Page 735***

B. **Resolution 15-050,** A Resolution of the City Council of Homer, Alaska, Providing for the Reassessment of Condominium Units in the Homer Natural Gas Distribution Special Assessment District. City Clerk. ***Page 933***

C. **Resolution 15-051,** A Resolution of the City Council of Homer, Alaska, Approving and Accepting a Regional and Community Jails Services Contract for FY 2016 With the Alaska Department of Corrections in the Amount of $424,080 and Authorizing the City Manager to Execute the Appropriate Documents. City Manager/Police Chief.

Page 949

Memorandum 15-092 from Police Chief as backup. ***Page 951***

16. COMMENTS OF THE AUDIENCE

17. COMMENTS OF THE CITY ATTORNEY

18. COMMENTS OF THE CITY CLERK

19. COMMENTS OF THE CITY MANAGER

20. COMMENTS OF THE MAYOR

21. COMMENTS OF THE CITY COUNCIL

22. ADJOURNMENT

Next Regular Meeting is Monday, July 27, 2015 at 6:00 p.m. and Committee of the Whole 5:00 p.m. All meetings scheduled to be held in the City Hall Cowles Council Chambers located at 491 E. Pioneer Avenue, Homer, Alaska.

PUBLIC COMMENTS
UPON MATTERS
ALREADY ON THE AGENDA

RECONSIDERATION

CONSENT AGENDA

Session 15-22 a Special Meeting of the Homer City Council was called to order on June 15, 2015 at 6:00 p.m. by Mayor Mary E. Wythe at the Homer City Hall Cowles Council Chambers located at 491 E. Pioneer Avenue, Homer, Alaska, and opened with the Pledge of Allegiance.

PRESENT: COUNCILMEMBERS: BURGESS, LEWIS, REYNOLDS, ROBERTS

ABSENT: ZAK, VAN DYKE

STAFF: CITY MANAGER KOESTER
DEPUTY CITY CLERK JACOBSEN
PUBLIC WORKS DIRECTOR MEYER
FINANCE DIRECTOR LI
POLICE CHIEF ROBL
CITY PLANNER ABBOUD

Mayor Wythe declared Councilmembers Van Dyke and Zak as excused. The Council had no objection.

Department Heads may be called upon from time to time to participate via teleconference.

AGENDA APPROVAL
(Only those matters on the noticed agenda may be considered, pursuant to City Council's Operating Manual, pg. 5)

Mayor Wythe called for a motion to approve the agenda.

LEWIS/REYNOLDS SO MOVED.

ROBERTS/BURGESS MOVED TO ADD COMMENTS OF THE AUDIENCE BETWEEN ITEMS TWO AND THREE.

There was brief discussion.

VOTE: (Amendment) NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

There was no further discussion on the agenda as amended.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

PUBLIC COMMENTS UPON MATTERS ALREADY ON THE AGENDA

Ken Castner, city resident, expressed his objection to the Council holding an executive session over matters of the budget. He believes that the public's business needs to be done in public. Its public money and public expense and there is nothing to be hidden from the public when deciding how money can be allocated. He urged them not to go into executive session.

MEMORANDUM 15-080, from City Clerk, Re: Request for Executive Session Pursuant to AS 44.62.310(A-C)(1) Matters, the Immediate Knowledge of Which Would Clearly Have an Adverse Effect Upon the Finances of the Government Unit and Matters Pertaining to Personnel (City Finances/Budget Shortfalls for 2015/2016).

Mayor Wythe called for a motion for the approval of the recommendations in Memorandum 15-080 to meet in executive session to discuss city finances/budget shortfalls for 2015/2016.

LEWIS/ROBERTS SO MOVED.

There was discussion to establish whether the topics to be addressed warranted going into executive session. Several felt it would be appropriate to hold executive session if discussing matters specifically related to personnel.

Mayor Wythe explained she requested the executive session after meeting with the City Manager to review the current situation of the finances. There were aspects that from a business perspective are information that the council should hear first before it becomes public information. She assured that there will be plenty of public meetings and discussion throughout the budget process.

City Manager Koester added that when a municipality this size starts talking about cuts relating to personnel in the small departments the conversations hit close to home and the conversations will have to happen.

Further discussion ensued in support of and opposition to executive session.

VOTE: YES: LEWIS, BURGESS, ROBERTS
NO: REYNOLDS

Motion failed.

City Manager Koester reviewed current actions take related to budget shortfalls for 2015 and challenges for 2016.

Council requested information on the following items:
- Number and cost of temporary employees
- Value of current food tax in the winter

- Overall overtime costs
- Comparison of raising property tax versus sales tax
- Property tax exemption cost and senior exemption cost
- Total cost of community recreation, and also discretionary items
- Savings related to reducing plowing snow only for impassible status, alternating snow plowing and sanding days, closing the library an additional day per week, and putting the animal shelter on a warm status
- Collection of ambulance charges and cost for a third party contract with an incentive on collections
- Charging for internet use at the library
- Airport costs
- Cost of overtime versus the cost of an employee
- Savings from the minimal snow removal needed this past winter
- Ways to increase revenues at animal shelter
- Revenue of Homer Foundation investments, total available for distribution, and who Council has approved additional funding for
- Savings of eliminating code enforcement

Increasing fines for code violations

There was also discussion of holding community meetings to education residents about core services and having them rank their priorities.

COMMENTS OF THE AUDIENCE

Ken Castner, city resident, commented that he didn't hear anything discussed tonight that would have warranted executive session. He appreciates that they had the discussion tonight openly.

Michael Armstrong, non-resident speaking for the Homer News, thanked the Council for considering their letter and holding tonight's discussion in an open meeting.

ADJOURNMENT

There being no further business to come before the Council, Mayor Wythe adjourned the meeting at 4:57 p.m. The next Special Meeting is Monday, June 29, 2015 at 6:00 p.m., Committee of the Whole 5:00 p.m., and Worksession 4:00 p.m. All meetings scheduled to be held in the City Hall Cowles Council Chambers located at 491 E. Pioneer Avenue, Homer, Alaska.

_____

MELISSA JACOBSEN, CMC, DEPUTY CITY CLERK

Approved:_____

Session 15-22 a Special Meeting of the Homer City Council was called to order on June 15, 2015 at 6:00 p.m. by Mayor Mary E. Wythe at the Homer City Hall Cowles Council Chambers located at 491 E. Pioneer Avenue, Homer, Alaska, and opened with the Pledge of Allegiance.

PRESENT: COUNCILMEMBERS: BURGESS, LEWIS, REYNOLDS, ROBERTS

ABSENT: ZAK, VAN DYKE

STAFF: CITY MANAGER KOESTER
DEPUTY CITY CLERK JACOBSEN
ASSISTANT CITY MANAGER LAWRENCE
PUBLIC WORKS DIRECTOR MEYER
HARBORMASTER HAWKINS
FINANCE DIRECTOR LI
IT MANAGER POOLOS

Mayor Wythe declared Councilmembers Van Dyke and Zak as excused. The Council had no objection.

The Council met for a Special Meeting from 4:00 p.m. until 4:57 p.m. to discuss city finances and budget shortfalls for 2015/2016. They met as Committee of the Whole from 5:00 until 5:54 p.m. to discussion Resolution 15-048 regarding the Lillian Walli Road Reconstruction, Paving, and Sewer Improvement Special Assessment District, also Consent Agenda and Regular Meeting Agenda items.

Department Heads may be called upon from time to time to participate via teleconference.

AGENDA APPROVAL

(Addition of items to or removing items from the agenda will be by unanimous consent of the Council. HCC 1.24.040.)

The following changes were made: **CONSENT AGENDA Resolution 15-047(S),** A Resolution of the City Council Of Homer, Alaska Changing the Dates for Payment of Assessments For the Homer Natural Gas Distribution Special Assessment District; **VISITORS** –Alaska Command and US Pacific Fleet to the Council and Public About Exercise Northern Edge 10 Minute Presentation Added; Friends of the Library , Library Western Lot Improvements moved to Commission Reports; **CITY ATTORNEY REPORT** – Written Report Dated June 11, 2015

Mayor Wythe called for a motion to approve the agenda.

LEWIS/ROBERTS SO MOVED TO APPROVE THE AGENDA.

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

PUBLIC COMMENTS UPON MATTERS ALREADY ON THE AGENDA

Ken Castner, city resident, commented on Ordinance 15-21 and with the budget shortfalls and this is a fully financed project. He objects to the ordinance and says stick to the payment plan for now and preserve 90% of this appropriation.

Barb Brodwoski, city resident, she requested that council review the analysis of 12 states and what food items they tax prior to the June 29 council meeting. It is information she provided in January 2014. The analysis shows two common threads of what these states are taxing relative to food and one common thread on what food is not being taxed.

RECONSIDERATION

CONSENT AGENDA

(Items listed below will be enacted by one motion. If separate discussion is desired on an item, that item may be removed from the Consent Agenda and placed on the Regular Meeting Agenda at the request of a Councilmember.)

A. Homer City Council unapproved Special and Regular meeting minutes of May 26, 2015. City Clerk. Recommend adoption.

B. **Memorandum 15-081,** from Mayor, Re: Appointment of Anna Rodriguez Sansom to the Economic Development Advisory Commission and Reappointments of Don Stead and Roberta Highland to the Advisory Planning Commission.

C. **Memorandum 15-082,** from City Clerk, Re: Liquor License Transfer for Beluga Lake Lodge and Best Western Bidarka Inn/Otter Room.

D. **Ordinance 15-19,** An Ordinance of the Homer City Council, Amending Homer City Code Chapter 9.16 to Revise HCC 9.16.040, HCC 9.16.100, and Add HCC 9.16.110 Repealing the Seasonal Sales Tax Exemption as Applied to Certain Categories of Nonprepared Foods, Including But Not Limited to Cakes, Cookies, Ice Cream, Candy, Chips, and Frozen Pizzas. Lewis. Recommended dates: Introduction June 15, 2015, Public Hearing and Second Reading June 29, 2015.

E. **Ordinance 15-20,** An Ordinance of the City Council of Homer, Alaska, Accepting and Appropriating an Alaska Department of Environmental Conservation Municipal Matching Grant in The Amount of $1,922,577 and Authorizing a 30% Matching

Requirement From the Homer Accelerated Water And Sewer Fund (HAWSP) in the Amount of $576,773.10 for the Purpose of Completing the Water Distribution/Storage Improvement Project and Authorizing the City Manager to Execute the Appropriate Documents. City Manager/Public Works Director. Recommended dates: Introduction June 15, 2015, Public Hearing and Second Reading June 29, 2015.

Moved to Ordinances.

F. **Ordinance 15-21,** An Ordinance of the City Council of Homer, Alaska, Amending the FY 2015 Operating Budget by Appropriating $277,335.45 to Pay for Homer Natural Gas Special Assessment District Assessments of 85 City Lots From Various City Reserve Funds. City Manager. Recommended dates: Introduction June 15, 2015, Public Hearing and Second Reading June 29, 2015.

G. **Ordinance 15-22,** An Ordinance of the City Council of Homer, Alaska, Declaring That Lillian Walli Estates Subdivision Lots 57-60, 65-67, and 70 No Longer Need to Be Retained For a Public Purpose as No Public Need Exists For Retaining the Property and Releasing HM0880016 T06S R14W S24 Lillian Walli Estate Sub Lot 60, 65, 66, 67, 70, 57, 58, 59 For Sale Subject to Land Disposal Proceedings Under the Homer City Code. City Manager. Recommended dates: Introduction June 15, 2015, Public Hearing and Second Reading June 29, 2015.

H. **Resolution 15-042,** A Resolution of the City Council of Homer, Alaska, Supporting Salmon Habitat Buffers on Lakes and Streams in the Kenai Peninsula Borough. Lewis. Recommend adoption.

I. **Resolution 15-043,** A Resolution of the City Council of Homer, Alaska, Urging the U.S. Navy to Change Training Exercises in the Gulf of Alaska. Zak/Roberts. Recommend adoption.

Moved to Resolutions.

J. **Resolution 15-044,** A Resolution of the Homer City Council Disbanding the Port and Harbor Building Task Force. Mayor. Recommend adoption.

Memorandum 15-083 from Port and Harbor Building Task Force as backup.

K. **Resolution 15-045,** A Resolution of the City Council of Homer, Alaska, Directing the Administration to Issue a Request for Proposals for Ambulance and Emergency Medical Billing Services. City Manager. Recommend adoption.

Memorandum 15-085 from Finance Director as backup.

L. **Resolution 15-047,** A Resolution of the City Council of Homer, Alaska, Changing Dates for Payment of Assessments for the Homer Natural Gas Special Assessment District. City Manager. Recommend adoption.

Resolution 15-047(S), A Resolution of the City Council of Homer, Alaska, Changing Dates for Payment of Assessments for the Homer Natural Gas Special Assessment District. City Manager. Recommend adoption.

Memorandum 15-084 from City Manager as backup.

Moved to Resolutions.

M. **Resolution 15-048,** A Resolution of the City Council of Homer, Alaska, Noting the Sufficiency of the Petition for the Lillian Walli Fairview Avenue Road Reconstruction and Paving and Sewer Improvements Special Assessment District and Setting the Public Hearing Date for September 14, 2015. City Clerk/Public Works Director. Recommend adoption.

Memorandum 15-086 from Public Works Director as backup.

Moved to Resolutions.

N. **Memorandum 15-087,** from Finance Director, Re: 2016 Proposed Budget Development Schedule.

Item E. Ordinance 15-20 was moved to Ordinance item A. Item L. Resolution 15-047 was moved to Resolutions Item B. – Burgess

Item I. Resolution 15-043 was moved to Resolutions Item. C – Lewis

Item M. Resolution 15-48 was moved to Resolutions Item D. – Roberts
Mayor Wythe called for a motion to approve the consent agenda as amended.

Mayor Wythe called for a motion to adopt the consent agenda as amended.

LEWIS SO MOVED.

There was brief discussion clarifying for an audience member that Resolution 15-043 was moved to Resolutions for further discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

VISITORS

A. Michelle Drew, BDO, Auditor's Report, 10 minutes.

Michelle Drew, partner with BDO, reviewed the 2014 audit report.

B. Robert Letson, South Peninsula Hospital, 10 minutes

Bob Letson, CEO of South Peninsula Hospital, updated the Council on new staffing, expanded systems and services provided by the hospital, community benefits, financial update, and immediate priorities.

C. Alaska Command and US Pacific Fleet, Exercise Northern Edge, 10 minutes

Captain Ray Hesser and Dr. Cynthia LeDoux provided an overview of the Northern Edge 2015 exercise. They also explained and answered Council questions regarding use of sonar, fish hearing, fish mitigation and monitoring, and effects on fish physiology.

ANNOUNCEMENTS/PRESENTATIONS/BOROUGH REPORT/COMMISSION REPORTS

A. Borough Report

B. Commissions/Board Reports:

1. Library Advisory Board
Friends of the Homer Library, Library Western Lot Improvements, 10 minutes

Sue Mauger reviewed a conceptual plan for improvements to the western library lot. She advised they will be having a work party on June 28th to do some upkeep in the area that was recently cleared by the city.

2. Homer Advisory Planning Commission

   a. Minutes of June 3, 2015

3. Economic Development Advisory Commission

4. Parks and Recreation Advisory Commission

Dave Brann, Parks and Recreation Advisory Commissioner, updated the Council about the Commission's long term project on the beach policy upgrade, emphasizing there were a lot of meetings and it was an educational process for all involved. He noted the trails symposium, the water trail birthday, and the Celtic club events happening this weekend.

5. Port and Harbor Advisory Commission

C. Thank You from Kachemak Heritage Land Trust for Grant Award Through The Homer Foundation

Mayor Wythe called for a recess at 7:05 p.m. and resumed the meeting at 7:10 p.m.

PUBLIC HEARING(S)

A. **Ordinance 15-14,** An Ordinance of the City Council of Homer, Alaska, Accepting and Appropriating a Commercial Vessel Passenger Tax Program Grant from the Kenai Peninsula Borough for FY 2014 in the Amount of $13,925.00 and Authorizing the City Manager to Execute the Appropriate Documents. City Manager. Introduction May 26, 2015, Public Hearing and Second Reading June 15, 2015.

Mayor Wythe opened the public hearing.

There were no public comments and the hearing was closed.

Mayor Wythe called for a motion for the adoption of Ordinance 15-14 by reading of title only for second and final reading.

LEWIS/REYNOLDS SO MOVED.

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT.

Motion carried.

B. **Ordinance 15-15,** An Ordinance of the City Council of Homer, Alaska, Purchasing Tax Foreclosure Property, Kenai Peninsula Borough (KPB) Tax Parcel Number 173-052-19 and Designating its Use for Public Purpose and Authorizing the City Manager to Execute the Appropriate Documents. City Manager. Introduction May 26, 2015, Public Hearing and Second Reading June 15, 2015.

Mayor Wythe opened the public hearing.

There were no public comments and the hearing was closed.

Councilmember Burgess requested to be recused because he is a managing member and owner of a corporation that owns property immediately adjacent to this parcel which falls under the ethics guidelines.

Mayor Wythe called for a brief recess at 7:17 p.m. to review the rules of necessity due to time constraints in adoption of this ordinance and the lack of a quorum if Councilmember Burgess is recused. The meeting resumed at 7:19 p.m.

Mayor Wythe advised that after reviewing the rule of necessity requirement, because this is an issue that is time sensitive and it is the last day to act upon it to receive this property she declared Councilmember Burgess would participate based on the rule of necessity.

Mayor Wythe called for a motion for the adoption of Ordinance 15-15 by reading of title only for second and final reading.

LEWIS/REYNOLDS SO MOVED.

Councilmember Burgess noted that if this creates personal or political liability to hold him harmless, he is acting on behalf of the Council at their request. He added if it's going to be the Council's intention to continue to acquire property within the Bridge Creek Watershed we need to take a more macro-cosmic view of property rights as we have largely stripped the people's ability to utilize their personal property in that area. There is a public benefit to doing that, but he doesn't believe in limiting people's ability to use private property while not compensating or addressing it another manner.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

C. **Ordinance 15-16,** An Ordinance of the City Council of Homer, Alaska, Amending Homer City Code 3.05.012, Complete Financial Plan, to Exclude State Revenue Sharing From Income in the City Budget. Mayor. Introduction May 26, 2015, Public Hearing and Second Reading June 15, 2015.

Mayor Wythe opened the public hearing.

There were no public comments and the hearing was closed.

Mayor Wythe called for a motion for the adoption of Ordinance 15-16 by reading of title only for second and final reading.

LEWIS/REYNOLDS SO MOVED.

Mayor Wythe explained the reason for bringing this forward is so the city isn't bound to the funds to balance the city's budget, particularly now with the state's budget concerns.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

D. **Ordinance 15-17,** An Ordinance of the City Council of Homer, Alaska, Amending Ordinance 13-03(S)(2) to Permit the City to Prepay Principal of the Natural Gas Distribution Special Assessment Bond Authorized by Ordinance 13-02(S)(2), and Authorizing an Amendment to the Loan Agreement Between the City and the Kenai Peninsula Borough Regarding the Bond. City Manager. Introduction May 26, 2015, Public Hearing and Second Reading June 15, 2015.

Ordinance 15-17(S), An Ordinance of the City Council of Homer, Alaska, Amending Ordinance 13-03(S)(2) to Permit the City to Prepay Principal of the Natural Gas Distribution Special Assessment Bond Authorized by Ordinance 13-02(S)(2), and Authorizing an Amendment to the Loan Agreement Between the City and the Kenai Peninsula Borough Regarding the Bond. City Manager.

Mayor Wythe recused herself from discussion due to her standing conflict of interest with gas line related subjects and passed the gavel to Mayor Pro Tempore Roberts.

Mayor Pro-Tempore Roberts opened the public hearing.

There were no public comments and the hearing was closed.

Mayor Pro- Tempore Roberts called for a motion to substitute Ordinance 15-17(S) for Ordinance 15-17.

LEWIS/REYNOLDS SO MOVED.

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

Mayor Pro- Tempore Roberts called for a motion for the adoption of Ordinance 15-17(S) by reading of title only for second and final reading.

LEWIS/REYNOLDS SO MOVED.

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

Mayor Wythe returned and assumed the gavel.

ORDINANCE(S)

A. **Ordinance 15-20,** An Ordinance of the City Council of Homer, Alaska, Accepting and Appropriating an Alaska Department of Environmental Conservation Municipal Matching Grant in The Amount of $1,922,577 and Authorizing a 30% Matching Requirement From the Homer Accelerated Water And Sewer Fund (HAWSP) in the Amount of $576,773.10 for the Purpose of Completing the Water Distribution/Storage Improvement Project and Authorizing the City Manager to Execute the Appropriate Documents. City Manager/Public Works Director. Recommended dates: Introduction June 15, 2015, Public Hearing and Second Reading June 29, 2015

Mayor Wythe called for a motion for the introduction of Ordinance 15-20.

LEWIS/ROBERTS SO MOVED.

Councilmember Burgess said he has an interest in a property adjacent to this one and a property that would be served by water and sewer as part of this project.

After conferring with staff on the timeframe for action, it was the consensus of the Council to move this to the June 29th agenda for introduction due to a lack of quorum based on Councilmember Burgess's conflict.

CITY MANAGER'S REPORT

A. City Manager's Report

B. Bid Report

City Manager Koester noted that she included information in her report about Bridge Creek Watershed Protection District lots that are for sale and ways to purchase them. She requested direction from the Council if they want her to precede the process.

City Manager Koester introduced Patrick Lawrence, Assistant City Manager and welcomed him to the Homer team. She also reported that Fire Chief Painter earned the distinction of being a certified emergency manager from the International Association of Emergency Managers.

She noted a letter of non-objection to Bunnell Street Gallery to do street painting a visual reminder of Woodard Creek on Pioneer Avenue through their Artist in Residence program, along with four other city roads showing where Woodard Creek would be flowing. Also Lake Street has been included in the latest STIP amendment and is on schedule for some design funding, and lastly there is a burn ban in effect.

CITY ATTORNEY REPORT

COMMITTEE REPORT

A. Public Arts Committee

B. Permanent Fund Committee

C. Employee Committee Report

D. Port and Harbor Building Task Force

E. Public Safety Building Review Committee

F. Vessel Haul-Out Task Force

PENDING BUSINESS

NEW BUSINESS

RESOLUTIONS

A. **Resolution 15-046,** A Resolution of the Homer City Council Accepting the 2014 Comprehensive Annual Financial Report with Audit and Financial Statements and Acknowledging the Management Letter Submitted by the City's Independent Auditor, BDO, USA, LLP and Authorizing the City Manager to Execute the Financial Report. City Manager/Finance Director.

Mayor Wythe called for a motion for the adoption of Resolution 15-046 by reading of title only.

ROBERTS/REYNOLDS SO MOVED.

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

B. **Resolution 15-047,** A Resolution of the City Council of Homer, Alaska, Changing Dates for Payment of Assessments for the Homer Natural Gas Special Assessment District. City Manager. Recommend adoption.

Resolution 15-047(S), A Resolution of the City Council of Homer, Alaska, Changing Dates for Payment of Assessments for the Homer Natural Gas Special Assessment District. City Manager. Recommend adoption.

Mayor Wythe recused herself from discussion due to her standing conflict of interest with gas line related subjects and passed the gavel to Mayor Pro Tempore Roberts.

Mayor Pro-Tempore Roberts called for a motion for the adoption of 15-047 by reading of title only.

BURGESS/REYNOLDS SO MOVED

Mayor Pro-Tempore Roberts called for a motion for the substitution of Resolution 15-047(S).

LEWIS/REYNOLDS SO MOVED.

There was no discussion regarding the substitution.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

BURGESS/LEWIS MOVED TO AMEND LINE 35 OF THE SUBSTITUTE TO CHANGE 15% TO 10.5% BOTH THE WRITTEN WORD AND ACTUAL NUMBER.

Councilmember Burgess commented that penalty and interest rates are of the capped for non-interest entities at 10.5% and it could be considered usurious to charge more interest. We are not in the category of an entity that is engaged in business like a credit card company.

City Manager Koester commented she thought the council's intent was to encourage payment as she explained in her back up memo. It's her hope very few people are put in the penalty situation.

VOTE: (Amendment) NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

VOTE: (Main motion as amended) NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

Mayor Wythe returned to the table and resumed the gavel.

C. **Resolution 15-043,** A Resolution of the City Council of Homer, Alaska, Urging the U.S. Navy to Change Training Exercises in the Gulf of Alaska. Zak/Roberts. Recommend adoption.

Mayor Wythe called for a motion for the adoption of Resolution 15-043 by reading of title only.

ROBERTS/REYNOLDS SO MOVED.

ROBERTS/LEWIS MOVED TO POSTPONE RESOLUTION 15-043 TO THE NEXT REGULAR MEETING OF THE CITY COUNCIL OF HOMER.

Councilmember Roberts explained she wants to postpone because a large number of people arrived after the comment period because of the earlier presentation by the Navy. The other reason is because we aren't a full council and it would be beneficial to have the other members here to weigh in on the issue.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

C. **Resolution 15-048,** A Resolution of the City Council of Homer, Alaska, Noting the Sufficiency of the Petition for the Lillian Walli Fairview Avenue Road Reconstruction and Paving and Sewer Improvements Special Assessment District and Setting the Public Hearing Date for September 14, 2015. City Clerk/Public Works Director. Recommend adoption.
Memorandum 15-086 from Public Works Director as backup.

Mayor Wythe called for a motion for the adoption of Resolution 15-048 by reading of title only.

BURGESS/ROBERTS SO MOVED

Councilmember Roberts feels that what was mailed out to property owners misrepresents what the city is going to do and she wonders how to resolve it.

Public Works Director Meyer commented that there are more steps in the process before finalizing the district where property owners could object to creation of the district if they don't want to continue to move forward. He said it would also be an option to take time to circulate a second petition to clarify the intent of payment for the project.

Councilmember Lewis asked if the City Attorney could weigh in on the best way to proceed with this. City Manager Koester said she will put it to the attorney.

Councilmember Burgess noted this resolution only sets the public hearing for the improvement district and property owners would have the opportunity to object to how this is formed.

ROBERTS/LEWIS MOVED TO POSTPONE TO THE NEXT MEETING.

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

COMMENTS OF THE AUDIENCE

Jamie Ross said he's lived in Homer over 25 years and commercial fished throughout the state for 35 years. He objected to the postponement of vote on Resolution 15-048. He's rarely here this time of year and there will like be no commercial fishermen at the next meeting. It's also his understanding the exercises may be done by the next meeting. This has an impact on the commercial fishing industry.

Craig Matkin, city resident, commented about the Navy exercises. Regarding the sonar and marine mammals, it's one of those things that have been fairly clearly demonstrated to cause injury and death in the case of beached whales as seen in the Bahamas, and we do have a substantial beached whale issue in the Gulf of Alaska which hasn't been thoroughly surveyed. He is concerned with the sonar aspect in particular. He cited some examples of studies of impacts on marine mammals.

Amy Christiansen, city resident, commented in opposition to the Navy playing war games anywhere near the fish and marine mammals that live in the ocean near Homer. She urged the city to join Kodiak and Cordova as a coastal community who is very much opposed to this and feels the Navy can practice their war games in a different season and farther away.

David Grimes, Cordova resident, commented that we are blessed to have an abundant ocean. The reason Kodiak and Cordova have rejected the Navy war games in the Gulf of Alaska is because we have been through the Exxon oil spill and are used to not trusting government and industry when they tell us not to worry, that no harm will come to our precious ecosystems and costal economies. We are aware of the Navies history of pollution and that active sonar has been implicated in marine mammal stranding around the world. He also commented about court's ruling against Navy plans to conduct war games in Puget Sound, Hawaii, and California waters. We don't know what long term effects on the fish will be.

Bob Shavelson, Executive Director of Cook Inletkeeper, said he understands the importance of training and readiness. He emphasized the danger to fish populations and a noted all the resolution is asking is to move the location and timing. This is the time of year when the

densest populations of fish and marine mammals are in this area and the sonobuoys are going to be directly along the path of our sockeye and king salmon traverse coming up the gulf. He cited a federal court ruling that the Navy violated the Federal Marine Mammal Protection Act during similar training activities in Hawaii and Southern California; and said they refused a recommendation to do a fish mortality study. This area supports billions and billions of dollars of economic activity in our state every year. He supports the recommendation to do it in a different location at a different time of year.

Sue Christiansen commented about the Navy games. She is mostly concerned about the big picture of ocean acidification and that the US military is the biggest contributors to climate change with wars and those kinds of things. She appreciates they aren't going to do all the things they are authorized to do, but is concerned there are no third party observers. She agrees it should be done at a different location at a different time.

Lisa Fellows, commercial fisherman, expressed concern about fish mortality studies and that just this year in Kodiak there was an unexplained three to four year age class of herring missing. It goes back to 2011, and she doesn't know if there is a connection but it's interesting since herring are affected by the sound. She explained the intercept fisheries and that this is bad timing for the fisheries, the location and time are really potentially adverse to our fishery. Most of the fishermen are already out, so you aren't going to hear from them. She understands they need to do training, but she questions the timing and location of it.

Gordy Vernon said in talking to the people from the Navy they said you have to show them where it's bad science. But there is a bigger reason called bad economics. The rub is that it's for defense. He thinks the City of Homer needs to lead the country and say no, this isn't the way to treat people. These war games are nothing but practicing death and destruction.

Tom Zitzmann, city resident, commented regarding the auditor's report. He is a CPA who has worked in the audit field. He found the discussion of material findings alarming. In the prior year there was a significant deficiency in the financial reporting that was elevated to a material weakness. This year there were two material weaknesses. The issue is the external financial records may not be materially correct. It's a huge issue. The second issue was with grant reporting and a $1.8 million error which is huge. The comments from the finance department were that they were in process or completed. He asked council to keep their eye on the ball and make sure this issue is being addressed and it seemed like it was downplayed tonight. It isn't acceptable.

Councilmember Burgess noted that the Council did address this in more depth at the Committee of the Whole meeting earlier. He briefly explained that the grant reporting error was that from an accrual standpoint the income was booked in a following year, not the current year. The city's books are materially accurate; it's an instance of year-end adjustments and accrual basis entries.

Shelley Gill commented she has worked as a marine mammal researcher with Eye of the Whale for the last 17years studying humpback whales. She was struck when listening to the presentation at Islands and Ocean, by the shadowing of this entire procedure. She thinks the Navy needs to be more forthcoming in what they will be doing in the Gulf of Alaska. All the information sent to council came from the Navy's EIS, there have been many changes since past exercises. The exercises will detonate high explosive charges in surface waters of the gulf. The EIS states that of the 1600 five inch gun shells to be fired, 45 will be live high explosive charges fused to detonate with three feet of the water's surface. The acoustical impact is comparable that of a 500 pound bomb. They have been thrown out of Puerto Rico, Hawaii, and California. She referenced precedence from a mass stranding in the Bahamas where biologists were able to get one animals head cut off and in the freezer and send to necropsy.

Rita Turner, city resident, thanked all the people in marine research that are concerned, and thanked the council for putting this on the agenda to make a statement. The exercises need to be held someplace else. The audience is more informed than the people representing the governments. She encouraged the Council to support them not being in our waters this time of year.

COMMENTS OF THE CITY ATTORNEY

City Attorney Klinkner was absent.

COMMENTS OF THE CITY CLERK

Deputy City Clerk Jacobsen had no comment.

COMMENTS OF THE CITY MANAGER

City Manager Koester had no comment.

COMMENTS OF THE MAYOR

Mayor Wythe said she feels like some of the issues that have come up in the audit in the last few years are found because of fresh eyes looking at our financials. We have a new director for our finance department so there are things that will come forward because new people will see it from a different perspective. She appreciates everyone who came to speak to them, she understands the environmental sensitivity and feelings people have, but for the benefit of our military, she wanted to clearly state that we respect and honor that they are willing to put their lives on the line so we can complain about the way they do their testing.

COMMENTS OF THE CITY COUNCIL

Councilmember Lewis commented that he personally doesn't think it is the city's job to interfere with joint training exercises. He would like to see the training postponed, but he doesn't think they can do it on such short notice. Also doing it later in the year in the fall and winter months, the water in the gulf is a lot rougher and he would not want to put anyone's lives more in danger. He is concerned about the marine mammals, not just with what the Navy does, but also what some people do out on the water. There were about 15 sea lions washed ashore near Craig about a week ago that appear to have been killed by man. Fishermen will use seal bombs to scare seals and sea lions away from their nets, how does that effect hearing, and who knows what the draggers are doing to the bottom. None of us are perfect when we are out on the water.

Councilmember Burgess commented regarding the audit. It's important that the City of Homer maintain accurate reconcilable books and that we follow up to correct the deficiencies. He wants to ensure the public that everything does reconcile out. He explained the two deficiencies, one had to do with how we track grant money, and specifically we didn't put accrual based income in the same year in which the expense occurred, that's because we hadn't received it from a cash flow basis by the end of that fiscal year which created an issue. The second was end of year entries that should have been done for reconciliation issues for several accounts weren't actually performed. It wasn't an issue of fraud or money disappearing, the money was tracked, it just wasn't adjusted the way it should have been. It's definitely something we need to follow up on. He commented about fire safety and asked that people be responsible, one of the worst things you could ever do is allow a fun weekend, drinking, or carelessness with yourself, kids, family, or vehicles to lead to something that threatens peoples life and property. Forest fires are freaky, it's a big deal. Drink water out there, be safe, put your campfires out or just don't make any fires at all. He also offered up the correct process for a two way stop. If you are at an intersection where two roads cross and there is a stop sign on two of those roads, like Main Street and the Sterling Highway, the people who are stopping, the rules are right turn has premise, straight next, then turning left. It doesn't matter who arrives at the intersection first. He noted two accidents, one which was fatal that were the result of people not knowing this rule. Lastly he thanked the public for thoughtful comments this evening. It's helpful for him when comments are measured, factual, calm, and compassionate. If you come up and use an emotional appeal or misinformation to try to discredit someone even if you think they are a bad person or don't agree with, he thinks science and good reasonable discourse certainly helps him make a more informed decision. He appreciated most people having that tone tonight.

Councilmember Reynolds thanked Beau for the stop sign information; it goes along with the whole share the roads message. She congratulated Patrick and welcomed him to the City. She added the other part of why they delayed the resolution about the Navy training is that the time to comment had passed before most of the audience arrived and we want to hear those comments, as well as being short two councilmembers.

Councilmember Roberts thanked Tom Zitzman for his comments about the audit. In her time on the council, very few citizens have paid attention to this and it was nice to hear input from

someone who read through the information. She echoed Beau in reassuring they aren't ignoring what is happening. She commented that postponing the Lillian Walli improvement was probably the best thing to see how to move forward given the situation we have at hand. She thanked Councilmember Lewis for bringing the salmon habitat buffer ordinance forward, even though it might have something to do with other entities. She likes Beau's yearly stop sign reminders. He's given a couple traffic information reminders over his time on the Council, its good he does those reminders. She thanked everyone coming out about the Navy exercises tonight, and lastly she welcomed Patrick.

ADJOURNMENT

There being no further business to come before the Council, Mayor Wythe adjourned the meeting at 8:27 p.m. The next Special Meeting is Monday, June 29, 2015 at 6:00 p.m., Committee of the Whole 5:00 p.m., and Worksession 4:00 p.m. All meetings scheduled to be held in the City Hall Cowles Council Chambers located at 491 E. Pioneer Avenue, Homer, Alaska.

_____
MELISSA JACOBSEN, CMC, DEPUTY CITY CLERK

Approved:_____

City of Homer
www.cityofhomer-ak.gov

Office of the City Clerk
491 East Pioneer Avenue
Homer, Alaska 99603
clerk@cityofhomer-ak.gov
(p) 907-235-3130
(f) 907-235-3143

Memorandum 15-101

TO: MAYOR WYTHE AND HOMER CITY COUNCIL

FROM: MELISSA JACOBSEN, CMC, DEPUTY CITY CLERK

DATE: JUNE 24, 2015

SUBJECT: LIQUOR LICENSE TRANSFER AND APPLICATION FOR BEST WESTERN BIDARKA INN/OTTER ROOM

We have been notified by the ABC Board of an application for liquor license transfer and application in the City of Homer for the following:

Type:	Beverage Dispensary - Tourism
Lic #:	1402
DBA Name:	Best Western Bidarka Inn/Otter Room
Service Location:	575 Sterling Hwy, Homer, AK
Owner:	Johnson Inn Homer, LLC
Mailing Address:	575 Sterling Hwy, Homer, AK 99603

RECOMMENDATION: Voice non objection and approval for the liquor license renewals.

Fiscal Note: Revenues.

Alcoholic Beverage Control Board
2400 Viking Drive
Anchorage, AK 99501

Transfer Liquor License

(907) 269-0350
Fax: (907) 334-2285
http://commerce.alaska.gov/dnn/abc/Home.aspx

License is: ☒ Full Year OR ☐ Seasonal List Dates of Operation: _____

SECTION A - LICENSE INFORMATION

FEES

License Year: 2015 - 2016
License #: 1402

License Type: Beverage Dispensary - Tourism

Statute Reference Sec. 04.11.400(d)

Filing Fee: $100.00

Rest. Desig. Permit Fee: *($50.00)* $ 50.00

Fingerprint: $ *($49.75 per person)*

TOTAL 150.00

Local Governing Body: (City, Borough or Unorganized)
Homer - city

Community Council Name(s) & Mailing Address:

Name of Applicant (Corp/LLC/LP/LLP/Individual/Partnership):
Johnson Inn Homer LLC

Doing Business As (Business Name):
Best Western Bidarka Inn/otter Room

Business Telephone Number: 907-235-8148
Fax Number: 907-235-8140

Mailing Address: 575 Sterling Hwy
City, State, Zip: Homer, AK. 99603

Street Address or Location of Premises: 575 Sterling Hwy Homer, AK. 99603

Email Address: dj_bidarkainn@hotmail.com

Is any shareholder related to the current owner? ☒ Yes ☐ No
If "yes" please state the relationship Self

SECTION B - TRANSFER INFORMATION

☒ Regular Transfer

☐ Transfer with security interest: Any instrument executed under AS 04.11.670 for purposes of applying AS 04.11.360(4)(b) in a later involuntary transfer, must be filed with this Application. Real or personal property conveyed with this transfer must be described. Provide security interest documents.

☐ Involuntary Transfer. Attach documents which evidence default under AS 04.11.670.

Name and Mailing Address of *CURRENT* Licensee: ~~Beluga Lake Lodge Inc~~
575 Sterling Hwy Homer, AK 99603

Business Name (dba) *BEFORE* transfer:
Best Western Bidarka Inn

Street Address or Location *BEFORE* transfer:
575 Sterling Hwy. Homer AK 99603

SECTION C - PREMISES TO BE LICENSED

Distance to closest school grounds: 308 Feet
Distance measured under: ☐ AS 04.11.410 *OR* ☐ Local ordinance No. ____

Distance to closest church: 0.2 miles
Distance measured under: ☐ AS 04.11.410 *OR* ☐ Local ordinance No. ____

☐ Premises is GREATER than 50 miles from the boundaries of an incorporated city, borough, or unified municipality.
☐ Premises is LESS than 50 miles from the boundaries of an incorporated city, borough, or unified municipality.
☒ Not applicable

Premises to be licensed is:
☐ Proposed building
☒ Existing facility
☐ New building

☐ Plans submitted to Fire Marshall (required for new & proposed buildings)
☐ Diagram of premises attached

Alcoholic Beverage Control Board
2400 Viking Drive
Anchorage, AK 99501

Transfer Liquor License

(907) 269-0350
Fax: (907) 334-2285
http://commerce.alaska.gov/dnn/abc

SECTION D – LICENSEE INFORMATION

1. Does any individual, corporate officer, director, limited liability organization member, manager or partner named in this application have any direct or indirect interest in any other alcoholic beverage business licensed in Alaska or any other state?

☒ Yes ☐ No If **Yes**, complete the following. Attach additional sheets if necessary.

Name	Name of Business	Type of License	Business Street Address	State
Douglas Johnson	Chart Room	Ber. Disp. - Tourism	236 Rezanof W. Kodiak	AK

2. Has any individual, corporate officer, director, limited liability organization member, manager or partner named in this application been convicted of a felony, a violation of AS 04, or been convicted as a licensee or manager of licensed premises in another state of the liquor laws of that state?

☐ Yes ☒ No If **Yes**, attach written explanation.

SECTION E – OWNERSHIP INFORMATION - CORPORATION

Corporations, LLCs, LLPs and LPs must be registered with the Dept. of Community and Economic Development.

Name of Entity (Corporation/LLC/LLP/LP) (or N/A if an Individual ownership):		Telephone Number:	Fax Number:
Johnson Inn - Homer LLC		907-235-8148	907-235-8140
Corporate Mailing Address: 575 Sterling Hwy	City: Homer	State: AK	Zip Code: 99603
Name, Mailing Address and Telephone Number of Registered Agent: 235-8148 Douglas Johnson 575 Sterling Hwy Homer, AK 99603		Date of Incorporation OR Certification with DCED: 11/10/2014	State of Incorporation: AK

Is the Entity in "Good Standing" with the Alaska Division of Corporations? ☒ Yes ☐ No

If no, attach written explanation. Your entity ***must*** be in compliance with Title 10 of the Alaska Statutes to be a valid liquor licensee.

Entity Members (Must include President, Secretary, Treasurer, Vice-President, Manager and Shareholder/Member with at least 10%)

Name	Title	%	Home Address & Telephone Number	Work Telephone Number	Date of Birth
Douglas Johnson	Member	50	907-299-1443 Homer AK 575 Sterling Hwy 99603	907-235-8148	4/26/73
Jacky Johnson	Member	50	575 Sterling Hwy Homer AK 99603	235-8148	1/5/75

Alcoholic Beverage Control Board
550 West 7th Ave. Suite 1600
Anchorage, AK 99501

Transfer Liquor License

(907) 269-0350
Fax: (907) 334-2285
http://commerce.alaska.gov/dnn/abc/Home.aspx

NOTE: If you need additional space, please attach a separate sheet.

SECTION F – OWNERSHIP INFORMATION – SOLE PROPRIETORSHIP (INDIVIDUAL OWNER & SPOUSE)

Individual Licensees/Affiliates (The ABC Board defines an "Affiliate" as the spouse or significant other of a licensee. Each Affiliate must be listed.)

Name: Douglas Johnson Address: 575 Sterling Hwy Homer, AK 99603 Home Phone: 299-1413 Work Phone: 235-8148	Applicant ☒ Affiliate ☐ Date of Birth: 4/26/73	Name: Address: Home Phone: Work Phone:	Applicant ☐ Affiliate ☐ Date of Birth:
Name: Jacky Johnson Address: 575 Sterling Hwy Homer, AK 99603 Home Phone: Work Phone: 235-8148	Applicant ☒ Affiliate ☐ Date of Birth: 1/5/75	Name: Address: Home Phone: Work Phone:	Applicant ☐ Affiliate ☐ Date of Birth:

Declaration

- I declare under penalty of perjury that I have examined this application, including the accompanying schedules and statements, and to the best of my knowledge and belief it is true, correct and complete, and this application is not in violation of any security interest or other contracted obligations.
- I hereby certify that there have been no changes in officers or stockholders that have not been reported to the Alcoholic Beverage Control Board. The undersigned certifies on behalf of the organized entity, it is understood that a misrepresentation of fact is cause for rejection of this application or revocation of any license issued.
- I further certify that I have read and am familiar with Title 4 of the Alaska statutes and its regulations, and that in accordance with AS 04.11.450, no person other than the licensee(s) has any direct or indirect financial interest in the licensed business.
- I agree to provide all information required by the Alcoholic Beverage Control Board in support of this application.

Signature of Current Licensee(s)	Signature of Transferee(s)
Signature: John R Johnson	Signature: Douglas Johnson
Signature	Signature
Name & Title (Please Print): John R Johnson - President	Name & Title (Please Print): Douglas J Johnson member
Subscribed and sworn to before me this 19th day of May, 2015	Subscribed and sworn to before me this 21 day of May, 2015.
Notary Public in and for the State of Alaska	Notary Public in and for the State of Alaska: Brandon M. Grochow
My commission expires: 2/19/19	My commission expires: 8-10-2018

STATE OF ALASKA NOTARY PUBLIC MARK D. LONHEIM

NOTARY PUBLIC
BRANDON M GROCHOW
STATE OF ALASKA

Alcoholic Beverage Control Board
2400 Viking Drive
Anchorage, AK 99501

Transfer Liquor License

(907) 269-0350
Fax: (907) 334-2285
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NOTE: If you need additional space, please attach a separate sheet.

SECTION F – OWNERSHIP INFORMATION – SOLE PROPRIETORSHIP (INDIVIDUAL OWNER & SPOUSE)

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Name: Douglas Johnson Address: 575 Sterling Hwy Homer, AK 99603 Home Phone: 299-1413 Work Phone: 235-8148	Applicant ☒ Affiliate ☐ Date of Birth: 4/26/73	Name: Address: Home Phone: Work Phone:	Applicant ☐ Affiliate ☐ Date of Birth:
Name: Jacky Johnson Address: 575 Sterling Hwy Homer AK 99603 Home Phone: 235-4747 Work Phone: 235-8148	Applicant ☒ Affiliate ☐ Date of Birth: 1/5/75	Name: Address: Home Phone: Work Phone:	Applicant ☐ Affiliate ☐ Date of Birth:

Declaration

- I declare under penalty of perjury that I have examined this application, including the accompanying schedules and statements, and to the best of my knowledge and belief it is true, correct and complete, and this application is not in violation of any security interest or other contracted obligations.
- I hereby certify that there have been no changes in officers or stockholders that have not been reported to the Alcoholic Beverage Control Board. The undersigned certifies on behalf of the organized entity, it is understood that a misrepresentation of fact is cause for rejection of this application or revocation of any license issued.
- I further certify that I have read and am familiar with Title 4 of the Alaska statutes and its regulations, and that in accordance with AS 04.11.450, no person other than the licensee(s) has any direct or indirect financial interest in the licensed business.
- I agree to provide all information required by the Alcoholic Beverage Control Board in support of this application.

Signature of Current Licensee(s)	Signature of Transferee(s)
Signature: [signature]	Signature: [signature]
Signature:	Signature:
Name & Title (Please Print): Douglas L Johnson V. President	Name & Title (Please Print): Douglas L Johnson Member
Subscribed and sworn to before me this: 26 day of February, 2015.	Subscribed and sworn to before me this: 26 day of February, 2015.
Notary Public in and for the State of Alaska: [signature]	Notary Public in and for the State of Alaska: [signature]
My commission expires: May 1, 2017	My commission expires: May 1, 2017

DAVID C. FERRIERA ★ NOTARY PUBLIC ★ MY COMMISSION EXPIRES MAY 1, 2017 ★ STATE OF ALASKA

DAVID C. FERRIERA ★ NOTARY PUBLIC ★ MY COMMISSION EXPIRES MAY 1, 2017 ★ STATE OF ALASKA

STATE OF ALASKA
ALCOHOLIC BEVERAGE CONTROL BOARD
APPLICATION FOR RESTAURANT DESIGNATION PERMIT
AS 04.16.049 & 3 AAC 304.715 – 794

The granting of this permit allows access of persons under 21 years of age to designated licensed premises for purposes of dining, and persons between the ages of 16 – 20 for employment. If for employment, please indicate in detail what the employment duties will be in question #3.

License Number: 1402 **Type:** Beverage Dispensary - Tourism

This application is for designation of premises where: (Please check the appropriate items below)

1. X Bona fide restaurant pursuant to 3 AAC 304.305 & 3 AAC 304.715-794.
2. X Persons 16 – 20 years of age may dine unaccompanied.
3. X Persons under 16 may dine accompanied by a person 21 years of age or older.
4. X Persons between 16 – 20 years of age may be employed. *(See note below)

Licensee's Name: Johnson Inn Homer LLC

Name of Business: Best Western Bidarka Inn / Otter Room

Business Address: 575 Sterling Hwy City: Homer

1. Hours of operation 12pm to 12 AM Telephone Number: 907-235-8148

2. Have police been called to your premises for any reason? [X] Yes [ ] No
(If you answered yes, please explain below). disturbance

3. * Duties of employment: clean bathrooms, Vacuum, Mop floors before it opens

4. Are video games available to the public on your premises? [X] Yes [ ] No

5. Do you provide live entertainment, such as live music, pool tables, karaoke, dancing, sports or pin-ball?
[X] Yes [ ] No

6. How is food served? [X] Table Service [ ] Buffett Service [ ] Counter Service [ ] Other _____

7. Is an owner, manager or supervisor 21 years of age or older always present during business hours? [X] Yes [ ] No

***** A MENU AND DETAILED PREMISES DIAGRAM MUST ACCOMPANY THIS APPLICATION *****

***Employees 16 and 17 years of age must have a valid work permit and a letter maintained in your files from a parent or guardian authorizing employment at your establishment.**

****Please attach additional sheets of paper if more space is needed to describe food service, entertainment, etc.**

Licensee Signature

Subscribed and sworn to before me this 7 day of May 2015

Notary Public in and for Alaska

My Commission expires; May 1, 2017

Local Governing Body Approval

Date

Director, ABC Board

Date

DAVID C. FERRIERA NOTARY PUBLIC MY COMMISSION EXPIRES MAY 1, 2017 STATE OF ALASKA

Rev. 03172014

#1402

STATE OF ALASKA
ALCOHOL BEVERAGE CONTROL BOARD
Licensed Premises Diagram

INSTRUCTIONS: Draw a detailed floor plan of your present or proposed licensed premises on the graph below; show all entrances and exits, and all fixtures such as tables, booths, games, counters, bars, coolers, stages, etc.

DBA: Best Western Bidarka Inn / Otter Room

PREMISES LOCATION: Otter Room 575 Sterling Hwy Homer, AK 9960

Indicate scale by x after appropriate statement or show length and width of premises.

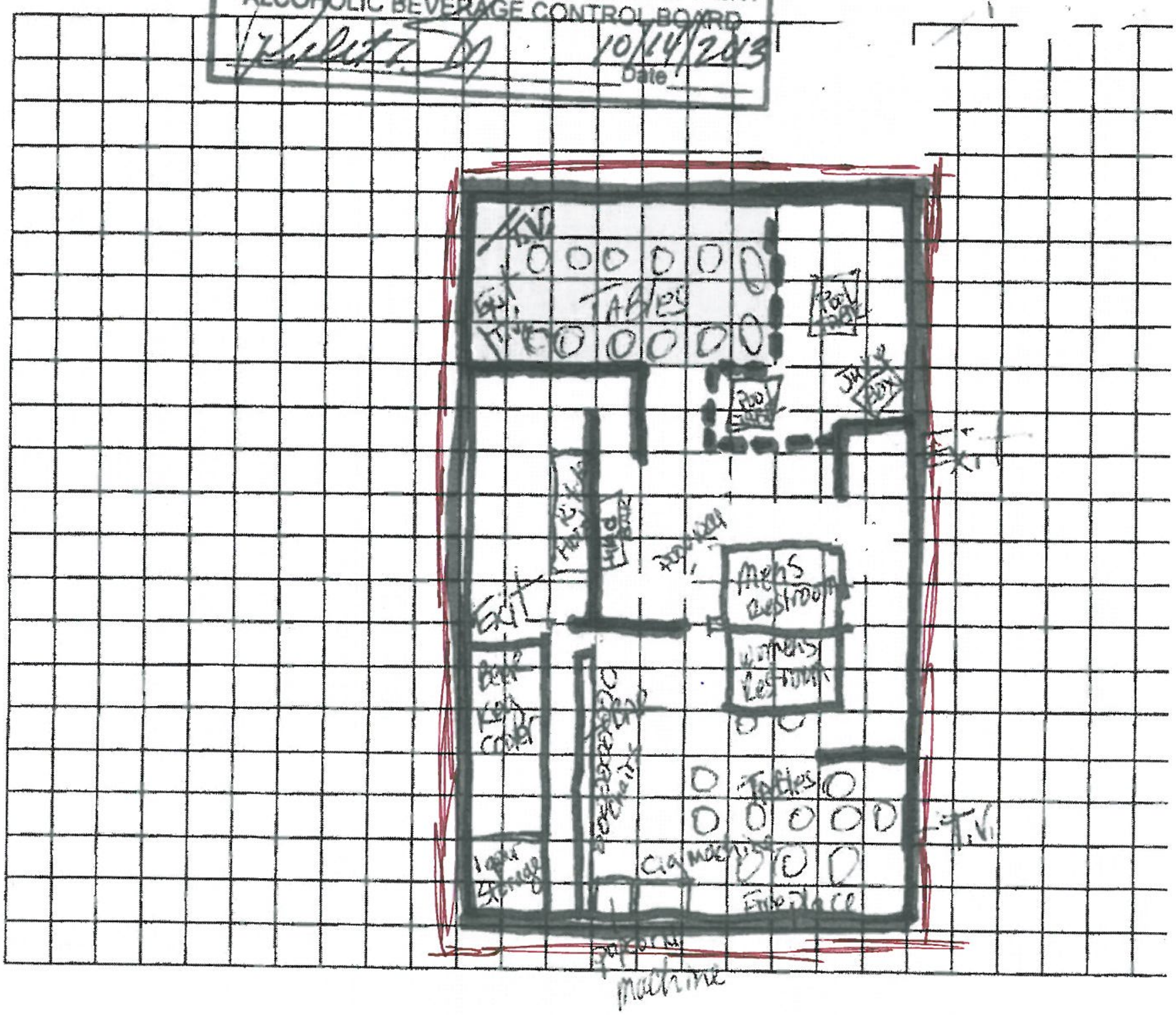
SCALE A: X 1 SQ. = 4 FT. **SCALE B:** ______ 1 SQ. = 1 FT.

Length and width of premises in feet: → No access to play pool tables by 16-20 year olds

Outline the area to be designated for sale, service, storage, or consumption of alcoholic beverages in *red*.

DO NOT USE BLUE INK OR PENCIL ON THIS FORM.

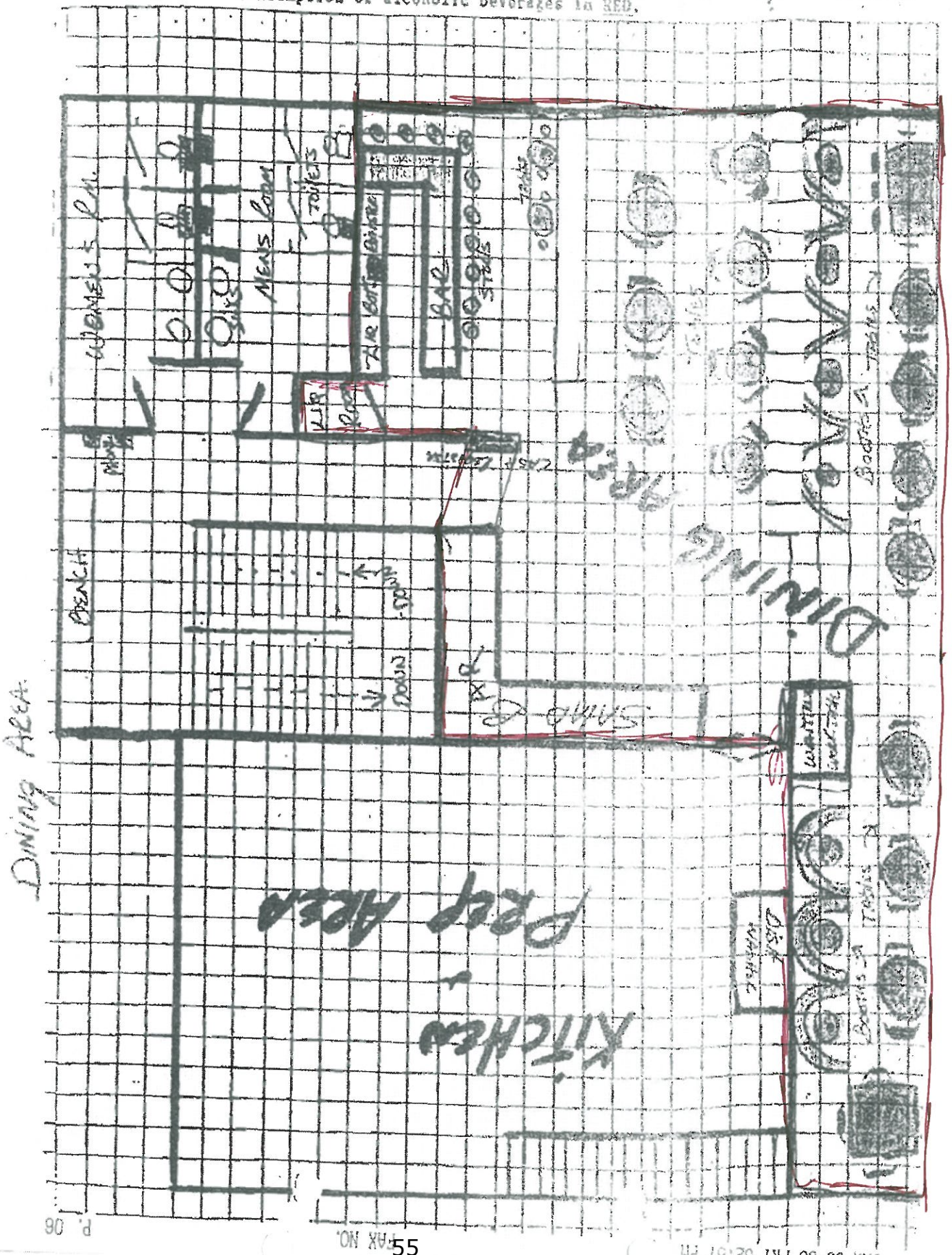
APPROVED DIAGRAM
STATE OF ALASKA, DEPT. OF COMMERCE
COMMUNITY AND ECONOMIC DEVELOPMENT
ALCOHOLIC BEVERAGE CONTROL BOARD
Date 10/14/2013



Revised 6/16/06

Best Western Bidarka Non-Smoking

Outline the area to be designated for sale, service and consumption of consumption of alcoholic beverages in RED.



The Otter Room Grill

Open 7 Days a Week. 4pm-10pm. Dine In or Carry Out. **(907)235-6114** *Like us on Facebook.*

Appetizers

Chili Cheese Fries or Tots.....$ 9
With Red Chili, Cheddar-Jack and Chopped Onion.

Chili Cheese Dog.....$ 5

Pub Fries or Tots.....$ 6

Mozzarella Sticks.....$ 8

Fried Pickles.....$ 5

Chips and Salsa.....$ 5

Chicken Wings.....5 for $8 10 for $15
Mild or Hot Buffalo, Teriyaki, BBQ or Raspberry Hot.

Jalapeno Poppers.....$ 8

Breaded Calamari.....$13

O-Rings.....$ 9

Shrooms.....$ 8

Clam Strips.....$ 6

Baskets

Baskets are served with Fries or Tots.

Shrimp Basket...$13

Halibut Fish and Chips...$22

Chicken Strip Basket.....$12

Mexican

Substitute Halibut or Prime Rib, Just $3 more.

Tacos*.....$9.
Hard or Soft, Beef or Chicken.
Served with Chips and Salsa.

Nachos*.....$8small/$15large
Choose Beef or Chicken,
Served with Salsa and Sour Cream.

Quesadilla*.....$12
Choose Chicken or Beef,
Served with Salsa and Sour Cream.

Soup and Salad

Soup of the Day .....Cup$4 Bowl $6

Garden Salad $4
Greens, Tomato, Cucumber, Onion, Cheese and Croutons.

Taco Salad*.....$14
Crispy Tortilla Shell, Lettuce, Tomato, Cheese, Jalapenos,
Onion and Your Choice of Beef, Chicken.

House Red Chili.....Cup$4 Bowl $6

Soup and Salad..... $7.50
Freshly Prepared Soup and Garden Salad.

Grilled Chicken Salad.....$13
Grilled Chicken, Tomato, Cucumber, Cheddar,
Red Onion, Croutons and Your Choice of Dressing.

Dressings and Dipping Sauces $.75
Ranch, Bleu Cheese, 1000 Island, Catalina, Fat Free Italian, Honey Mustard, Mild or Hot Buffalo,
Raspberry Hot, Sriracha, Teriyaki, Tartar, Cocktail, Sweet Chili and Au Jus.

City of Homer
www.cityofhomer-ak.gov

Office of the City Clerk
491 East Pioneer Avenue
Homer, Alaska 99603
clerk@cityofhomer-ak.gov
(p) 907-235-3130
(f) 907-235-3143

Memorandum

TO: MARK ROBL, POLICE CHIEF

FROM: MELISSA JACOBSEN, DEPUTY CITY CLERK

DATE: JUNE 9, 2015

SUBJECT: LIQUOR LICENSE TRANSFER AND APPLICATION FOR BEST WESTERN BIDARKA INN/OTTER ROOM

We have been notified by the ABC Board of an application for liquor license transfer and application in the City of Homer for the following:

Type:	Beverage Dispensary - Tourism
Lic #:	1402
DBA Name:	Best Western Bidarka Inn/Otter Room
Service Location:	575 Sterling Hwy, Homer, AK
Owner:	Johnson Inn Homer, LLC
Mailing Address:	575 Sterling Hwy, Homer, AK 99603

This matter is scheduled for the June 29, 2015 City Council meeting. Please respond with objections/non-objections to these liquor license renewals by **Wednesday, June 24, 2015**.

Thank you for your assistance.

JUN 09 2015 PM02:14

City of Homer

www.cityofhomer-ak.gov

Office of the City Clerk
491 East Pioneer Avenue
Homer, Alaska 99603
clerk@cityofhomer-ak.gov
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Memorandum

TO: MELISSA JACOBSEN, DEPUTY CITY CLERK

FROM: MARK ROBL, POLICE CHIEF

DATE: JUNE 9, 2015

SUBJECT: LIQUOR LICENSE TRANSFER AND APPLICATION FOR BEST WESTERN BIDARKA INN/OTTER ROOM

The Homer Police Department has no objection to the following liquor license transfer:

Type:	Beverage Dispensary - Tourism
Lic #:	1402
DBA Name:	Best Western Bidarka Inn/Otter Room
Service Location:	575 Sterling Hwy, Homer, AK
Owner:	Johnson Inn Homer, LLC
Mailing Address:	575 Sterling Hwy, Homer, AK 99603

ORDINANCE REFERENCE SHEET
2015 ORDINANCE
ORDINANCE 15-20

An Ordinance of the City Council of Homer, Alaska, Accepting and Appropriating an Alaska Department of Environmental Conservation Municipal Matching Grant in The Amount of $1,922,577 and Authorizing a 30% Matching Requirement From the Homer Accelerated Water And Sewer Fund (HAWSP) in the Amount of $576,773.10 for the Purpose of Completing the Water Distribution/Storage Improvement Project and Authorizing the City Manager to Execute the Appropriate Documents.

Sponsor: City Manager/Public Works Director

1. City Council Special Meeting June 15, 2015 Introduction (postponed to June 29)

    a. Notification of Municipal Matching Grant from Alaska Department of Environmental Conservation

2. City Council Special Meeting June 29, 2015 Introduction

    a. Notification of Municipal Matching Grant from Alaska Department of Environmental Conservation

CITY OF HOMER
HOMER, ALASKA

City Manager/
Public Works Director

ORDINANCE 15-20

AN ORDINANCE OF THE CITY COUNCIL OF HOMER, ALASKA, ACCEPTING AND APPROPRIATING AN ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION MUNICIPAL MATCHING GRANT IN THE AMOUNT OF $1,922,577 AND AUTHORIZING A 30% MATCHING REQUIREMENT FROM THE HOMER ACCELERATED WATER AND SEWER FUND (HAWSP) IN THE AMOUNT OF $576,773.10 FOR THE PURPOSE OF COMPLETING THE WATER DISTRIBUTION/STORAGE IMPROVEMENT PROJECT AND AUTHORIZING THE CITY MANAGER TO EXECUTE THE APPROPRIATE DOCUMENTS.

WHEREAS, The City submitted an application for an Alaska Department of Environmental Conservation Municipal Matching Grant for the purpose of completing water distribution/storage improvement projects to include water main extensions on Kachemak Drive and Shellfish Avenue/South Slope Drive; and

WHEREAS, The Alaska Department of Environmental Conservation Municipal Matching Grant was awarded to the City in the amount of $1,922,577, requiring a 30% match of $576,773.10 from the Homer Accelerated Water and Sewer Fund; and

NOW, THEREFORE, THE CITY OF HOMER ORDAINS:

Section 1. The Homer City Council hereby accepts and appropriates an Alaska Department of Environmental Conservation Municipal Matching Grant in the amount of $1,922,577 with a required 30% match of $576,773.10 from the Homer Accelerated Water and Sewer Fund for the purpose of completing the water distribution/storage improvement project as follows:

Revenue:

Account	Description	Amount
HAWSP (205)	Water Distribution/ Storage Improvements	$1,922,577

Expenditure:

Account	Description	Amount
205-375	30% HAWSP Fund Match	$576,773.10

Section 2. The City Manager is authorized to execute the appropriate documents.

Section 3. This is a budget amendment ordinance, is temporary in nature, and shall not be codified.

ENACTED BY THE HOMER CITY COUNCIL this ___ day of _____, 2015.

CITY OF HOMER

_____
MARY E. WYTHE, MAYOR

ATTEST:

_____
JO JOHNSON, MMC, CITY CLERK

YES:
NO:
ABSENT:
ABSTAIN:

First Reading:
Public Hearing:
Second reading:
Effective Date:

Reviewed and approved as to form:

_____ _____
Mary K. Koester, City Manager Thomas F. Klinkner, City Attorney

Date:_____ Date:_____

THE STATE of ALASKA
GOVERNOR BILL WALKER

Department of Environmental Conservation

DIVISION OF WATER

Post Office Box 111800
Juneau, Alaska 99811-1800
Main: 907.465.5300
Fax: 907.465.5177
www.dec.alaska.gov

May 19, 2015

Ms. Katie Koester
City Manager
City of Homer
491 E. Pioneer Avenue
Homer, AK 99603

RE: FY16 Funding Notice (SB26)

Dear Ms. Koester:

As you may be aware, your community will be eligible to receive $1,922,577 in Municipal Matching Grant funding for the Water Storage and Distribution Improvements Project through the capital budget being finalized in the legislature. The local contribution (match) requirement is 30%. The grant number assigned to this project is MMG No. 40909.

Due to the need to ensure that state funds are obligated and expended in a timely manner, **we require you to submit your application for these funds by June 15, 2015 in order to have a grant offer in place by the beginning of State Fiscal Year 2016.**

By no later than June 15, 2015 please complete the online Grant application at the Division of Water, Municipal Grants and Loans Program Website: http://dec.alaska.gov/water/MuniGrantsLoans/index.htm. Additional information on the program, requirements and forms can be found on this page.

If you are not able to complete the grant application online, please mail (and e-mail) the completed signed grant application to the following address by June 15, 2015:

DEC.Water.MGL.MAT@alaska.gov
Alaska Department of Environmental Conservation
Division of Water, Municipal Matching Grants & Loans Program
Attn: MAT (Municipal Administrative Team)
P.O. Box 111800
410 Willoughby Avenue, Suite 303
Juneau, AK 99811-1800

If you have any questions regarding this process you may contact me directly or any of the parties below:

Mike Lewis, Program Manager 907-269-7616 mike.lewis@alaska.gov
Zorrie Cassell-Caparroso, Grants Accountant 907-465-5172 soraida.cassell-caparroso@alaska.gov
Beth Verrelli, Project Engineer 907-269-7603 beth.verrelli@alaska.gov

The department looks forward to working with the City of Homer on this jointly funded project to provide improved services to the residents of your community.

Sincerely,

Melinda Liddle for
Zorrie Cassell-Caparroso
Municipal Grants and Loans Program Accountant

cc: Mike Lewis, Program Manager, ADEC
Beth Verrelli, Project Engineer, ADEC

ORDINANCE REFERENCE SHEET
2015 ORDINANCE
ORDINANCE 15-23

An Ordinance of the Homer City Council Amending Homer City Code 21.40.070, Requirements, Regarding Standards for Impervious Coverage in the Bridge Creek Watershed Protection District.

Sponsor: Planning

1. City Council Special Meeting June 29, 2015 Introduction

    a. Memorandum 15-100 from City Planner as backup w/attachments: Ordinance 15-23, staff reports, excerpts of Planning Commission meetings of 4/16/14, 8/06/14, 8/20/14, 9/03/14, 9/17/14, 10/15/14, 11/05/14, 1/21/15, 2/18/15, 3/18/15, and 4/15/15

CITY OF HOMER
HOMER, ALASKA

Planning

ORDINANCE 15-23

AN ORDINANCE OF THE HOMER CITY COUNCIL AMENDING HOMER CITY CODE 21.40.070, REQUIREMENTS, REGARDING STANDARDS FOR IMPERVIOUS COVERAGE IN THE BRIDGE CREEK WATERSHED PROTECTION DISTRICT.

THE CITY OF HOMER ORDAINS:

Section 1. Homer City Code 21.40.070, Requirements, is amended to read as follows:

21.40.070 Requirements. The requirements of this section shall apply to all structures and uses in the BCWP district unless more stringent requirements are required pursuant to Chapter 21.71 HCC. The City of Homer water utility is exempt from this section.

a. Impervious Coverage.

1. Lots two and one-half acres and larger shall have a maximum total impervious coverage of 4.2 percent.

2. Lots smaller than two and one-half acres shall have a maximum total impervious coverage of 4.2 percent, except as provided in subsection (a)(3) of this section.

3. Lots smaller than two and one-half acres may be allowed impervious coverage up to 6.4 percent if (a) the owner submits a lot-specific mitigation plan for **the City Planner's** ~~Planning Commission's~~ approval, and (b) if approved, thereafter implements and continuously complies with the approved plan. The mitigation plan must be designed to mitigate the effect of impervious coverage on water flow and the effect of loss of vegetation created by the impervious coverage and **shall comply with the following performance standards:**

a. Disturbed areas shall be reseeded by August 31st

b. Storm water retention for the proposed new impervious surface must be provided on site.

1. The post-development stormwater discharge rate shall not exceed the pre-development peak discharge rate (PDR) for the 10-year frequency storm event, consisting of rainfall for a period of three consecutive hours at a rate of one-half inch per hour.

2. Retention may be provided in the form of one or a combination of dry wells, rain barrels, rain gardens, foot drain retention or other method approved by the City Planner.

c. For the purpose of calculating impervious coverage for mitigation plans on lots smaller than two and one-half acres, driveways and

[**Bold and underlined added**. ~~Deleted language stricken through~~.]

walkways may be calculated as 70% impervious and structures as 90% impervious.

~~b. Impervious Coverage Calculations.~~

~~1. For the purpose of calculating impervious coverage on lots smaller than two and one-half acres, driveways and walkways may be partially or fully excluded from the calculation, if constructed and maintained in accordance with a mitigation plan, submitted and approved in accordance with subsection (a)(3) of this section.~~

Section 2. This Ordinance is of a permanent and general character and shall be included in the City Code.

ENACTED BY THE CITY COUNCIL OF HOMER, ALASKA, this ____ day of _____ 2015.

CITY OF HOMER

_____
MARY E. WYTHE, MAYOR

ATTEST:

_____
JO JOHNSON, MMC, CITY CLERK

AYES:
NOES:
ABSTAIN:
ABSENT:

First Reading:
Public Hearing:
Second Reading:
Effective Date:

Reviewed and approved as to form:

_____ _____
Mary K. Koester, City Manager Thomas F. Klinkner, City Attorney

Date: _____ Date: _____

[**Bold and underlined added**. ~~Deleted language stricken through~~.]

City of Homer
www.cityofhomer-ak.gov

Planning
491 East Pioneer Avenue
Homer, Alaska 99603
Planning@ci.homer.ak.us
(p) 907-235-3106
(f) 907-235-3118

Memorandum 15-100

TO: MAYOR WYTHE AND HOMER CITY COUNCIL

THROUGH KATIE KOESTER, CITY MANAGER

FROM: RICK ABBOUD, CITY PLANNER

DATE: JUNE 18, 2015

SUBJECT: RECOMMENDATION FROM HOMER ADVISORY PLANNING COMMISSION REGARDING THE PROPOSED AMENDMENT TO HCC 21.40.070, REQUIREMENTS, REGARDING STANDARDS FOR IMPERVIOUS COVERAGE IN THE BRIDGE CREEK WATERSHED PROTECTION DISTRICT.

For approximately one year the Planning Commission has discussed the Bridge Creek Watershed Protection District (BCWPD). The commission considered increasing the amount of impervious coverage from the current allowance. After the testimony received from two public hearings, where every property owner in the watershed was sent direct notification, the Commission decided against an increase. The Planning Commission's draft ordinance does allows development proposals in the district (those eligible to exceed 4.2% impervious coverage) to be completed with less delay and clarifies a more uniform procedure for impervious surface mitigation.

Non-ordinance recommendation for the BCWPD

1. Platting fees be waved when vacating lines to increase lot sizes.
2. Increase City efforts to purchase one property a year.
3. Examine ditch cleaning policies and work with DOT on Skyline Drive maintenance including minimizing road ditch clearing to minimize possible negative effects to the watershed.
4. Ask Public Works not to use calcium chloride for dust control.

Current Procedure

All lots in the BCWPD are allowed up to 4.2% of impervious coverage, lots smaller than 2.5 acres are allowed to provide mitigation for review at the Planning Commission for up to 6.4% of impervious coverage. The standards for mitigation are not defined in code. Taking the plan to the Commission incurs additional time compared to standard permits that may be issued by the Planning Department. Not having defined standards for the calculation of mitigation leads to staff suggesting the measures which then need to be 'sold' to the Commission. There is little consistency between mitigation plans or outcomes and this creates a lot of uncertainty for developers.

Proposed Amendments

1.) The Commission recommends that the City Planner review and approve mitigation plans without having to go before the Commission.

2.) Reseeding is prescribed by a date specific so that vegetation has an opportunity to be established before the winter and the opportunity for runoff is decreased.
3.) Standards are proposed for design of the mitigation plan. The storm water event that is defined as the same that is required elsewhere in code, rainfall at a rate of 1.5 inches per hour for 3 hours. While common methods of approved retention forms are listed, others may be approved.
4.) The calculation of impervious surface for the purpose of mitigation is based on professional engineering standards. Prescribed calculations for typical driveways, walkways, and structures are those an engineer uses to create an appropriate mitigation plan. Other methods still have an option for other calculations in case someone wanted to install a 'green roof' or other non-typical measure.

Eliminated is the subjective nature of partially excluding driveways without having any specific expectations. Currently, the commission may decide to grant someone some sort of exclusion, but they have no standards in code for this provision. This leads to inconsistency among applicants and can alter the carefully thought out provisions for impervious throughout the district.

The proposed amendment was a subject on 12 Planning Commission meetings. The meetings of the October 15th, November 5th and April 15th were public hearings where the entire Bridge Creek Watershed Protection District was sent a notice. While testimony was varied, a great deal was against creating the opportunity for additional impervious coverage. Allowing the Planner to process permits was universally accepted.

Planning staff review of the zoning code amendment as required by HCC 21.95.040.

21.95.040 Planning Department review of code amendment. The Planning Department shall evaluate each amendment to this title that is initiated in accordance with HCC 21.95.010 and qualified under HCC 21.95.030, and may recommend approval of the amendment only if it finds that the amendment:

a. Is consistent with the comprehensive plan and will further specific goals and objectives of the plan.

Discussion: Comprehensive Plan Chapter 4, Goal 2: "Maintain the quality of Homer's natural environment and scenic beauty." A strategy stated to accomplish this goal includes "recommend that appropriate standards be adopted so that where development does occur it is designed to respect environmental functions and characteristics." Examples giving include "site development policies for drainage, vegetation, and grading." This amendment is directly correlated toward accomplishing this goal.

Staff response: This amendment is consistent with the Comprehensive Plan.

b. Will be reasonable to implement and enforce.

Staff response: This code amendment will be reasonable to implement and enforce. Standards for mitigation calculation are more certain than current policy.

c. Will promote the present and future public health, safety and welfare.

Staff response: The public health, safety and welfare is promoted in the creation of targeted standards to help mitigate potential negative impacts on the Bridge Creek Reservoir.

d. Is consistent with the intent and wording of the other provisions of this title.

Staff response: This amendment is consistent with the intent and wording of other provisions of this title. The amendments have been reviewed by the City Attorney and are deemed consistent with the intent and wording of the other provision of this title.

21.95.010 Initiating a code amendment.

Staff response: The Planning Commission initiated the code amendment, per 21.95.010(b).

21.95.030 Restriction on repeating failed amendment proposals.

Staff response: This section of code is found to be not applicable.

Att.

1. Proposed draft ordinance
2. Staff Reports with attachments
3. Excerpts of Planning Commission minutes

City of Homer
www.cityofhomer-ak.gov

Planning
491 East Pioneer Avenue
Homer, Alaska 99603
Planning@ci.homer.ak.us
(p) 907-235-3106
(f) 907-235-3118

Staff Report PL 15-22

TO:	Homer Advisory Planning Commission
FROM :	Rick Abboud, City Planner
DATE:	April 15, 2015
SUBJECT:	Draft ordinance for the Bridge Creek Watershed Protection District.

Review

This proposed ordinance accomplishes two things for those developing in the Watershed Protection District. Additionally, it cleans up references made concerning outdated activities .

1. Designates the City Planner to approve mitigation plans allowed when lots under 2 ½ acres wish to develop past 4.2% coverage as allowed in code.

Currently, a mitigation plan needs to be approved by the Planning Commission to develop these parcels up to 6.4% of total coverage. The amount of impervious coverage allowed does not change, just the ability to get the mitigation plan approved in the Planning Office. This will avoid delays when having to schedule before the Commission, while letting the applicant work with one person instead of 7.

2. Clarifies standards for calculating the amount of mitigation required in the plan.

Currently, mitigation for water flow due to development in the district is not defined in code. This can lead applicants to design for what might be a moving target, while approval may not be consistent from one application to the next. Using accepted standards for storm water mitigation, the standard event and mitigation calculations are listed in the proposed code. This gives an applicant clear expectations on what the design is to accomplish. Listed are the accepted measures from plans previously approved by the Commission, with the ability for consideration of mitigation methods not listed.

The Planning Office is familiar with the standards and mitigation methods and can provide assistance to applicants on defining the amount of water to mitigate and the methods that would accomplish the task. We believe that this ordinance will save time for applicants and provide clear and consistent expectations for those developing in the watershed.

Additionally, the references to "Ongoing Construction and Timer Harvesting" and "Pending Subdivisions" that started in 2003 are deleted. No construction or harvesting activities have been ongoing or noticed while I have worked for the city starting in 2008. I have also not seen any requests for time extensions of platting actions which would be requested within a two year window. Deleting HCC 21.40.070 (f-g) will cleanup the code that addresses situations that do not currently exist.

Staff Recommendation: Hold public hearing. Move on recommendation of adoption for City Council.

Attachments
Draft Ordinance public hearing version

CITY OF HOMER
ORDINANCE 15-xx

AN ORDINANCE OF THE HOMER CITY COUNCIL AMENDING HOMER CITY CODE 21.40.070, REQUIREMENTS, REGARDING STANDARDS FOR IMPERVIOUS COVERAGE IN THE BRIDGE CREEK WATERSHED PROTECTION DISTRICT.

THE CITY OF HOMER ORDAINS:

Section 1. Homer City Code 21.40.070, Requirements, is amended to read as follows:

21.40.070 Requirements. The requirements of this section shall apply to all structures and uses in the BCWP district unless more stringent requirements are required pursuant to Chapter 21.71 HCC. The City of Homer water utility is exempt from this section.

a. Impervious Coverage.

1. Lots two and one-half acres and larger shall have a maximum total impervious coverage of 4.2 percent.

2. Lots smaller than two and one-half acres shall have a maximum total impervious coverage of 4.2 percent, except as provided in subsection (a)(3) of this section.

3. Lots smaller than two and one-half–acres may be allowed impervious coverage up to 6.4 percent if (a) the owner submits a lot-specific mitigation plan for **the City Planner's** ~~Planning Commission's~~ approval, and (b) if approved, thereafter implements and continuously complies with the approved plan. The mitigation plan must be designed to mitigate the effect of impervious coverage on water flow and the effect of loss of vegetation created by the impervious coverage and **shall comply with the following performance standards:**

a. Any area that is disturbed shall be reseeded no later than the next August 31st.

b. Storm water retention for the proposed new impervious surface must be provided on site by one or a combination of dry wells, rain barrels, rain gardens, foot drain retention or another method approved by the City Planner, so that for the 10-year frequency storm event (consisting of rainfall for a period of three consecutive hours at a rate of one-half inch per hour) the post-development peak discharge rate (PDR) does not exceed the pre-development PDR.

c. For the purpose of calculating impervious coverage for mitigation plans on lots smaller than two-and one-half-acres, driveways and walkways may be calculated as 70% impervious and structures as 90% impervious.

b. Impervious Coverage Calculations. ~~1. For the purpose of calculating impervious coverage on lots smaller than two and one-half acres, driveways and walkways may be partially or fully excluded from the calculation, if constructed and maintained in accordance~~

[**Bold and underlined added**. ~~Deleted language stricken through~~.]

~~with a mitigation plan~~, ~~submitted and approved in accordance with subsection (a)(3) of this section. 2.~~ Except as otherwise provided in this section, parcels of land subdivided after February 25, 2003, shall be allowed a total impervious coverage of 4.2 percent including right-of-way (ROW) dedication. ROW coverage area shall be calculated as 50 percent of the total area of the dedicated ROW. The impervious coverage allowed for the subdivided parcels shall be calculated after deducting the ROW coverage from the total parcel allowance according to the following formula:

Formula:

(Area of parcel being subdivided) x 0.042 = Total allowed impervious coverage (TAC)

(Area of ROW dedication) x 0.5 = ROW coverage (ROW C)

(TAC) – (ROW C) = Allowed impervious coverage for remainder of parcel being subdivided

(Area of parcel being subdivided) – (Area of ROW dedication) = New parcel area

(Allowed impervious coverage for remainder) ÷ (New parcel area) x 100 = Percent impervious coverage allowed on subdivided lots.

c. Additional Requirements for Subdivisions and Lots.

1. Lots created by subdivision after February 25, 2003, shall be a minimum of four and one-half acres.

2. Applications for subdivisions, dedications, and vacations of easements and rights-of-way in the BCWP district must be approved by the Planning Commission prior to submission to the Kenai Peninsula Borough.

d. Building Setbacks. Buildings must be set back from the Bridge Creek Reservoir and from streams as provided in HCC 21.40.110 and 21.40.120.

e. Sewer Systems. Appropriate to the use of the lot, each lot shall be served by a septic or sewer system approved by the Alaska State Department of Environmental Conservation (ADEC). Stream setbacks equal to 100 feet for drain fields and subsurface discharge and 250 feet for raised septic systems are required.

~~f. Ongoing Construction and Timber Harvesting. All activities including, but not limited to, timber harvesting, road building, subdivision and building activities involving loss of vegetation ground cover or soil disturbance and that are in process on February 25, 2003, shall be required to obtain permits under this chapter and shall fully conform to the terms of this chapter. Activities leaving disturbed or lost vegetative ground cover, disturbed soils without revegetation or leaving slash piles will be considered in process for the purposes of this subsection, regardless of when the activity occurred.~~

~~g. Pending Subdivisions. Subdivisions that have not received final plat approval by February 25, 2003, shall obtain approval from the Planning Commission and shall be required to conform to the requirements of this chapter.~~

Section 2. This Ordinance is of a permanent and general character and shall be included in the City Code.

ENACTED BY THE CITY COUNCIL OF HOMER, ALASKA, this ____ day of _____ 2015.

[**Bold and underlined added**. ~~Deleted language stricken through~~.]

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Planning@ci.homer.ak.us
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(f) 907-235-3118

PUBLIC NOTICE

Public notice is hereby given that the City of Homer will hold a public hearing by the Homer Advisory Planning Commission on Wednesday, April 15, 2015 at 6:30 p.m. at Homer City Hall, 491 East Pioneer Avenue, Homer, Alaska on the following matters:

AN ORDINANCE OF THE HOMER CITY COUNCIL AMENDING HOMER CITY CODE 21.40.070, REQUIREMENTS, REGARDING STANDARDS FOR IMPERVIOUS COVERAGE IN THE BRIDGE CREEK WATERSHED PROTECTION DISTRICT.

Anyone wishing to present testimony concerning these matters may do so at the meeting or by submitting a written statement to the Homer Advisory Planning Commission, 491 East Pioneer Avenue, Homer, Alaska 99603, by 4:00 p.m. on the day of the meeting.

For additional information, please contact Rick Abboud in the City Planning and Zoning Office at 235-8121, ext. 2236.

The proposed changes only affect lots less than 2.5 acres, and only when a mitigation plan is requested to exceed 4.2% impervious surface area. New code language is **bold and underlined.** ~~Strikeout~~ shows language proposed for deletion. An excerpt of the changes is provided below.

CITY OF HOMER
ORDINANCE 15-xx

AN ORDINANCE OF THE HOMER CITY COUNCIL AMENDING HOMER CITY CODE 21.40.070, REQUIREMENTS, REGARDING STANDARDS FOR IMPERVIOUS COVERAGE IN THE BRIDGE CREEK WATERSHED PROTECTION DISTRICT.

THE CITY OF HOMER ORDAINS:

Section 1. Homer City Code 21.40.070, Requirements, is amended to read as follows:

21.40.070 Requirements. The requirements of this section shall apply to all structures and uses in the BCWP district unless more stringent requirements are required pursuant to Chapter 21.71 HCC. The City of Homer water utility is exempt from this section.

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2. Lots smaller than two and one-half acres shall have a maximum total impervious coverage of 4.2 percent, except as provided in subsection (a)(3) of this section.

3. Lots smaller than two and one-half–acres may be allowed impervious coverage up to 6.4 percent if (a) the owner submits a lot-specific mitigation plan for **the City Planner's** ~~Planning Commission's~~ approval, and (b) if approved, thereafter implements and continuously complies with the approved plan. The mitigation plan must be designed to mitigate the effect of impervious coverage on water flow and the effect of loss of vegetation created by the impervious coverage and **shall comply with the following performance standards:**

a. Any area that is disturbed shall be reseeded no later than the next August 31st.

b. Storm water retention for the proposed new impervious surface must be provided on site by one or a combination of dry wells, rain barrels, rain gardens, foot drain retention or another method approved by the City Planner, so that for the 10-year frequency storm event (consisting of rainfall for a period of three consecutive hours at a rate of one-half inch per hour) the post-development peak discharge rate (PDR) does not exceed the pre-development PDR.

c. For the purpose of calculating impervious coverage for mitigation plans on lots smaller than two-and one-half-acres, driveways and walkways may be calculated as 70% impervious and structures as 90% impervious.

b. Impervious Coverage Calculations. ~~1. For the purpose of calculating impervious coverage on lots smaller than two and one-half acres, driveways and walkways may be partially or fully excluded from the calculation, if constructed and maintained in accordance with a mitigation plan, submitted and approved in accordance with subsection (a)(3) of this section.~~

None

Reports

A. Staff Report PL 15-21, City Planner's Report

City Planner Abboud reviewed the staff report.

Public Hearings

Testimony limited to 3 minutes per speaker. The Commission conducts Public Hearings by hearing a staff report, presentation by the applicant, hearing public testimony and then acting on the Public Hearing items. The Commission may question the public. Once the public hearing is closed the Commission cannot hear additional comments on the topic. The applicant is not held to the 3 minute time limit.

A. Staff Report PL 15-22 Draft Ordinance Amending Bridge Creek

City Planner Abboud reviewed the staff report.

Chair Stead opened the public hearing.

Sue Mauger, property owner in the district and Science Director for Cook Inletkeeper, shared some research she did relating to property currently developed in the district to show that the owners are able to develop their property with the ordinance that is currently in place which suggests that it's reasonable and smaller lots are developable. She also referenced comment in the January 21st meeting minutes that suggest the information provided by the Cook Inletkeeper says the city should be able to go up to 10% impervious cover if buffers were provided, is incorrect. She noted the information indicates in Alaska when impervious coverage hits 4.4% and 5.8% water quality decreases, a 10% threshold has been reported in other parts of the country but in Alaska our streams are more sensitive to degradation because there are more extreme natural stressors on the landscape. She questions the 70% and 90% values as they seem arbitrary and encouraged that they are cautious of changes that might weaken the effectiveness of the ordinance that protects our drinking water.

Mark Hemstreet, property owner in the district, commented in support of the proposed amendments. He and his wife think it is a fair and equitable plan because it gives property owners a little more flexibility and it isn't a huge change from the current code.

Bill Smith commented that a lot of work went into developing the numbers currently used in code, based on the more lenient of the impact range they found. He likes that the mitigation plan can be approved by the City Planner, and also likes the reseeding and retention standards. He doesn't agree with the 90% impervious coverage regarding structures. He thought they eliminated the impervious requirement for driveways with a proper mitigation plan. Lastly he expressed that this narrow application applies to Mr. Stroozas' property and the group should revisit whether he is conflicted.

Joel Cooper, property owner in the district, concurred with Ms. Mauger's comments that the ordinance in place is working, adding that people are managing to work with what is in code now. He

agrees the lots adjacent to the stream raise concern due to non-point source pollution being a conduit into the stream. It would be great to see if there are ways to acquire the riparian corridor. The 70% related to walkways has no detail as to specifics about materials used. He likes the reseeding and retention standards.

There were no further comments and the hearing was closed.

City Planner Abboud mentioned that the 70% and 90% gives property owners a concrete target, where before they had to come in and convince the Commission of the effectiveness of what they were mitigating.

Public Works Director Meyer explained that in the textbook and advice that is given to engineers is a .9 coefficient to estimate runoff from impermeable surfaces. He assumes there is some evaporation and that not every drop of water that falls on a dry pavement, leaves the dry pavement. Regarding the difference in the permeability between gravel and concrete surface, he agrees there is a difference in the summer, but in the winter months a frozen gravel surface is just as impervious as a paved surface. Mr. Meyer noted that most of the significant rain events happen in November through January when the ground is frozen and an engineer would have to take into account dealing with worst case scenarios.

Commissioner Highland noted that they didn't identify in the ordinance what driveways and walkways were made of relating to percentages. It seems that it needs to be included. Chair Stead noted it says they may be calculated at 70% not that they will be, which allows for consideration of materials used to determine 70 or 90 percent.

BOS/HIGHLAND MOVED TO APPROVE THE DRAFT ORDINANCE AMENDING HOMER CITY CODE 21.40.070, REQUIREMENTS, REGARDING STANDARDS FOR IMPERVIOUS COVERAGE IN THE BRIDGE CREEK WATER SHED PROTECTION DISTRICT AND FORWARD IT TO CITY COUNCIL FOR PUBLIC HEARING AND ADOPTION.

Commissioner Highland commented she thinks gravel or paved should be included in the language and that 100% makes more sense under item C. No amendment was proposed.

VOTE: YES: STROOZAS, BOS, STEAD, VENUTI
NO: HIGHLAND

Motion carried.

Plat Consideration

A. Staff Report PL 15-23 Webber Subdivision No. 9 Preliminary Plat

City Planner Abboud reviewed the staff report.

Steve Smith, project surveyor, said he was available for questions.

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Staff Report PL 15-19

TO:	Homer Advisory Planning Commission
THROUGH:	Rick Abboud, City Planner
FROM:	Julie Engebretsen, Deputy City Planner
DATE:	March 18, 2015
SUBJECT:	Draft ordinance for the Bridge Creek Watershed Protection District.

Introduction

Under current code, when a land owner submits a mitigation plan, part or all of the driveway area can be excluded from the total 6.4% coverage. At the last meeting, the Commission directed staff to create more objective standards for excluding a driveway or walkway from the impervious coverage calculation.

Staff used the information from the Stormwater and Meltwater Management and Mitigation handbook for information on calculating runoff. (Commissioners should all have a copy; if not let staff know) Public Works Director Carey Meyer provided a similar example back in November. Staff used the handbook coefficients to write code language stating how storm water runoff shall be calculated. Under current code, part or all of the impervious coverage for a driveway or walkway may be excluded. This code amendment would use published runoff coefficients. Driveways and gravel roads have an impervious coverage of 70%, and all roof areas 90%. (See page 33).

Staff Recommendation: Discuss the proposed requirements for a mitigation plan, and make any amendments. Move to public hearing when ready. Staff will submit it to the attorney prior to hearing as some of the language could be further refined.

Attachments
Draft Ordinance 3/12/15 version
Example from Carey Meyer dated 11/2014

CITY OF HOMER
ORDINANCE 15-xx

AN ORDINANCE OF THE HOMER CITY COUNCIL AMENDING HOMER CITY CODE 21.40.070, REQUIREMENTS, REGARDING STANDARDS FOR IMPERVIOUS COVERAGE IN THE BRIDGE CREEK WATERSHED PROTECTION DISTRICT.

THE CITY OF HOMER ORDAINS:

Section 1. Homer City Code 21.40.070, Requirements, is amended to read as follows:

21.40.070 Requirements. The requirements of this section shall apply to all structures and uses in the BCWP district unless more stringent requirements are required pursuant to Chapter 21.71 HCC. The City of Homer water utility is exempt from this section.

a. Impervious Coverage.

1. Lots two and one-half acres and larger shall have a maximum total impervious coverage of 4.2 percent.

2. Lots smaller than two and one-half acres shall have a maximum total impervious coverage of 4.2 percent, except as provided in subsection (a)(3) of this section.

3. Lots smaller than two and one-half–acres may be allowed impervious coverage up to 6.4 percent if (a) the owner submits a lot-specific mitigation plan for **the City Planner's** ~~Planning Commission's~~ approval, and (b) if approved, thereafter implements and continuously complies with the approved plan. The mitigation plan must be designed to mitigate the effect of impervious coverage on water flow and the effect of loss of vegetation created by the impervious coverage and **shall comply with the following performance standards:**

a. Disturbed areas shall be reseeded by August 31st

b. Storm water retention for the proposed new impervious surface must be provided on site.

1. The post-development stormwater discharge rate shall not exceed the pre-development peak discharge rate (PDR) for the 10-year frequency storm event, consisting of rainfall for a period of three consecutive hours at a rate of one-half inch per hour.

2. Retention may be provided in the form of one or a combination of dry wells, rain barrels, rain gardens, foot drain retention or other method approved by the City Planner.

c. For the purpose of calculating impervious coverage for mitigation plans on lots smaller than two–and one-half–acres, driveways and walkways may be calculated as 70% impervious and structures as 90% impervious.

[**Bold and underlined added**. ~~Deleted language stricken through~~.]

~~b. Impervious Coverage Calculations.~~

~~1. For the purpose of calculating impervious coverage on lots smaller than two and one-half acres, driveways and walkways may be partially or fully excluded from the calculation, if constructed and maintained in accordance with a mitigation plan, submitted and approved in accordance with subsection (a)(3) of this section.~~

Section 2. This Ordinance is of a permanent and general character and shall be included in the City Code.

ENACTED BY THE CITY COUNCIL OF HOMER, ALASKA, this ____ day of _____ 2014.

CITY OF HOMER

_____
MARY E. WYTHE, MAYOR

ATTEST:

_____
JO JOHNSON, MMC, CITY CLERK

AYES:
NOES:
ABSTAIN:
ABSENT:

First Reading:
Public Hearing:
Second Reading:
Effective Date:

Reviewed and approved as to form:

_____
_____, City Manager
Date: _____

_____
Thomas F. Klinkner, City Attorney
Date: _____

[**Bold and underlined added**. ~~Deleted language stricken through~~.]

From C Meyer 11/201

Bridge Creek Water Shed (BCWS) Impermable Surface Area Regulation Changes
Stormwater Runoff Calculation - Mitigating Detention Volume Calculations

Assumptions:

1) Use Rational Method: Q = C x I x A
2) Design for a 2 YR - 3 HR Storm (.5 in/hr)
3) Proposed new regulation provides for an additional 4 acres of impermable surface within the BCWS.
The new regs will only apply to lots less than 3 acres (93 lots). 4 acres x 43,560 sf per acre/93 lots = 1875 sf/lot (average)
Also allowed will be an additional 500 SF of deck and 200 SF accessory structure.

Pre-Development Runoff:	A Area (sf)	A Area (acres)	C Runoff Coeff.	I Rainfall Intensity (in/hr)	Q Flow (cf/sec)	Q Flow 1 hr (cf/hr)	V Volume 3 hr (cf)	V Volume 3 hr (gallons)
Average Additional SF	1875	0.0430	0.15	0.5	0.0032	11.62	35	261
Deck	500	0.0115	0.15	0.5	0.0009	3.10	9	70
Accessory Structure	200	0.0046	0.15	0.5	0.0003	1.24	4	28
		0.0591			0.0044	15.96	48	358

Post Development Runoff:	A Area (sf)	A Area (acres)	C Runoff Coeff.	I Rainfall Intensity (in/hr)	Q Flow 1 hr (cf/sec)	Q Flow 1 hr (cf/hr)	V Volume 3 hr (cf)	V Volume 3 hr (gallons)
Additional Impermable SF	1875	0.0430	0.9	0.5	0.019	69.7	209	1565
Deck	500	0.0115	0.75	0.5	0.0043	15.50	46	348
Accessory Structure	200	0.0046	0.9	0.5	0.0021	7.44	22	167
		0.0591			0.0257	92.67	278	2079

Difference Between Pre and Post (Required Detention Volume for 3 hr Storm) =	230	1721

Detention Pond Sizing	
Pond (9' wide x 9' long x 3' deep) =	243 cf
Pond (8' wide x 12' long x 2.5' deep) =	240 cf

Pending Business

A. Staff Report PL 15-19, Bridge Creek Watershed Protection District

City planner Abboud reviewed the staff report.

The commission did not make any further amendments and agreed by consensus to forward it to the attorney to review prior to scheduling a public hearing.

New Business

A. Staff Report Pl 15-20, Land Allocation Plan

City Planner Abboud reviewed the staff report and updates since the last plan was adopted.

Commissioner Bos commented regarding some of the undesignated lots. The lots on page C-4 are small and unbuildable and don't serve much purpose to the city. He suggested they could be deeded to the adjoining property owners. The property on page C-8 could also be split between neighboring property owners or sold. The lot on page D-3 is a fantastic lot, but it would take a lot of effort to get the grade down, however with city projects going on the city could use the material as fill and create a great building opportunity for a lot of different things there.

There group briefly discussed the merits of Commissioner Bos's suggestions.

BRADLEY/BOS MOVED TO RECOMMEND THE LOTS ON PAGE C-4 BE REDISTRIBUTED TO THE STATE OR ADJACENT PROPERTY OWNERS.

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

ERICKSON/BOS MOVED TO RECOMMEND SELLING THE LOT ON PAGE C-8 FOR ITS ASSESSED VALUE OR DISPOSE OF IT TO THE NEIGHBORING PROPERTY OWNER ON THE NORTH OR SOUTH.

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

There was further discussion of the property on page D-3 that was formerly part of the old library site. They acknowledged the challenges of trying to develop it, that it could be a future site for a facility like

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Staff Report PL 15-14

TO:	Homer Advisory Planning Commission
THROUGH:	Rick Abboud, City Planner
FROM:	Julie Engebretsen, Deputy City Planner
DATE:	February 18, 2015
SUBJECT:	Bridge Creek Watershed Protection District

Introduction
At the last meeting, the Commission discussed recommendations you would like to make to the City Council. In addition, the Commission wanted to further explore the idea of the City Planner approving mitigation plans. A draft ordinance is attached for your review.

Analysis
Currently, mitigation plans are approved by the Commission, and there are no standards in Homer City Code. This ordinance would allow the City Planner to approve a mitigation plan, and creates some basic requirements. Mitigation plans would need to include reseeding the site by August 31st, a provision for storm water from new impervious surfaces, and possible additional driveway mitigation, if warranted (see code language).

The benefit to land owners would be faster approval, and more certainty in the outcome. There currently are no standards for mitigation plans.

Staff Recommendation
Review the draft ordinance and make any amendments. Move to public hearing when ready.

Attachments
Draft Ordinance 2.10.14 version


CITY OF HOMER
ORDINANCE 15-xx

AN ORDINANCE OF THE HOMER CITY COUNCIL AMENDING HOMER CITY CODE 21.40.070, REQUIREMENTS, REGARDING STANDARDS FOR IMPERVIOUS COVERAGE IN THE BRIDGE CREEK WATERSHED PROTECTION DISTRICT.

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a. Disturbed areas shall be reseeded by August 31st

b. Storm water retention for the proposed new impervious surface must be provided on site, in the form of one or a combination of dry wells, rain barrels, rain gardens, foot drain retention or other method approved by the City Planner. The post-development stormwater discharge rate shall not exceed the pre-development peak discharge rate (PDR) for the 10-year frequency storm event, consisting of rainfall for a period of three consecutive hours at a rate of one-half inch per hour. The storm water retention is intended to mitigate the effect of impervious coverage and the resulting loss of vegetation on water flow.

c. When the City Planner finds that special site considerations such as topography or drainage warrant such treatment, a ditch lined with filter fabric and rock shall be constructed to slow water runoff from the driveway and encourage infiltration of water into the ground.

[**Bold and underlined added**. ~~Deleted language stricken through~~.]

b. Impervious Coverage Calculations.

1. For the purpose of calculating impervious coverage on lots smaller than two and one-half-acres, driveways and walkways may be partially or fully excluded from the calculation, if constructed and maintained in accordance with a mitigation plan, submitted and approved in accordance with subsection (a)(3) of this section.

Section 2. This Ordinance is of a permanent and general character and shall be included in the City Code.

ENACTED BY THE CITY COUNCIL OF HOMER, ALASKA, this ____ day of _____ 2014.

CITY OF HOMER

_____
MARY E. WYTHE, MAYOR

ATTEST:

_____
JO JOHNSON, MMC, CITY CLERK

AYES:
NOES:
ABSTAIN:
ABSENT:

First Reading:
Public Hearing:
Second Reading:
Effective Date:

Reviewed and approved as to form:

_____
_____, City Manager

Date: _____

_____
Thomas F. Klinkner, City Attorney

Date: _____

[**Bold and underlined added**. ~~Deleted language stricken through~~.]

Presentations

None

Reports

A. Staff Report PL 15-13, City Planner's Report

City Planner Abboud reviewed the staff report. There was brief discussion explaining the notification process for the natural gas line assessments.

Public Hearings

Testimony limited to 3 minutes per speaker. The Commission conducts Public Hearings by hearing a staff report, presentation by the applicant, hearing public testimony and then acting on the Public Hearing items. The Commission may question the public. Once the public hearing is closed the Commission cannot hear additional comments on the topic. The applicant is not held to the 3 minute time limit.

None

Plat Consideration

None

Pending Business

A. Staff Report PL 15-14, Bridge Creek Watershed Protection District

City Planner Abboud reviewed the staff report.

Commissioner Highland questioned if they want legislation that requires testing leach fields in the area once in a while and what they could do about it.

Commissioner Erickson commented in support of including allowance for a small shed or green house in the ordinance. It is something they had talked about previously.

Commissioner Stroozas added that he would like to see the 500 square feet of uncovered added as well. He is also interested in working on line 45 regarding impervious coverage of driveways and sidewalks. It seems to be very subjective and as he mentioned in the worksession other areas of the ordinance are very objective regarding percentages. He agrees they need to get into the septic tank issue and would like to see if there is a way to incorporate it into the ordinance. He agrees with Ms. Highland in that if property owners in the area don't get their septic tank pumped until there is a problem after 5 or 6 years, then it causes problems. Getting it pumped on a routine basis and the City helping with all or some of the cost would enable the owner to know if he or she has a problem with their leach field and fix it before it goes on for years and possibly harms the water shed. There are a lot of positives that come from routine maintenance.

The Commission discussed current mitigation plan information and impervious coverage. City Planner Abboud said the idea is to get a mitigation plan that addresses a 10 year three hour storm, and he can look at other plans where driveways have been excluded depending on engineer certification.

STROOZAS/BOS MOVED TO AMEND LINE 45 OF THE DRAFT THAT STATES "FOR THE PURPOSE OF CALCULATING IMPERVIOUS COVERAGE ON LOTS SMALLER THAN TWO AND ONE HALF ACRES, DRIVEWAYS AND WALKWAYS MAY BE PARTIALLY OR FULLY EXCLUDED FROM THE CALCULATION DEPENDING UPON THEIR DEGREE OF IMPERVIOCITY IF CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH A MITIGATION PLAN SUBMITTED AND APPROVED IN ACCORDANCE WITH SUBSECTION (A)(3) OF THIS SECTION.

City Planner Abboud suggested something directing the Planner to make more objective standards for determination of exclusion of items in this paragraph.

There was brief discussion regarding the wording of the motion.

Commissioner Highland called for the question.

There was no objection to the call for the question.

VOTE: YES: ERICKSON, STROOZAS
NO: BOS, STEAD, HIGHLAND, VENUTI, BRADLEY

Motion failed.

HIGHLAND/STROOZAS MOVED TO RETURN NUMBER ONE UNDER ITEM B ON LINE 45 BACK TO THE PLANNER TO CREATE MORE OBJECTIVE STANDARDS FOR EXCLUSION FROM IMPERVIOUS CALCULATION.

There was no further discussion.

VOTE: YES: HIGHLAND, ERICKSON, STEAD, VENUTI, STROOZAS, BRADLEY
NO: BOS

Motion carried.

B. Staff Report PL 15-16, Towers

The Commission briefly discussed the information from The Center for Municipal Solutions, an organization that has industry experts, is set up to assist with the creation of ordinances, and can do review, enforcement, or whatever we would need them to do. The idea is their review is paid by the applicant, so it wouldn't cost the city, but it is a significant amount of money. It was suggested this may be cost prohibitive to an applicant, and point was raised that putting up a tower is very costly to begin with, so it may not. City Planner Abboud wasn't sure of the cost of their service for Alaska.

City Planner Abboud and the Commission reviewed the ordinance information and revisions included in the staff report.

Discussion included:

- Essential services shouldn't be an exemption and telecommunications could be considered an essential service. The Environmental Protection Agency will require any utility or service using federal funds to construct will have to go through an environmental assessment. If an essential service wants to build a tower in excess of our height requirement, they should still have to come in for a CUP.
- The 1.1x setback is agreeable.
- 12 months is acceptable relating to reconstruction and replacement and also abandonment.
- Including review by a group like The Center for Municipal Solutions within the standards for approval of new tall structures. This company shouldn't be called out by name in code as there may be others offering the service.
- Continue working on and getting legal review of the draft ordinance, height requirements, and restrictions.

New Business

A. Staff Report Pl 15-15, Zoning for Marijuana

City Planner Abboud reviewed the staff report.

There was discussion that the City can adopt local regulations but they can't make them less restrictive than the state regulations. Opposition was expressed to cultivation being allowed in the GC1 and EEMU districts.

They acknowledged the work the state is doing and that it may be beneficial to wait to see what the legislators come up with first. It seems many of the other communities are stepping back to see what the state and larger cities are doing. Forming a local advisory board would be a good step in the process as it will allow a group of people time to focus on the topic and allow the city and residents to be actively engaged in the process.

HIGHLAND/BOS MOVED THAT THE COMMISSION RECOMMENDS COUNCIL FORM A LOCAL ADVISORY BOARD FOR MARIJUANA REGULATIONS.

There was discussion the Commission will still have an opportunity to address zoning relating to the allowable uses and restrictions in the districts.

VOTE: YES: STEAD, BRADLEY, STROOZAS, BOS, HIGHLAND, VENUTI
NO: ERICKSON

Motion carried.

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Staff Report PL 15-07

TO:	Homer Advisory Planning Commission
THROUGH:	Rick Abboud, City Planner
FROM:	Julie Engebretsen, Deputy City Planner
DATE:	January 21, 2015
SUBJECT:	Bridge Creek Watered Protection District Ordinance

Introduction

The Commission held a public hearing on the draft ordinance on October 15, and November 5th 2014. The hearing was postponed to this meeting. Commissioner Highland was going to speak with a hydrologist. She will speak to the Commission about this at the meeting.

Analysis

The draft ordinance is attached. Staff does not recommend approval of the draft ordinance. At minimum, the storm water retention section needs to be amended. (Staff miscalculated and the figure in the ordinance is wrong.) The Commission has heard testimony in favor and against the ordinance. The Commission's discussion has been leaning toward more regulation, not less, which is counter to the original request.

The Commission can make recommendations to Council that are not related to the zoning code. For example, the Commission can recommend the Council budget money for acquiring more property, establish ditch cleaning policies, waive fees etc.

Staff Recommendation: Fail the draft ordinance. Discuss and forward non-zoning incentives and policy recommendations to Council at the next meeting.

Such ideas might include:

~Waiver of platting fees when vacating lot lines
~Increase City efforts to purchase key properties
~Examine ditch cleaning policies and work with DOT on Skyline Drive maintenance

Attachments

Excerpt of November 5th 2014 meeting minutes
Excerpt of October 15th 2014 meeting minutes
Draft Ordinance
Comments of Bill Smith

CITY OF HOMER
ORDINANCE 14-xx

City Manager

AN ORDINANCE OF THE HOMER CITY COUNCIL AMENDING HOMER CITY CODE 21.40.070, REQUIREMENTS, REGARDING STANDARDS FOR IMPERVIOUS COVERAGE IN THE BRIDGE CREEK WATERSHED PROTECTION DISTRICT.

THE CITY OF HOMER ORDAINS:

Section 1. Homer City Code 21.40.070, Requirements, is amended to read as follows:

21.40.070 Requirements. The requirements of this section shall apply to all structures and uses in the BCWP district unless more stringent requirements are required pursuant to Chapter 21.71 HCC. The City of Homer water utility is exempt from this section.

a. Impervious Coverage.

1. Lots **three** ~~two-and-one-half~~ acres and larger shall have a maximum total impervious coverage of 4.2 percent.

2. Lots smaller than **three** ~~two-and-one-half~~ acres shall have a maximum total impervious coverage of **5,500 square feet** ~~4.2 percent, except as provided in subsection (a)(3) of this section~~.

3. Lots smaller than **three** ~~two-and-one-half~~ acres **shall comply with the following performance standards:** ~~may be allowed impervious coverage up to 6.4 percent if (a) the owner submits a lot-specific mitigation plan for Planning Commission's approval, and (b) if approved, thereafter implements and continuously complies with the approved plan. The mitigation plan must be designed to mitigate the effect of impervious coverage on water flow and the effect of loss of vegetation created by the impervious coverage~~

a. Disturbed areas shall be reseeded by August 31st

b. Storm water retention of 40 gallons must be provided on site, in the form of one or a combination of dry wells, rain barrels, rain gardens, foot drain retention or other method approved by the City Planner. The storm water retention is intended to mitigate the effect of impervious coverage and the resulting loss of vegetation on water flow.

c. When the City Planner finds that special site considerations such as topography or drainage warrant such treatment, a ditch lined with filter fabric and rock shall be constructed to slow water runoff from the driveway and encourage infiltration of water into the ground.

b. Impervious Coverage Calculations.

1. For the purpose of calculating impervious coverage on lots smaller than **three** ~~two-and-one-half~~ acres, **up to 500 square feet of uncovered deck attached to a**

[**Bold and underlined added**. ~~Deleted language stricken through~~.]

residence, and one accessory structure with a footprint area up to 200 square feet are excluded from the calculation ~~driveways and walkways may be partially or fully excluded from the calculation, if constructed and maintained in accordance with a mitigation plan, submitted and approved in accordance with subsection (a)(3) of this section~~.

2. Except as otherwise provided in this section, parcels of land subdivided after February 25, 2003, shall be allowed a total impervious coverage of 4.2 percent including right-of-way (ROW) dedication. ROW coverage area shall be calculated as 50 percent of the total area of the dedicated ROW. The impervious coverage allowed for the subdivided parcels shall be calculated after deducting the ROW coverage from the total parcel allowance according to the following formula:

Formula:

(Area of parcel being subdivided) x 0.042 = Total allowed impervious coverage (TAC)

(Area of ROW dedication) x 0.5 = ROW coverage (ROW C)

(TAC) – (ROW C) = Allowed impervious coverage for remainder of parcel being subdivided

(Area of parcel being subdivided) – (Area of ROW dedication) = New parcel area

(Allowed impervious coverage for remainder) ÷ (New parcel area) x 100 = Percent impervious coverage allowed on subdivided lots.

c. Additional Requirements for Subdivisions and Lots.

1. Lots created by subdivision after February 25, 2003, shall be a minimum of four and one-half acres.

2. Applications for subdivisions, dedications, and vacations of easements and rights-of-way in the BCWP district must be approved by the Planning Commission prior to submission to the Kenai Peninsula Borough.

d. Building Setbacks. Buildings must be set back from the Bridge Creek Reservoir and from streams as provided in HCC 21.40.110 and 21.40.120.

e. Sewer Systems. Appropriate to the use of the lot, each lot shall be served by a septic or sewer system approved by the Alaska State Department of Environmental Conservation (ADEC). Stream setbacks equal to 100 feet for drain fields and subsurface discharge and 250 feet for raised septic systems are required.

f. Ongoing Construction and Timber Harvesting. All activities including, but not limited to, timber harvesting, road building, subdivision and building activities involving loss of vegetation ground cover or soil disturbance and that are in process on February 25, 2003, shall be required to obtain permits under this chapter and shall fully conform to the terms of this chapter. Activities leaving disturbed or lost vegetative ground cover, disturbed soils without revegetation or leaving slash piles will be considered in process for the purposes of this subsection, regardless of when the activity occurred.

g. Pending Subdivisions. Subdivisions that have not received final plat approval by February 25, 2003, shall obtain approval from the Planning Commission and shall be required to conform to the requirements of this chapter.

[**Bold and underlined added**. ~~Deleted language stricken through~~.]

Section 2. This Ordinance is of a permanent and general character and shall be included in the City Code.

ENACTED BY THE CITY COUNCIL OF HOMER, ALASKA, this ____ day of _____ 2014.

CITY OF HOMER

_____
MARY E. WYTHE, MAYOR

ATTEST:

_____
JO JOHNSON, MMC, CITY CLERK

AYES:
NOES:
ABSTAIN:
ABSENT:

First Reading:
Public Hearing:
Second Reading:
Effective Date:

Reviewed and approved as to form:

_____
Walt Wrede, City Manager

Date: _____

_____
Thomas F. Klinkner, City Attorney

Date: _____

[**Bold and underlined added**. ~~Deleted language stricken through~~.]

BOS/STROOZAS MOVED TO ADOPT STAFF REPORT PL 15-06 AND APPROVE CUP 15-01 AT 2315 EAST END ROAD FOR MORE THAN ONE BUILDING CONTAINING A PERMITTED PRINCIPAL USE ON A LOT, WITH FINDINGS 1 THROUGH 10 AND CONDITIONS 1, 2, AND 3.

Commissioner Bos commented that this project will have to go through the requirements to make it a safe project. Maybe after this is complete the speed can be addressed again. The applicant has been a good steward in other projects he has built.

Commissioner Bradley agrees and sees the need for affordable housing. This project offers a great opportunity and it is a good location for it.

Commissioner Stroozas added that the density of the project complies with code and as long as the conditions are met there is no reason to deny it.

HIGHLAND MOVED TO LOWER THE NUMBER OF CABINS TO SIX.

Motion died for lack of a second.

HIGHLAND MOVED TO REQUEST PRIVACY FENCING ON THE SIDES THAT HAVE RESIDENCES ON IT NOW.

Motion died for lack of a second.

VOTE (Main motion): YES: HIGHLAND, STEAD, STROOZAS, BRADLEY, BOS

Motion carried.

Commissioner Venuti returned to the table.

B. Staff Report PL 15-07, Proposed Ordinance to amend the Bridge Creek Watershed Protection District impervious coverage allowance

City Planner Abboud reviewed the staff report.

Chair Stead re-opened the public hearing.

Kevin Dee, non-resident in the Bridge Creek Watershed Protection District, said he enjoyed the worksession discussion regarding the BCWPD, and agrees that property owners with smaller lots need some relief. He has concerns about the integrity of the watershed as there are many components to maintaining it. He agrees with voting down the ordinance and working on new ideas.

Sue Mauger, Science Director at Cook Inletkeeper and non-resident in the Bridge Creek Watershed Protection District, appreciates the the Commission being thoughtful about making changes to the original ordinances and encouraged them to continue to use caution in considering this area. She explained that if the smaller lots were scattered across the area there would be less concern, but because they are concentrated it changes the dynamic.

Joel Cooper, non-resident in the Bridge Creek Watershed Protection District, appreciates the recommendation to not pass this draft ordinance and encouraged the Commission to continue to look at other options for these property owners.

Bill Smith, non- resident, commented that when developing the current BCWPD as it is in code they looked at a lot of methods using Alaska numbers and chose the high end of the range that was given for impacts. They made allowance for impervious coverage in rights-of-way and roads in the district. True science would take in the roads and driveways that serve the lot and in terms of science you may find the lots are over 10% impervious coverage. He hopes the Commission goes forward with making recommendations to Council because it's important that the community does something for the people we are asking to help protect our water.

Rich Fetterhoff, city resident and owner of a smaller lot in the Kelly Ranch Estates, appreciates the initiative to accommodate property owners. The restrictions imposed on the property owners there are hardships. The total acreage in the subdivision is about 4 acres out of 2,000 or .002%. It's hard to believe that is really going to be detrimental to the watershed. He asked that they continue to consider this.

Lance Prouse, owner of a lot in the watershed district, said he lives on Eagle View because it isn't feasible to build on his lot, which is about 1.5 acres. He appreciates the Commission looking at this and agrees with Mr. Fetterhoff that it's time for some relief up there. He understands the concern and mitigation for runoff and pollutants, having worked on putting the gas line in the area. It is very expensive to do mitigation on the lots up there, it takes hours upon hours of time, and the typical homeowner isn't going to be able to find the financing to hire someone to spend those hours. The land owners don't want to pollute the water, other stop gap measures are in place, and property owner need to be able to use or sell their lots.

There were no further comments and the hearing was closed.

VENUTI/BOS MOVED TO APPROVE THE BRIDGE CREEK WATERSHED PROTECTION DISTRICT DRAFT ORDINANCE.

HIGHLAND MOVED TO AMEND THAT IF THIS IS APPROVED SHE REQUESTS STATE HYDROLOGIST GIVE US A PRESENTATION AND THAT WE ASK THE STATE TO DO SOME ON GROUND WORK WITH THE BRIDGE CREEK WATER SHED.

Motion failed for lack of a second.

STROOZAS/HIGHLAND MOVED TO AMEND THE DRAFT ORDINANCE TO CHANGE FROM 40 GALLONS OF RETAINAGE ON A LOT TO A MINIMUM OF 1000 GALLONS PER LOT.

There was brief discussion to confirm staff agreed with 1000 gallons not 4000 gallons.

VOTE: YES: STROOZAS, HIGHLAND
NO: STEAD, BRADLEY, BOS, VENUTI

Motion failed.

Commissioner Venuti commented there has been minimal testimony of making this change. Most of it has been against making a change to the district as it stands. He suggests taking in to consideration information shared by Mr. Smith at the worksession, and approach this differently and try to make some non-zoning incentives to land owners up there.

Commission Highland agreed and said the previous work done on this ordinance was immense and they chose to go conservative because it is our only water source. She likes the idea of incentives and wants to further explore them. She is also interested in seeing what possibilities there are to get funding to purchase some of the property.

Commissioner Bradley also agrees with previous comments and supports the idea of incentives.

Commissioner Stroozas reiterated a comment of the public that we are looking at 4 acres in the entire acreage of 93 lots. It is .0019%. He acknowledged the work that was done in creating the district and this is not going to bring them to a ten percentile figure, the point where engineers and scientists have expressed is where you need to start being concerned. We need to do something to help the lot owners who can't build and can't sell. They are stuck.

Commissioner Bos recognized there has been a lot of testimony relating to water quality and its history. There hasn't been much testimony for it. If we end up moving it along to the city to try to get help for the land owners he would like to say that it shouldn't just be the city taking on the adjustment, it should be everyone getting water from the watershed.

Chair Stead appreciates the previous work that was done. He believes the current studies provided have given them some additional things to look at, but doesn't think it's conclusive or that they have any way to help specify reasonable mitigation methods. He doesn't support this particular ordinance, but they should revamp it.

VOTE (Main motion): YES: STROOZAS
NO: BRADLEY, STEAD, VENUTI, HIGHLAND, BOS

Motion failed.

There was brief discussion that the cost causer/cost payer approach of increasing water rates to have funds to offer some sort of relief could be a challenge. It was also noted that the four acres would create a lot of concentration in close proximity to the creek and some sort of unified or subdivision mitigation could address concerns we heard, it just isn't clear what that might look like.

It was further noted the information from Cook Inletkeeper says we should be able to go up to 10% if there are some sort of buffers provided and protect the riparian zones. Hopefully something can be done along those lines so these people can have some relief.

They talked about the state hydrologist for DNR and that our local NRCS people have a lot of information. There could be a way to work with NRCS to sift through what questions should be asked

to be more specific on the direction this should be going. They also touched on different avenues for funding to acquire properties.

Plat Consideration

Pending Business

A. Staff Report PL 15-08, Towers

City Planner Abboud reviewed the staff report.

Discussion ensued regarding tower height, fall zones, and conditional use. They used the table included in the packet and plugged in the following heights as a starting point for consideration of conditional use:

UR, OSR, CONS, CBD and TC – greater than 60' requires CUP
RR and RO – greater than 85' requires CUP
MI, MC, GC2, EEMU- greater than 120' requires CUP
GC1 - greater than 120' or FAA requirement
BCWP (outside city) – greater than 150' requires CUP

No suggestions were made yet on the maximum height.

New Business

Informational Materials

A. Resolution 15-001 Interim City Manager
B. City Manager's report for January 12, 2015 Council Meeting

Comments of the Audience

Members of the audience may address the Commission on any subject. (3 minute time limit)

None

Comments of Staff

City Planner Abboud commented that he will work on this and they will look at the Comprehensive Plan in relation to the Strategic Doing process the Council is working on.

Comments of the Commission

Commissioner Highland commented about the CUP tonight. It is difficult for her when people come in and have issues with a proposal. That area is moving out of rural residential, and when she first started and looked at rural residential, she didn't realized how much is allowed there. It was a good meeting, they got a lot done.

Bill Smith comments from Work Session Jan. 7, 2015

Pump septic tanks for free or reduced price

Reduce mill rate to below out of city

No charge for zoning permits

Staff approval of Mitigation plans

Expand district to cover actual watershed

Minimize road ditch clearing

Map wetlands & streams; communicate with affected property owners

No road salts

Publish best practices booklet & distribute every 2 or 3 years.

Send Christmas cards to thank property owners for being good stewards

Baseline water quality study, with ongoing updates

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STAFF REPORT PL 15-01

TO: Homer Advisory Planning Commission
FROM: Rick Abboud
MEETING: January 7, 2015
SUBJECT: City Planner's Report

City Council meeting of 12.08.14

Introduced Ordinance 14-56, zoning permit required……Public hearing and second reading 1-12-15. Adopted meeting schedule that the Planning Commission approved

Staff: We are having some realignment of duties. Travis will become responsible for permitting and code enforcement activities and Dotti will work the front desk.

Bridge Creek Watershed: I have included a memo in addition to scheduling Bill Smith to speak. While we are free to speak about this at the meeting, any action will have to wait until the next meeting.

SRTS (Safe Routes to School): Unfortunately, it looks like our application to the program did not get funded. I have been having discussions about continuing some activities of the grant without the funding. We do have some resources for pedestrian improvements and could conduct some outreach activities.

Marijuana: We voted to make it legal. Now we must deal with it. I will start the process of reviewing some of the concepts that the Planning Commission will have to address regarding the sale of marijuana. I will list the things that we may address in the zoning code and start a draft ordinance.

STIP Amendments

I routinely decipher and comment on DOT projects that directly affect Homer. Attached are my comments for the latest proposed amendment.

Attachments: SR 15-03 Bridge Creek Watershed Protection District
Letter of support for State DOT Sterling Hwy. planned upgrades

P:\PACKETS\2015 PCPacket\Staff Reports\City Planner reports\SR 15-01 Jan 7 City Planner.docx

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Staff Report PL 15-03

TO:	Homer Advisory Planning Commission
THROUGH:	Rick Abboud, City Planner
FROM:	Julie Engebretsen, Deputy City Planner
DATE:	January 7, 2015
SUBJECT:	Bridge Creek Watershed Protection District

Requested Action: Read through this staff report. No action requested at this meeting.

Introduction

Bill Smith will be a guest speaker at the work session and also at the regular meeting.

The Commission is scheduled to resume discussion of the draft ordinance at the next meeting, and continue the public hearing. The draft ordinance is on the floor for discussion and vote at that meeting. The purpose of this staff report is to give the Commission some options for future action.

In 2014, the Commission began having speakers at work sessions, to increase communication between the Commission and the community. One of the groups that spoke to the Commission was the Kachemak Board of Realtors. They made a request of the Commission to change the BCWPD rules, and the Commission and department made a sincere effort to review the rules and find solutions. This has been a positive, constructive dialogue and public process. But while the process was good, the results are not widely supported. We have received public testimony against the ordinance, and the Commission has many more questions. It does not appear the ordinance will be ready to approve any time soon.

The question before the Commission is now one of priorities: is this ordinance important enough to keep working on at the expense of other topics? The point of this process was twofold: the Commission demonstrated the ability and willingness to have a constructive conversation on a potentially controversial topic, and to make a change in the BCWPD. The process worked well, but the resulting ordinance is not well supported by the public. Does the Commission want to spend more time on the draft ordinance? Or, has this topic been reasonably debated and the proposed changes well-intentioned but not worthy of adoption?

At this point, the Commission has discussed possible changes to the BCWPD ordinance, and held two public hearings. The hearing will be continued on January 21st. At that meeting, there are several possible next steps.

1. Adopt the ordinance as is. Staff does not recommend this option without amending the ordinance. At minimum, the rainwater retention section needs to be amended. If the Commission pursues adoption of the ordinance, staff can work on drafting this amendment.
2. Continue to work on the ordinance. There seems to be little consensus amongst Commissioners and the public that the changes are acceptable. As the Commission has seen from the information received through the hearing process, its hard to find definitive data one way or another about the difference between 4.2% and 6% or some other single digit of impervious surface in a watershed. There probably isn't one single 'right' answer. It will take significant time and resources to do more with this ordinance.
3. Table the ordinance, or vote it down. (Tabling means the ordinance dies on the spot.)
4. Work on other topics related to the watershed, such as more aggressive land acquisition, and better road maintenance, ditching and culvert practices. These topics can be addressed by the Commission in a memo addressed to the City Council, and by lobbying during the Capital Improvement Plan and city budget processes. These actions will not be addressed through a change in the zoning code, nor are they direct activities of the Planning Department. It would be up to the City Council to decide if these items are a priority to the City and to direct the City Manager to work on these issues.

Staff Recommendation: Read through this staff report. No action requested at this meeting.

Presentations

Reports

A. Staff Report PL 14-91, City Planner's Report

Deputy City Planner Engebretsen reviewed the staff report. In response to questions she gave an overview of the Safe Routes to School Grant.

Public Hearings

Testimony limited to 3 minutes per speaker. The Commission conducts Public Hearings by hearing a staff report, presentation by the applicant, hearing public testimony and then acting on the Public Hearing items. The Commission may question the public. Once the public hearing is closed the Commission cannot hear additional comments on the topic. The applicant is not held to the 3 minute time limit.

A. Staff Report PL 14-92 Proposed Conditional Fence Permit for a 70 ft long 7ft tall fence along Mullikin Street 3945 Mullikin Street

Deputy City Planner Engebretsen reviewed the staff report.

Chair Stead opened the public hearing. There were no comments and the hearing was closed.

STROOZAS/HIGHLAND MOVED TO APPROVE STAFF REPORT PL 14-92 AND A CONDITIONAL FENCE PERMIT AT 3945 MULLIKIN ST. WITH STAFF RECOMMENDATIONS AND FINDINGS.

It was suggested that there doesn't seem to be any special circumstances to justify needing the additional height, and that a fence of this size along the section of road will likely dominate the site. Other comments included in looking at the location of the house and the slope of the lot the additional height could be justified for privacy. The artistic design of the fence also includes using different length boards.

VOTE: YES: STEAD, HIGHLAND, ERICKSON, VENUTI, STROOZAS, BRADLEY

Motion carried.

B. Memorandum 14-03, Continued Public Hearing for an ordinance of the Homer City Council amending Homer City Code 21.40.070, requirements, regarding standards for impervious coverage in the bridge creek watershed protection district.

Deputy City Planner Engebretsen noted correspondence included in the packet; as well as the additional laydown materials including letters from Carol Griswold, Phil Clay, Tammy Clay, and Lance and Rachel Prouse, also an additional laydown from Bob Shavelson and Cook Inletkeeper.

Chair Stead opened the public hearing.

Bob Shavelson, Executive Director of Cook Inletkeeper and city resident, commented in support of slowing down the process of amending the Bridge Creek Watershed District. He noted any proposed changes have to be consistent with the Comprehensive Plan and he thinks this fails to meet that

standard. The standard of promoting present and future public health, safety, and welfare and creating clear consistent regulation for small parcel development in the watershed does not get to the criteria the Commission is required to look at before forwarding this to council. There are certain due diligence requirements that he doesn't feel have been met here. He believes there needs to be some hydrologic study to understand what type of development can be done here. He reiterated that it is cheaper to prevent pollution to a drinking water supply than to treat it after the fact. He doesn't feel like there is enough information to make an informed decision.

Commissioner Venuti raised question about the water quality data and Mr. Shavelson said he sent the water data to planning late today. The caveat to the data is that they haven't gone through final quality control on the data and the data needs to be verified.

Commissioner Stroozas commented about the .19% increase of impervious surface that is being addressed in lots that are three acres or smaller. After 11 years with the current regulations we are asking to mitigate property for a small amount of owners who are unable to enjoy a reasonable amount of their property. If at a point in the future there is dramatic high density development in the area, additional changes can be made if needed. Mr. Shavelson said he doesn't believe there is enough factual information to determine the impact of the proposed changes. The purpose of the ordinance was not to prevent a catastrophe, it was meant to effect daily, weekly, and yearly chronic pollution that comes from non-point source pollution.

Joel Cooper, Bridge Creek watershed resident, recognized the land where he built his home is unique and as a landowner has an obligation to help protect it. Remember this is the city's drinking water supply, so don't look at it through the lens of development on a regular scale, it has to be looked at differently. He agrees they need to do a hydrological review of the area, and work with USGS to get a better idea of the water quality there. He also encouraged calculating the impervious cover in that concentrated area, that is a conduit for pollutants into the water shed. Developing this in small parcels would be like death by 1000 cuts to the watershed.

Nancy Hillstrand, owner of about 350 acres in the watershed, commented she does everything she can to protect the property and had planned to put into a conservation easement to protect the water quality. She feels like this change is going backward. She addressed the Beluga Lake plan and suggested it be used as a template, along with the Soil and Water Conservation District information on soils and what is going on there. This is the information that needs to be on the table before making these decisions, because protecting the city's water source is probably the most important job this group will do. She recommended a coalition, like they have done for Woodard Creek, to look at all this data so that we don't make a mistake.

Kevin Dee, Bridge Creek watershed resident, commented that he is willing to work within the current regulations relating to developing his property in order to keep the watershed intact. He agrees that there needs to be more facts on the table so they can make a decision that maintains the purpose of the watershed. It should be fact driven rather than based on a set of opinions. He isn't hearing anything about subdivision mitigation plans that would tie into small lots.

Carey Meyer, City of Homer Public Works Director, commented that he has talked to property owners with lots smaller than 3 acres to figure out a way to develop their lot, and it becomes very difficult. He noted his understanding that in the district there are 93 lots that are 3 acres or less and that there

won't be any more lots created in the district that are three acres or less. He recommended they look at a 1000 gallon retainage instead of 40 gallons. 40 gallons doesn't mitigate enough runoff from a site. He also suggested the potential for dry wells as mitigation factors.

Commissioner Highland noted that a majority of the 93 lots aren't developed and they don't know what it will look like with the 4.2% with the lots developed.

Mike Hayes, property owner along Twitter Creek, recognizes that this district is a special place. He has 10 acres with three of them in the watershed. He feels that people should be able to live within the limits outlined in code and agrees it is important that the Commission continue to study this before making any changes.

There were no further comments and the public hearing was closed.

Deputy City Planner Engebretsen had no rebuttal comments.

VENUTI/STROOZAS MOVED TO APPROVE THE DRAFT ORDINANCE AMENDING HCC 21.40.070 REQUIREMENTS, REGARDING STANDARDS FOR IMPERVIOUS COVERAGE IN THE BRIDGE CREEK WATERSHED PROTECTION DISTRICT AND FORWARD TO CITY COUNCIL FOR ADOPTION.

Commissioner Stroozas acknowledged Public Works Director Meyer's comments about the water retention area. Deputy City Planner Engebretsen said she will look at the calculations and bring it back to them.

Commissioner Venuti agrees they need a hydrologist. He sees both sides of the picture but they need more information to make a good decision that is in the best interest of the public.

Commissioner Highland noted she has been attempting to contact some people regarding a hydrologist; also the NRCS and the Kenai Watershed. She feels they are guessing right now and it isn't the best way to approach this. She thinks there must be some best management practices for a water source they could use for reference. She also wonders if they can put together something showing what the runoff would be if all 93 lots were developed, and the impact of leach fields.

Commissioner Erickson expressed her understanding that for any new development within the district they can't have lots smaller than 4.5 or 5 acres. We aren't going to be looking at more of the smaller lots other than the Kelly Ranch Estates that was established prior to the Bridge Creek Watershed District formation. She would like to see City Council more actively pursue purchasing the smaller lots that people can't deal with because of the size; or if the Land Trust has the monies to purchase them for conservation. She also encourages incentives for current property owners to purchase the lots around them to create larger lots.

Chair Stead acknowledged they addressed the 4 acres being a minor change in Kelly Ranch Estates, and the impervious coverage in the subdivision goes up to 6%. He added that at the report from the October 15 staff report did not state that they don't need to protect our environmental function, but we do need to do that. We also need to define what the City Planner would find as special site considerations. He expressed his frustration with the studies that have been presented and touched on issues he sees relating to discrepancies between the studies and the area they are working with. In

these studies there is no ability to go in and say this type of a mitigation or activity would prevent damage to the water quality. The Commission is trying to incorporate what we can do to allow people to use their land and provide some sort of mitigation.

Deputy City Planner Engebretsen commented that she doesn't know that the Commission will be able to get the magic number. The 4.2 was based on the information at the time. She explained that the Commission has some options to approve it as is, vote this down, or maybe look at mitigation plans instead of 5500 square feet so it's more consistent over time. Staff didn't spend a lot of time explaining the ways various commissions have approved mitigation plans, some have been simple, and some have required a stamped, engineered plan. In some ways best management practices or more consistency with mitigation plans would be a worthwhile result of this, whether they are staff or Commission approved.

There were comments relating to finding grants for the city to purchase additional land in the watershed, and working with DEC and other state agencies to find support and information that won't cost the city; and also discussion of when they wanted this back on their agenda.

HIGHLAND/BRADLEY MOVED TO POSTPONE THIS DRAFT ORDINANCE TO JANUARY 21, 2015.

There was brief discussion that Commissioner Highland would talk with the City Planner about what she would like to see from a hydrologist.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

C. Staff Report PL 14-93, Proposal for a public sign at Jack Gist Park

Commissioner Highland stated she has a conflict of interest. She is President of the Kachemak Bay Equestrian Association, which owns a neighboring property.

VENUTI/STROOZAS MOVED THAT COMMISSIONER HIGHLAND HAS A CONFLICT OF INTEREST.

Question was raised if Commissioner Highland felt she could make a nonbiased decision. She responded that she could.

VOTE: YES: ERICKSON
NO: STEAD, VENUTI, STROOZAS, BRADLEY

Motion failed.

Deputy City Planner Engebretsen reviewed the staff report.

Public Works Director Meyer commented about users of the park wanting a sign on East End Road to indicate the park is down there, and the Parks and Recreation Commission's goal to standardize park signage in the city.

Chair Stead opened the public hearing. There were no comments and the hearing was closed.

Commissioner Erickson suggested there be hooks on the sign that would allow for displaying information on activities that are happening at the park.

Deputy City Planner Engebretsen explained that the information in the packet is what's being requested. The city's sign design does not include a logo of what activity is at a park. While this sign is larger than the other park signs, it isn't large enough to be an informational sign for all the activities there. If the Commission fails this, staff could come back with another solution.

There was further discussion about options to be able to display events at the park.

ERICKSON/VENUTI MOVED TO APPROVE STAFF REPORT PL 14-93 AND THE PROPOSED PUBLIC SIGN AT JACK GIST PARK WITH STAFF RECOMMENDATIONS AND FINDINGS, ALONG WITH A COUPLE HOOKS OR SOME WAY FOR ACTIVITIES TO BE DISPLAYED ON A TEMPORARY BASIS FOR THE DAY.

More discussion ensued about options to be able to display events at the park.

VOTE: YES: ERICKSON, BRADLEY, HIGHLAND, VENUTI
NO: STEAD, STROOZAS

Motion carried.

Plat Consideration

Pending Business

New Business

Informational Materials

A. City Manager's Report for the October 13 and October 27 City Council Meetings
B. Kenai Peninsula Borough Plat Committee Notice of Decision Re: Homer Enterprises, Inc. Subdivision Resetarits Replat Preliminary Plat

Comments of the Audience
Members of the audience may address the Commission on any subject. (3 minute time limit)

Bob Shavelson, Executive Director of Cook Inletkeeper and city resident, commented that having attended a previous meeting where there was no information on impervious coverage, his intent with what he provided was to get some information to them. There is a wide range of methodologies to look at and it's inherently complicated. He reiterated a comment from Ms. Hillstrand that the Commission deals with a lot of different and complicated things, but can't think of a more important thing they do than work on the drinking water supply for the City of Homer. It isn't just for the residents, but also the tourists, and people who live outside the city. It's a vital asset for the community and again, he advocates for a go slow approach.

Joel Cooper, Bridge Creek Watershed resident, added that the abstract of the original document used in creating the district talks about thresholds and how things correspond to the 4.4 to 5% imperviousness. If they get that kind of analysis on the Bridge Creek Watershed, they might get some of the answers they are looking for. He noted he could have them focus on the highly concentrated area to see what kind of impact is happening.

Public Works Director Meyer commented that they don't need an expert to remind them of the importance of the water and that Homer soils are highly organic and erodible and underlying are fine grain silty soils that are even more erodible. Different percentages were looked at in developing the watershed ordinance as it exists and he recalls settling on the 4% because they recognized that it is a drinking watershed and wanted to be conservative and not approach the 10%. The other issue was impermeable surface are also created in the watershed off the site with roads, utility corridors, and so forth. It is important to maintain a safety factor there. We should be careful when we make adjustments that we aren't creating any problems.

Comments of Staff

None

Comments of the Commission

Commissioner Stroozas acknowledged the importance of the information presented by Mr. Shavelson. The Commission isn't done yet, obviously, but he believes they will make a decision at some point in time that will work for everyone, but especially for the watershed.

Commissioner Venuti said it was an interesting meeting. He acknowledged the potential cost of working with a hydrologist and the notion of who will pay for it. Deputy City Planner Engebretsen hopes to have some answers related to cost and timing at the January 21st meeting.

Commissioners Highland and Bradley said it was a good meeting.

Commissioner Erickson said good night.

Chair Stead said he will miss the December 3rd meeting. He acknowledged the Bridge Creek Watershed is the most important work they will do. The studies in hand don't adequately represent the types of issues they are trying to address and he has difficulty with that. When talking with the experts, they need to ensure the experts give them studies, or reasoning to accept studies, that make sense to the group.

Adjourn

There being no further business to come before the Commission, the meeting adjourned at 8:10 p.m. The next regular meeting is scheduled for December 3, 2014 at 6:30 p.m. in the City Hall Cowles Council Chambers.

_____
MELISSA JACOBSEN, CMC, DEPUTY CITY CLERK

Approved: _____

Lay Down at November 5, 2014 HAPC Meeting

From: Lance & Rachel Prouse <lanceprouse@mac.com>
Sent: Wednesday, November 05, 2014 3:40 PM
To: Department Planning
Subject: Bridge Creek Watershed

Planning Commission,

As a property owner in the Bridge Creek Watershed District, I would like to voice my support of the proposed changes to the zoning rules.

Property: 5580 Felix

Lance Prouse

11/05/14

From: Lance & Rachel Prouse <lanceprouse@mac.com>
Sent: Wednesday, November 05, 2014 3:42 PM
To: Department Planning
Subject: Bridge Creek Watershed

Planning Commission,

As a property owner in the Bridge Creek Watershed District, I would like to voice my support of the proposed changes to the zoning rules.

Property owned: 5580 Felix

Rachel Prouse

11/05/14

RECEIVED

11/5/2014

CITY OF HOMER
PLANNING/ZONING

Lay Down at November 5, 2014 HAPC Meeting

-----Original Message-----
From: tamera143@yahoo.com [mailto:tamera143@yahoo.com]
Sent: Wednesday, November 05, 2014 3:40 PM
To: Dotti Harness
Subject: Planning commission letter

To Homer Planning Commission

Thank you for reconsidering the restrictions on developing lots in the Bridge Creek Watershed District. For years, we have put off building because of the prohibitive existing restrictions. We have also found that the lot we own is nearly impossible to sell, because prospective buyers find out that they will have to go through strict mitigation processes, and then they decline. We can't build, we can't sell, and we are stuck in limbo.
You're on the right track to turn around the predicament of many land owners near us!
I appreciate the time that you are each putting into this.
Respectfully,
Tammy Clay

Sent from my iPhone

RECEIVED

11/5/2014

CITY OF HOMER
PLANNING/ZONING

Lay Down at November 5, 2014 HAPC Meeting

To: Homer Planning commission
From: Phil Clay

Thank you for taking the time to review the issue of development in the BCWSD. I purchased lots in East highlands sub (within BCWSD) a short time before annexation. I had plans to develop those lots with a B and B in mind. When the city put the existing development restrictions on that area, it pretty well eliminated that idea, or development of any consequence on those properties.
I have attempted to sell my property for several years at a price that would allow me to at least break even on my investment, to no avail. Land prices plummeted after the regulations went into effect. Who would want to try to purchase a property with so little area for use, and so much regulation?
I understand and agree that our water
sources need to be protected. I also believe that responsible development can occur in the area without disturbing this essential resource.
Please consider increasing the land usage to 7500 square feet for developed areas on lots smaller than 3 acres. This would allow for a home that would meet the covenant size requirements , and include a driveway, shed and decks.
Thank you for your consideration.
Phil Clay

Lay Down at November 5, 2014 HAPC Meeting

From: rainyday <c_griz@yahoo.com>
Sent: Thursday, October 30, 2014 5:42 PM
To: Department Planning
Subject: Bridge Creek Watershed Protection District comments

Dear Homer Planning Commissioners,

As a property owner in the BCWPD, I support the proposed amendments to HCC 21.40.070 that protect the watershed while allowing reasonable use of small lots, and make administration of this ordinance more efficient and effective.

Sincerely,
Carol Griswold

11/5/14 laydown at HAPC PH

Cook Inletkeeper
3734 Ben Walters Lane
Homer, Alaska 99603

p. 907.235.4068
f. 907.235.4069
www.inletkeeper.org

November 5, 2014

Don Stead, Chair
Homer Advisory Planning Commission
491 East Pioneer Avenue
Homer, Alaska 99603

RE: PROPOSED CHANGES TO THE BRIDGE CREEK WATERSHED PROTECTION DISTRICT

Dear Chairman Stead:

Please accept these comments on behalf of Cook Inletkeeper (Inletkeeper) and its more than 500 members and supporters in the Homer area. These comments are a supplement to comments and documents Inletkeeper has provided the Commission on this matter previously.

I. The Bridge Creek Watershed: Homer's Sole Public Drinking Water Source

As previously noted, Inletkeeper recognizes the Bridge Creek Watershed as a vital community asset. Across the nation and the world, there's no more important community resource than clean, accessible and plentiful drinking and domestic water. We need look no further than the current drought conditions in California to understand how important and valuable municipal water supplies are to local families and businesses.

The Homer City Council recognized the importance of the Bridge Creek Watershed in 2008, when it passed into law the Bridge Creek Watershed Protection District (HCC 21.40). At the time, the Council debated a variety of issues, including development rights and the value of the City's sole drinking water source. In response, when establishing the purpose for the District, the Council came down firmly on the side of protecting drinking water quality for current and future generations, and restricting land use activities to do so:

> The purpose of this chapter is to prevent the degradation of the water quality and protect the Bridge Creek Watershed to ensure its continuing suitability as a water supply source for the City's public water utility. These provisions benefit the public health, safety, and welfare of the residents of the City of Homer and other customers of the City's water system by restricting land use activities that would impair the water quality, or increase the cost for treatment (HCC 21.40.010).

II. Insufficient Information

The Homer City Code requires the Planning Commission to satisfy some basic due diligence criteria before it may recommend approval of a proposed Code amendment to the City Council (HCC 21.95.040). For the following reasons, the proposed Code changes fail to meet this test.

First, the proposed changes must be consistent with the Comprehensive Plan (HCC 21.95.040(a)). Comprehensive Plan Chapter 4, Land Use Goal 2, Objective B, states: "Establish development standards and require development practices that protect environmental functions." Yet in the October 15, 2014, memo from staff to the Commission, staff writes: "The amendment is consistent with the plan be [sic] creating new, consistent development standards." This brief statement fails to address how the proposed changes "protect environmental functions," and therefore it violates HCC 21.95.040(a).

Next, the Code requires the Commission the proposed changes will be "reasonable to implement and enforce." HCC 21.95.040(b). Yet under the proposed changes, the City Planner must make a finding whenever "special site conditions" exist that may require interception and infiltration ditches. Nowhere, however, does the proposal discuss where, when or how such findings will be made. As a result, the proposed changes create uncertainty and would not be reasonable to implement.

Finally, the Code requires proposed changes to "promote the present and future public health, safety and welfare. " HCC 21.95.040(c). The October 15, 2014, staff memo, however, states this criterion will be met "by creating clear, consistent regulation for small parcel development in the watershed." Again, this brief statement has nothing to do with the stated goal to "promote the present and future public health, safety and welfare." In fact, the rationale presented in the staff memo runs directly counter to the very purpose of the Bridge Creek Watershed Protection District, which is to "benefit the public health, safety, and welfare of the residents of the City of Homer and other customers of the City's water system by restricting land use activities that would impair the water quality, or increase the cost for treatment." (HCC 21.40.010) (emphasis added).

III. Conclusion

The point in raising the above issues is not to throw up legalistic hurdles. Instead, Inletkeeper's intent is to show how little consideration has gone into the proposed changes, and how such changes fail to meet the basic purposes of the Bridge Creek Watershed Protection District and the City of Homer's Comprehensive Plan.

I will also reiterate a previous point: it's not the overall addition of new development in the watershed that raises concerns here, but rather the concentration of development in a relatively small area – with attendant leaking vehicles, herbicide and pesticide use, etc. This point takes on special significance in light of the documents provided to the Commission by Mr.

Story in April 2014, which envision subdividing and developing all non-public parcels in watershed.

Accordingly, Inletkeeper recommends the Planning Commission table the proposed changes until a professional hydrological review can determine whether such changes can in fact comport with the purpose of the Bridge Creek Watershed Protection District to "prevent the degradation of the water quality and protect the Bridge Creek Watershed to ensure its continuing suitability as a water supply source for the City's public water utility."

Thank you for your attention to this important matter and feel free to contact me with any questions.

Very truly yours,

Bob Shavelson
Inletkeeper

From: Julie Engebretsen
Sent: Wednesday, October 29, 2014 11:52 AM
To: Travis Brown
Subject: FW: Bridge Creek Watershed Ordinance
Attachments: Impervious Cover Documents.pdf

From: Bob Shavelson [mailto:bob@inletkeeper.org]
Sent: Thursday, October 16, 2014 12:47 PM
To: Rick Abboud
Cc: Julie Engebretsen
Subject: Bridge Creek Watershed Ordinance

Hi Rick -

Would you please forward this email to the Planning Commission and include in the record for the proposed revisions to the Bridge Creek Watershed Ordinance?

Thanks -

Bob

Dear Commissioners -

Thank you for the opportunity to testify last night on the proposed revisions to the Bridge Creek Watershed. Attached please find some literature on impervious cover that hopefully can help guide decision-making through this process.

In response to Commissioner Venuti's request, I will also be providing habitat and water quality data Inletkeeper has collected for the area in the near future.

A few points I would like to highlight from last night:

In response to Commissioner Stroozas question regarding the relative increase in impervious cover that would occur under the proposed ordinance, it's important to understand it's not the overall increase in impervious cover across the entire watershed, but rather the concentration of development in Kelly Ranch Estates which presents important questions. As noted during the Commission's discussion, runoff from Kelly Ranch Estates has a direct path to the Bridge Creek Reservoir, and it makes sense to understand the hydrology of that area and what effect best management practices might have on runoff should most or all of the lots in Kelly Ranch Estates get developed.

I emphasized again last night the importance of the Bridge Creek Watershed as Homer's sole drinking water source, and it's important to look down the road 20 or 50 years to think about what our actions now will do in the future. We cannot know whether all the lots will be developed, or whether some or many lots will be sub-divided and developed. Safe drinking water is and will increasingly be one of Homer's most valuable commodities, for residents, businesses

and tourists alike. That's why it's so important to conduct hydrology studies so we base any decisions on the professional judgement and data of people skilled in this area.

Inletkeeper recognizes the arguments put forth by Mr. Story last night, and as mentioned, believes there are creative ways - through tax credits, sub-division scale mitigation measures and other tools - to address the issues raised by the concentration of lots in Kelly Ranch Estates. Along those lines, we're available to assist the Planning Department and the Commission in any way we can to help ensure we protect Homer's water supply while acknowledging property owner rights in the Bridge Creek Watershed District.

Thank you again for your time and work -

Bob

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f. 907.235.4069
c.907.299.3277
skype: inletkeeper
bob@inletkeeper.org

Title:	Impervious surface coverage.
Authors:	Arnold Jr., Chester L. Gibbons, C. James
Source:	Journal of the American Planning Association. Spring96, Vol. 62 Issue 2, p243. 16p. 6 Diagrams, 2 Charts, 2 Graphs.
Document Type:	Article
Subject Terms:	*WATER quality management *URBAN planning
NAICS/Industry Codes:	237210 Land Subdivision 925120 Administration of Urban Planning and Community and Rural Development 924110 Administration of Air and Water Resource and Solid Waste Management Programs
Abstract:	Discusses various aspects of water resource protection in urban areas. Impervious land cover as an environmental indicator; Addressing of environmental issues; Land-use regulation; Natural resources planning in cities.
Full Text Word Count:	9367
ISSN:	0194-4363
Accession Number:	9604010765
Database:	Environment Complete

The Emergence of a Key Environmental Indicator

Planners concerned with water resource protection in urbanizing areas must deal with the adverse impacts of polluted runoff. Impervious surface coverage is a quantifiable land-use indicator that correlates closely with these impacts. Once the role and distribution of impervious coverage are understood, a wide range of strategies to reduce impervious surfaces and their impacts on water resources can be applied to community planning, site-level planning and design, and land use regulation. These strategies complement many current trends in planning, zoning, and landscape design that go beyond water pollution concerns to address the quality of life in a community.

Impervious land cover has long been characteristic of urban areas, but has only recently emerged as an environmental indicator. Natural resource planning using impervious surface coverage as a framework can be a pragmatic and effective way of addressing a host of complex urban environmental issues, particularly those related to the health of water resources.

Water resource protection at the local level is getting more complicated, largely due to the recognition of nonpoint source pollution, or polluted runoff, as a major problem. This diffuse form of pollution, now the nation's leading threat to water quality (Environmental Protection Agency 1994), is derived from contaminants washed off the surface of the land by stormwater runoff, and carried either directly or indirectly into waterways or groundwater. As programs directed at nonpoint source control cascade down from federal to state to local governments, the technical complexities involved with such control are further complicated by regulatory and management considerations.

Stormwater runoff problems are nothing new to local land-use decision-makers. However, the principal concern about runoff has always been safety, with the focus on directing and draining water off of paved surfaces as quickly and efficiently as possible. Once off the road and out of sight, stormwater has been largely out of mind--downstream consequences be damned (or dammed). Regulations have been expanded in recent years to include consideration of flooding and erosion, yet these factors fall far short of a comprehensive and effective approach to mitigating the water quality impacts of development.

How do planners and other local officials get a handle on protecting their local water resources? While no magic bullet exists to simplify all the complexities involved, an indicator is emerging from the scientific literature that appears to have all the earmarks of a useful tool for local planners--the amount of impervious, or impenetrable, surface. This article reviews the scientific underpinning, usefulness, and practical application of impervious surface coverage as an urban environmental indicator.

People, Pavement and Pollution

Impervious surfaces can be defined as any material that prevents the infiltration of water into the soil. While roads and rooftops are the most prevalent and easily identified types of impervious surface, other types include sidewalks, patios, bedrock outcrops, and compacted soil. As development alters the natural landscape, the percentage of the land covered by impervious surfaces increases.

Roofs and roads have been around for a long time, but the ubiquitous and impervious pavement we take for granted today is a relatively recent phenomenon. A nationwide road census showed that in 1904, 93 percent of the roads in America were unpaved (South-worth and Ben-Joseph 1995). This changed with the early twentieth century ascendancy of the automobile over the railways, capped by the mid-century massive construction of the interstate highway system, which served to both stimulate and facilitate the growth of suburbia. From that point on, imperviousness became synonymous with human presence--to the point that studies have shown that an areas's population density is correlated with its percentage of impervious cover (Stankowski 1972).

Impervious surfaces not only indicate urbanization, but also are major contributors to the environmental impacts of urbanization. As the natural landscape is paved over, a chain of events is initiated that typically ends in degraded water resources. This chain begins with alterations in the hydrologic cycle, the way that water is transported and stored.

These changes, depicted in figure 1, have long been understood by geologists and hydrologists. As impervious coverage increases, the velocity and volume of surface runoff increase, and there is a corresponding decrease in infiltration. The larger volume of runoff and the increased efficiency of water conveyance through pipes, gutters, and artificially straightened channels result in increased severity of flooding, with storm flows that are greater in volume and peak more rapidly than is the case in rural areas (Carter 1961; Anderson 1968; Leopold 1968; Tourbier and Westmacott 1981). The shift away from infiltration reduces groundwater recharge, lowering water tables. This both threatens water supplies and reduces the groundwater contribution to stream flow, which can result in intermittent or dry stream beds during low flow periods (Dunne and Leopold 1978; Harbor 1994).

Hydrologic disruption gives rise to physical and ecological impacts. Enhanced runoff causes increased erosion from construction sites, downstream areas and stream banks. The increased volume of water and sediment, combined with the "flashiness" of these peak discharges, result in wider and straighter stream channels (Arnold, Boison, and Patton 1982). Loss of tree cover leads to greater water temperature fluctuations, making the water warmer in the summer and colder in the winter (Galli 1991). There is substantial loss of both streamside (riparian) habitat through erosion, and in-stream habitat as the varied natural stream bed of pebbles, rock ledges, and deep pools is covered by a uniform blanket of eroded sand and silt (Schueler 1992). Engineered responses to flooding like stream diversion, channelization, damming, and piping further destroy stream beds and related habitats like ponds and wetlands. Finally, with more intensive land uses comes a corresponding increase in the generation of pollutants. Increased runoff serves to transport these pollutants directly into waterways, creating nonpoint source pollution, or polluted runoff.

Major categories of nonpoint source pollutants include pathogens (disease-causing microorganisms), nutrients, toxic contaminants, and debris. Pathogen contamination indicates possible health hazards, resulting in closed beaches and shellfish beds. Over-abundance of nutrients such as nitrogen and phosphorous can threaten well water supplies, and in surface waters can lead to algal "blooms" that, upon decaying, rob the waters of life-sustaining oxygen. Toxic contaminants like heavy metals and pesticides pose threats to the health of aquatic organisms and their human consumers, and are often persistent in the environment. Debris, particularly plastic, can be hazardous to animal and human alike, and is an aesthetic concern. Sediment is also a major nonpoint source pollutant, both for its effects on aquatic ecology and because of the fact that many of the other pollutants tend to adhere to eroded soil particles (Environmental Protection Agency 1992, 1993a).

The results of polluted runoff are evident in every corner of the United States. According to the Environmental Protection Agency (1994), nonpoint source pollution is now the number one cause of water quality impairment in the United States, accounting for the pollution of about 40% of all waters surveyed across the nation. The effects of nonpoint source pollution on coastal waters and their living resources have been of particular concern (U.S. House of Representatives 1988; Environmental Protection Agency 1993a). Urban runoff alone ranks as the second most common source of water pollution for lakes and estuaries nationwide, and the third most common source for rivers (Environmental Protection Agency 1994).

As point source pollution is increasingly brought under control, the true impact of urban nonpoint source pollution is being recognized. For instance, even in an urbanized estuary like Long Island Sound, where the major environmental problems have been strongly linked to point source discharges from sewage treatment plants, an estimated 47% of the pathogen contamination is from urban runoff (Long Island Sound Study 1994).

Imperviousness as an Environmental Indicator

Planners wishing to protect their community's water resources against these threats may not know where to begin. The site-specific and diffuse nature of polluted runoff seems to demand extensive technical information on pollutant loadings, hydrologic modeling, and the effectiveness of various management practices. This information is difficult to acquire, not only because of the cost of such studies, but because nonpoint-source-related research and engineering are new and evolving fields.

Enter impervious surfaces. When doing community-level planning, or where detailed site information is unavailable, impervious coverage may often be the most feasible and cost-effective vehicle for addressing water pollution. Two major factors argue for its potential utility to the local planner.

First, imperviousness is integrative. As such, it can estimate or predict cumulative water resource impacts without regard to specific factors, helping to cut through much of the intimidating complexity surrounding nonpoint source pollution. Although impervious surfaces do not generate pollution, they: (1) are a critical contributor to the hydrologic changes that degrade waterways; (2) are a major component of the intensive land uses that do generate pollution; (3) prevent natural pollutant processing in the soil by preventing percolation; and (4) serve as an efficient conveyance system transporting pollutants into the waterways. It is not surprising, then, that research from the past 15 years consistently shows a strong correlation between the imperviousness of a drainage basin and the health of its receiving stream (Klein 1979; Griffin 1980; Schueler 1987; Todd 1989; Schueler 1992; Booth and Reinfelt 1993; Schueler 1994a).

Figure 2 is a stylized graph of this general relationship, showing stream health decreasing with increasing impervious coverage of the watershed, or drainage basin, of the stream. The horizontal lines mark average threshold values of imperviousness at which degradation first occurs (10%), and at which degradation becomes so severe as to become almost unavoidable (30%). These thresholds serve to create three broad categories of stream health, which can be roughly characterized as "protected" (less than 10%), "impacted" (10%-30%), and "degraded" (over 30%).

Thresholds are always controversial and subject to change, yet it is important to note that to date, the threshold of initial degradation in particular seems to be remarkably consistent. The scientific literature includes studies evaluating stream health using many different criteria-pollutant loads, habitat quality, aquatic species diversity and abundance, and other factors. In a recent review of these studies, Schueler (1994a) concludes that "this research, conducted in many geographic areas, concentrating on many different variables, and employing widely different methods, has yielded a surprisingly similar conclusion--stream degradation occurs at relatively low levels of

imperviousness (10-20%)" (100). Recent studies also suggest that this threshold applies to wetlands health. Hicks (1995) found a well-defined inverse relationship between freshwater wetland habitat quality and impervious surface area, with wetlands suffering impairment once the imperviousness of their local drainage basin exceeded 10%. Impervious coverage, then, is both a reliable and integrative indicator of the impact of development on water resources.

The second factor in favor of the use of imperviousness is that it is measurable. This enhances its utility both in planning and regulatory applications. (Examples follow in a later section.) Depending on the size of the area being considered and the particular application being applied, a wide range of techniques--with a wide range of price tags--exists for the measurement of impervious coverage.

For site level applications, on-site measurement using surveying equipment (sometimes as basic as a tape measure) is the most accurate and appropriate method. On the neighborhood level, "windshield" surveys may be appropriate where it is less important to have exact numbers. For community- or regional-scale areas, land cover derived from aerial photographs provides perhaps the best compromise between accuracy and cost. Finally, for applications encompassing even larger areas, remotely-sensed satellite-based land cover can be a viable option. At present, impervious estimates based on satellite data must be calculated by applying literature values of imperviousness to satellite land cover categories. We are currently involved with a remote sensing research project at the University of Connecticut that is attempting to devise a method for directly estimating imperviousness from satellite images (Civco and Arnold 1994).

It is important to note that all of these methods of measurement are increasingly being digitized and presented in the form of computerized maps in a geographic information system, or GIS. This trend eventually will make the information easier to acquire, often at lower expense. Many communities have been unable to afford GIS, and others have been disillusioned at its cost and complexity once they invested in it. Evolution of the technology, however, is making GIS more accessible to local officials every day.

The Components of Imperviousness

To measure and use impervious coverage as a tool for protecting water resources, it is necessary to know how imperviousness is distributed about the landscape. On a scale of increasing refinement, impervious coverage can be broken down by land use, by function within each land use, and by its relative impact on runoff. Each of these pieces of the puzzle can help to target planning and/or regulatory approaches to reducing impervious coverage. As with measurement techniques, the extent to which planners need detailed information on these components depends on the particular application.

The percentage of land covered by impervious surfaces varies significantly with land use. The most frequently cited estimates come from a report by the Soil Conservation Service (1975) (figure 3). "Strip" type commercial development tops the chart at around 95% coverage, with other business areas and industrial development lagging slightly behind. In residential areas, there is a wide range of imperviousness that varies predictably with lot size, going from about 20% in one-acre zoning to as high as 65% in one-eighth-acre zoning.

The City of Olympia, Washington, recently conducted a thorough study of impervious coverage in their area. For 11 sites measured, they found coverage values similar to the SCS values, finding four high-density residential developments (3-7 units/acre) to average 40% impervious, four multifamily developments (7-30 units/acre) to average 48% impervious, and three commercial/industrial sites to average 86% impervious coverage (City of Olympia 1995) (table 1).

In addition to the relationship between land use and the total amount of impervious coverage, studies show that all land uses are not equal with regard to the levels of contaminants present in the runoff. As noted, pollutant or land-use-specific studies are relatively new to the scientific community, but existing information supports the common-sense assumption that some land uses are more contaminating than others; for instance, runoff from gasoline stations contains extremely high levels of hydrocarbons and heavy metals (Schueler 1994b).

Recent research from Wisconsin goes one major step further, actually determining the pollutant concentrations from specific categories of impervious surfaces. Using micro-monitoring samplers that collected the runoff from 12 different types of surfaces (e.g., roofs, streets, parking lots, lawns, driveways) in residential, commercial, and industrial areas, Bannerman et al. (1993) were able to show distinct differences in the types and amounts of certain pollutants, depending on the source of the runoff. The study clearly identified streets as the impervious surfaces having the highest pollutant loads for most land-use categories (table 2). Roofs, with the exception of the zinc from industrial roofs, were generally low in pollutant loads, while parking lots had surprisingly moderate levels of pollutants. The one unpaved surface monitored, residential lawns, showed high levels of phosphorous, presumably from lawn and garden fertilizers. As this study is augmented by others over time, reliable relationships between pollutant loads and specific landscape components will undoubtedly emerge.

Impervious cover can be further broken down into its functional components. Schueler (1994a) and others point out the two major categories of impervious surface: rooftops, and the transport system (roads, parking lots, driveways, sidewalks). In general, the transport system is the dominant component, reinforcing the concept of an automobile-centric society. In the Olympia study, for instance, the transportation component ranged from 63% for single-family residential development to 70% for commercial development (City of Olympia 1995) (table 1).

One last refinement of the impervious component is its relationship in the landscape to surrounding areas, in the sense of how much of the rainfall onto a given surface is actually conveyed to a stream or stormwater collection system. In general, the rooftop component, which often drains to a lawn or other permeable areas, has less impact than roadways, which typically channel runoff directly to the stormwater system. The Olympia study (1994b) calls this factor the effectiveness at producing runoff, and estimates impervious areas in low-density residential developments to be about 40% effective, while those in commercial/industrial areas are close to 100% effective. In theory this concept could be applied to all surfaces--lawns themselves, for instance, can have a significant coefficient of runoff--but to our knowledge this level of refinement has not been researched, nor is it generally needed for most applications.

Imperviousness in Planning: A Framework, Some Examples

By considering the distribution of impervious cover by land use, function, and contribution to runoff, strategies begin to emerge for the reduction of both current and future levels of imperviousness. We suggest that these strategies can be grouped into three basic categories: community or regional planning; neighborhood and site planning, and regulation. Each category presents opportunities to revisit the status quo with an eye to water resource protection. Following are some general concepts and specific examples of such opportunities.

Planning at the Community or Regional Level

Land-use planning, even at the town level, need not be based on traditional political boundaries. Increasingly, environmental and natural resource professionals recommend planning based on the organization of natural systems (Environmental Protection Agency 1993c). Ecosystems as an organizational unit have been suggested, but the functional definition of an ecosystem remains elusive.

A more promising trend has been toward using watersheds as planning units (Environmental Protection Agency 1993b). A watershed, or drainage basin, is an area that drains to a common body of water, be it a lake, river, stream, aquifer, or bay. Watersheds have an advantage in that they can be clearly defined as geographic units. In addition, the watershed can be used as a system of organization at any number of scales, from a major basin encompassing several states, to a regional basin involving several municipalities, to a local sub-basin on the neighborhood level.

Thinking in terms of watersheds is particularly appropriate for stormwater management, which, after all, is all about drainage. At the University of Connecticut, we have developed a regional/community-level planning approach that provides an example of the use of both watersheds and impervious coverage. The Nonpoint Education for Municipal Officials (NEMO) project was initiated in 1991 to assist communities in dealing with the complexities of polluted runoff management (Arnold et al. 1993). The project, funded by the United States Department of Agriculture's Cooperative State Research, Education and Extension Service, is run by an interdisciplinary team that includes water quality, natural resource planning, and computer technology expertise. NEMO uses geographic information system (GIS) technology as a tool to educate local land-use decision-makers about the links between their town's land use and its water quality. Natural resource information on waterways and watersheds is combined with satellite-derived, land-cover information, and then displayed on colorful maps created with the GIS.

At the heart of NEMO is an analysis of impervious cover. Literature values for the percentage of impervious cover are applied to satellite land-cover categories to come up with rough estimates for the current level of imperviousness within a town or watershed. These values are averaged and displayed by local drainage basin (average area about one square mile) and categorized according to the protected/impacted/degraded scale of increasing impervious cover previously described and shown in figure 2. The current values are then contrasted with a zoning-based, build-out analysis of imperviousness, again displayed by local sub-basin (figure 4). The build-out allows town officials a look into the possible future of their town, not in conventional terms of

population or lot coverage, but in terms of impervious cover--and by inference, the health of their local water resources.

The results of the impervious surface analysis can be used to help guide planning emphasis within each local basin area. For areas in the lower impervious zone, emphasis should be placed on preventive measures that retain existing natural systems, using techniques like open space planning and stream buffers. For areas that are in, or will be in, the "impacted" (1030%) zone, preventive planning should be accompanied by a focus on site design considerations that reduce runoff and imperviousness. Finally, for areas at (or climbing into) the "degraded" (over 30%) zone, the focus shifts to remediation through pollutant mitigation and resource restoration.

NEMO is one example of the use of imperviousness for broad-based community or regional water resource planning. Similar approaches are beginning to spring up around the country. Schueler (1994a) recommends watershed-based zoning that "is based on the premise that impervious cover is a superior measure to gauge the impacts of growth, compared to population density, dwelling units or other factors." In Alpine Township, Michigan, concern about the effects of urbanization on a formerly productive cold-water trout fishery has prompted researchers from Grand Valley State University to design a watershed-based GIS decision support system for local land-use authorities (Frye and Denning 1995). The system makes use of a number of hydrologic and land-use factors, including impervious surface estimates and zoning-based build-out analyses. In Montgomery County, Maryland, a detailed planning study was done to formulate a land-use strategy to protect the water resources of the Paint Branch stream (Montgomery County MD 1995). The study both measures and projects future impervious surface coverage by subwater-shed basin, and uses this information to help guide its recommendations for protective actions.

Each of these efforts contains the elements of impervious cover, subbasin-level analysis, and build-out projections. An even more comprehensive treatment is that undertaken by the City of Olympia, Washington. During 1993 and 1994, Olympia conducted their Impervious Surface Reduction Study (ISRS), from which information is cited repeatedly in this paper. The ISRS Final Report (City of Olympia 1995) contains an impressive and comprehensive body of research, policy analysis, and build-out scenarios, culminating in 19 specific action recommendations. The study concludes that "a 20% reduction [in future impervious cover] is a feasible and practical goal for Olympia and will not require exceptional changes in the Olympia community." The recommended reduction is equal to approximately 600 fewer acres of impervious coverage by the year 2012. Planners wishing to see an example of a comprehensive approach to reducing imperviousness would do well to read the Olympia ISRS report.

As with other natural resource protection efforts, community and watershed-level planning approaches like these are often the most effective way of achieving results. Addressing the issue at this scale provides an overall perspective and rationale for the design and regulatory tools described in the following sections. Site-level considerations are then based not only on the immediate impacts of a given development on the local stream or pond, but also on the site's incremental contribution to the pollution (or protection) of a larger-scale water body or aquifer. Review of site design and stormwater management plans, for instance, can be checked for consistency with goals for the appropriate watershed.

Providing this broad context has the added benefit of allowing for greater flexibility at the site level. Planners can evaluate individual factors like a site's location within the watershed, its land use, and the relative priority of the receiving stream as they relate to the overall plan, rather than applying a rigid and uniform set of requirements to all parcels.

Site-Level Planning

Site planning is perhaps the least-explored approach to reducing water pollution. Kendig (1980) states that "good design begins with an analysis of the natural and environmental assets and liabilities of a site," and that these factors should be the determinants of development patterns. Applying this principle to water resource protection translates to maintaining the natural hydrologic function of a site, through retaining natural contours and vegetation to the maximum extent possible. Consideration of impervious surface is a key element of this overall strategy, extending to all site-level considerations. These include construction practices, design that reduces imperviousness, and design that includes measures to mitigate the effects of the runoff from impervious areas.

Construction activity itself usually creates impervious surface, severely compacting earth with heavy machinery. Although erosion control practices may require procedures for limiting the area of exposed soil and how long it remains exposed, that requirement does not necessarily minimize the amount of compacted soil. Construction should be sequenced with this goal in mind, and it may be necessary later to loosen compacted areas and/or cover them with additional pervious materials (Craul 1995).

From construction, we move to reduction. For virtually all land uses, one of the best design-related opportunities for reducing imperviousness is through the reduction of road widths. As has been seen, roads both constitute a major fraction of a community's impervious coverage, and tend to produce the most pollutant-laden runoff.

The long-established concept of road hierarchies, which relates road size to the intensity of use, has many positive aspects beyond water quality, among them cost reductions and aesthetic benefits. Yet Southworth and Ben-Joseph (1995), in a recent article on the history of residential street design, found that, for a variety of historical and institutional reasons, road hierarchies are often overlooked by local planners and commissions. The authors conclude that an over-emphasis on traffic control has resulted in a "rigid, over-engineered approach . . . deeply embedded in engineering and design practice." Simple math dictates that for a given length of subdivision road, reduction from a typical 32-foot to a 20-foot width results in a 37.5% reduction in pavement, or over 63,000 square feet (about one and one-half acres) per linear mile. The Olympia study estimated that changing the width of local access roads from 32 to 20 feet would result in an overall 6% reduction in imperviousness for a given development site in their region, that is, six acres less street pavement for a typical 100-acre subdivision (City of Olympia 1994b).

Road surface reduction is a primary reason why clustering is the most pavement-stingy residential design. Large-lot subdivisions, which have long been recognized as being antithetical to most conservation goals (Arendt 1994a, 1994b) generally create more impervious surface and greater water resource impacts than cluster-style housing does. This is true even though the large

lots may have less impervious coverage per lot, because the attenuated design requires longer roads, driveways, and sidewalks, which make the overall subdivision parcel more impervious (figure 5). Schueler (1994c) states that cluster development can reduce site imperviousness by 10-50%, depending on lot size and the road network.

In commercial and industrial zones, the focus of design-related reductions in imperviousness shifts to parking areas, the largest component of impervious cover (table 1). Research has shown oversupply of parking to be the rule. Willson (1995), citing his research and that of many others, found that the "golden rule" of 4.0 parking spaces per 1,000 square feet of office floor space is often almost twice what is actually needed. Using a generic, medium-sized office building as a hypothetical example, he shows that a typical parking supply ratio of 3.8 results in an extra 55,000 square feet of parking lot, compared to using a more factually-based ratio of 2.5.

The City of Olympia found not only parking oversupply, with vacancy rates of 60-70%, but also developers consistently building parking above minimum ratios, with 51% more parking spaces at their 15 survey sites than were required by zoning (City of Olympia 1994c). This agrees with our observation that, at least in Connecticut, overbuilding of parking appears to be a recent trend with "big box" retail store developers, who typically require at least 5 spaces per 1,000 square feet, principally to meet peak demands on weekends and during the busy period from Thanksgiving to Christmas.

Reductions in parking-related impervious cover-age can be attained in ways other than adjusting parking supply ratios. Shoup (1995) suggests that parking can be reduced through economic incentives that effectively end the subsidy provided by employer-paid parking. Employee commuter option programs, mandated by the Clean Air Act Amendments of 1990 in areas of "severe nonattainment" for ozone standards, hold some promise for reducing parking demand. The Olympia study (City of Olympia 1994d) concluded that sharing, joining, or coordinating parking facilities can reduce parking significantly. Finally, vertical garages (above or below ground) can be encouraged, although this alternative can be expensive. Many of these strategies were recently combined in an innovative office park design in Lacey, Washington, where the new 360,000-square-foot headquarters of the state Department of Ecology was designed around a "parking diet" that slashed parking spaces from 1500 to 730 (Untermann 1995).

Imperviousness also has a role in design related to mitigation of polluted runoff. "Best management practices" (BMPs) is the most commonly-used term to describe the wide range of on-site options available to manage stormwater runoff. BMPs are often divided into two major types: those involving structures such as stormwater detention ponds or infiltration trenches, and "nonstructural" practices that usually involve use of vegetated areas to buffer, direct, and otherwise break up the sea of asphalt. Maintenance measures like road sand sweeping and storm drain cleaning are also included.

It is not within the scope of this article to give a thorough discussion of these practices; choosing the correct assemblage is a combination of art and science, and involves many considerations. From the standpoint of imperviousness, however, BMPs can be viewed in terms of how well they replicate the natural hydrological functioning of the site. This perspective puts a premium

on restoring infiltration, which has been suggested by Ferguson (1994) and others to be highly preferable to surface detention.

Emphasizing infiltration and nonstructural solutions often comes into conflict with established development practices. Curbing is a good example. Just as Southworth and Ben-Joseph (1995) found the over-engineering of road widths to be ingrained in local practice, our experience has been that to many town engineers, the necessity of curbing is a given. Safety and structural integrity of the road are often given as reasons for curbing, above and beyond its drainage function. Highway engineers in our state, however, have told us that the sole purpose of curbing is to direct stormwater, and even then, it is only truly needed during the unstable construction phase (Connecticut Department of Transportation 1995). In many cases, more pervious alternatives to directing runoff should be investigated. Grassy swales, for instance, might be constructed in the margin created when existing right-of-way widths are retained while road widths are reduced.

Mitigating the impacts of polluted runoff in the "ultra-urban" inner city environment is a particularly thorny issue. Regional approaches like the Olympia ISRS may target these areas for increased impervious cover (City of Olympia 1994a). Growth policies that encourage urban "infilling" may result in higher inner-city imperviousness in order to reduce sprawl and overall imperviousness, region-wide. In effect, this is "clustering" on a regional scale.

Nonetheless, even for these seemingly intractable areas, using imperviousness as a planning framework can be useful. Usually, this involves linking the reduction of impervious surfaces to complementary urban initiatives. Parking is one example. Excess parking can be attacked from many angles other than water quality, including air quality, traffic congestion, promotion of sprawl, and inefficient use of building lots. A parking reduction initiative could be combined with a plan to use the recouped paved area either for active stormwater treatment (infiltration basins, detention ponds) or for more modest stormwater management (vegetated strips). Such a strategy could be combined with the creation of "vest pocket" parks and other green spaces, shown by urban forestry research as having positive sociological and psychological effects on city dwellers (Gobster 1992; Schroeder and Lewis 1992).

Research on the pollutant-processing capability of various types of vegetation suggests a slight twist on parking lot design that may reap large benefits in water quality for urban areas. Parking lots often incorporate landscaped areas, usually in raised beds surrounded by asphalt curbing. However, these vegetated areas can be planted below the level of the parking surface, serving as infiltration and treatment areas for runoff (Bitter and Bowers 1994) (figure 6). This idea can be extended to other areas where vegetated "islands" are traditionally used, such as in the middle of cul-de-sac circles.

Another consideration for urbanized areas is pervious alternatives to pavement. This includes various mixes of asphalt with larger pore spaces (e.g., "popcorn" mix), and alternative systems such as open-framework concrete pavers filled with sand or gravel, or turf reinforced with plastic rings. These systems can become clogged with sediment, particularly during construction, but are often a suitable alternative in low traffic areas like emergency roads, driveways, and overflow parking areas. Cahill (1994) asserts that, contrary to common belief, pervious pavement

can be used successfully in many places if certain siting, construction, and maintenance practices are followed; for instance, he recommends vacuum cleaning at least twice per year. Granular surfacings are being promoted by some landscape architects as attractive, inexpensive, and more aesthetically-pleasing alternatives to paved pathways and trails (Sorvig 1995).

One last important note about reducing imperviousness through planning and design-it can save money. Savings to both the private and public sectors in reduced construction and infrastructure costs can be considerable. For instance, a recent study done for the Delaware Estuary Program compared the impacts on twelve communities in the watershed, over a 25-year horizon, of a continuation of current "sprawl" development patterns versus the Program-recommended pattern of promoting mixed uses, open space, and growth around existing centers. They concluded that for these communities, the less consumptive pattern resulted in savings of $28.8 million in local road costs, $9.1 million in annual water treatment costs, $8.3 million in annual sewer treatment costs, as well as an 8.4% reduction in overall housing costs, and a 6.9% savings in annual costs of local public-sector services (Burchell, Dolphin, and Moskowitz 1995).

The Use of Imperviousness for Regulation

Planning approaches at the community and site level can be complemented with specific applications that give regulatory teeth to planning objectives. To begin with, planners can revisit their current zoning and subdivision requirements with an eye to imperviousness. For instance, many lot coverage limits, particularly for residential uses, refer to rooftops but do not include parking space, sidewalks, and driveway coverage.

Impervious cover lends itself well to zoning that uses performance standards. In fact, Kendig (1980) defines performance zoning as that which regulates development on the basis of four fundamental measures of land-use intensity, one of which is the impervious surface ratio. Jaffe (1993), in a critical assessment of performance-based zoning, concludes that "Kendig's recreational and impervious surface ratios are especially effective in achieving local environmental objectives for stormwater management and groundwater recharge." Performance zoning has the added effect of encouraging mixed uses, which generally result in less impervious coverage and less pollution, by reducing roads and vehicle traffic.

Community-wide applications encompassing large areas with varied land use will require sliding scales of impervious coverage limits that depend on the location, size, and type of use. Such standards have been in place in some Florida communities for almost a decade (American Planning Association Zoning News 1989). More recently, ordinances limiting impervious cover have been enacted in Austin and San Antonio, Texas, driven by concern about pollution of the area's major drinking water aquifer (City of Austin 1992; City of San Antonio 1995).

In instances where protection of a particularly important resource is desired, strict limits on impervious coverage may be imposed. Such is the case in Brunswick, Maine, where a "coastal protection" zone was created for areas draining to Maquoit Bay, site of shellfish beds critically important to the town. The special zone has certain stringent performance standards, among them a maximum impervious-surface lot coverage of 5%. This coverage includes ". . . buildings, roads, driveways, parking areas, patios, and other similar surfaces" (Town of Brunswick 1991).

In this case, the very low impervious limit was feasible because the total area affected was fairly small, the use was largely residential, and the specific pollutant of concern was nitrogen emanating from septic systems, resulting in zoning that called for a minimum lot size of one unit per five acres. This "down-zoning" approach, which has also been used in the Buttermilk Bay area in Massachusetts (Horsley and Witten 1991), is practicable for small areas with septic-related concerns, but if applied over large areas, can lead in the long run to promotion of sprawl.

Strict limits may be appropriate, yet in practice they can result in the need for complicated exemption provisions, or even raise the specter of private property rights takings (Land Use Law and Zoning Digest 1995; Ross 1995; Settle, Washburn, and Wolfe 1995). One method for "softening" the concept of limits is to allow for flexibility on the site level. In this scenario, an ordinance setting a limit (or goal) for a site's impervious coverage would require more stringent on-site stormwater treatment when the limit is exceeded. This type of approach will undoubtedly become more common as the information base on removal efficiencies of various treatment measures expands. Another type of flexibility comes from applying performance standards to specific elements of imperviousness within the landscape, In their discussion of next steps, the Olympia study (City Of Olympia 1995) cites the development of performance-based standards for sidewalks, parking, and landscaping "to encourage innovation and provide flexibility in meeting impervious surface reduction goals."

One practical regulatory application of impervious coverage is for stormwater utility assessment, an "impact fee" that is growing in use in urban areas of the country as a way of paying for the treatment and control of polluted runoff. Impervious surface has long been a key determinant in mathematical models that predict the volume of runoff from a given piece of land. Stormwater utility assessments have taken the lead from these models in using imperviousness as a basis for a utility rate structure that fairly distributes the cost of treatment according to a property's contribution to runoff.

Such systems are now in place in many areas, including Kansas City, Missouri; Kitsap County, Washington; and throughout the state of Florida. This type of application requires a community-wide assessment of impervious coverage, and a wide range of techniques is being used. In Kansas City, rate structures are based on digitized high-resolution orthorectified aerial photos (Murphy 1995), while in Florida they are based on statistical surveys of area lots (Livingston 1995). The Kitsap County, Washington, Comprehensive Surface and Stormwater Management Program, established in 1994, creates a rate structure based on an "equivalent service unit" equal to the average estimated amount of impervious surface area on a single-family residential parcel (Kitsap County 1994).

Such programs not only raise funds for mitigation of adverse impacts, but also, by attaching a cost to imperviousness, provide an economic incentive to reduce it. Apparently, this effect is beginning to be seen in Florida, where the cost savings associated with lower stormwater utility fees have provided the impetus for reduction of impervious cover during site redevelopment (Livingston 1995).

Integrating Stormwater Control into Community Planning

The strategies described above demonstrate that for the planner, imperviousness can provide a useful framework .for addressing the impacts of urbanization on water resources. But the advantage of this approach goes beyond any specific application. We have found that working with a town on water resource protection often leads to related natural resource issues like open space preservation and forest management. Our recent experience with NEMO has taught us that framing water issues largely in terms of imperviousness serves to expand the range of these connections.

Once water pollution is linked to impervious coverage and its various components, it has a way of insinuating itself into issues currently "on the table" in town. Road widths and curbing may be subjects of town debate about cost or neighborhood character. Parking and landscaping requirements for commercial zones may be undergoing reexamination for aesthetic reasons. The appropriateness of "big box" retailers may be a hot topic, with arguments centered around traffic congestion and the impact on local merchants. An open space plan may be in the formative stages, or the use of stream buffers being questioned. Citizens may be interested in naturalistic landscaping, water conservation, or volunteer monitoring of local waterways. These typical local debates, drawn from towns working with the NEMO Project, now have elements of water quality and impervious surface reduction as part of the mix. And through these debates, the subject of water quality in the community is extended beyond land-use-related staff and boards to include engineering and public works departments, land trusts and other nonprofits, and citizens.

Cross connections of this type are an important key to ensuring the implementation of any planning initiative. For the professional planner, they create opportunities to reinforce complementary planning concepts from several different angles. Beyond the well-established concept of planning and designing with nature (McHarg 1969), there are many relatively recent themes in transportation, subdivision design, and landscape architecture that go hand-in-glove with the reduction of impervious surfaces. Performance zoning is one example. Another is neotraditional residential design, which champions styles of development patterned after the traditional New England village in order to foster a sense of community (Duany and Plater-Zyberk 1991). The open space subdivision designs promoted by Arendt (1994b) for land conservation age also a good fit. On another front, residential street layouts promoting "traffic calming" for a variety of safety, aesthetic, and sociological benefits (Hoyle 1995; Ben-Joseph 1995) could easily incorporate pavement reduction. Landscape architects are calling for more naturalistic schemes that follow. the natural contours and make use of low-maintenance, drought-resistant plants (Ash 1995). Planners should seize the opportunity to "piggy-back" water quality with these complementary initiatives, making sure to explicitly incorporate the reduction of paved surfaces and their impacts into official policy, plans, and procedures.

The other advantage of the cross-cutting nature of water resource protection in general, and imperviousness specifically, is that it seems to make sense to the average citizen. Reduction of paved areas is one of relatively few planning initiatives that "plays" at all levels, from the suburban driveway to the big box parking lot, and even to the Chief Justice of the Supreme Court, who recognized the link between the growth of paved surfaces and increased runoff (in Dolan v. City of Tigard) (Merriam 1995).

From our standpoint as educators, this feature is critical to the success of any local planning initiative. Education of citizens and local officials on the issues is a necessary and integral part of the process of changing land-use procedures. Volunteer commissioners on local land-use boards are particularly important. In our experience, almost any narrowly-framed issue or problem (environmental or otherwise) brought before busy city, town, or county boards is already operating with two strikes against it. Few issues are isolated, yet they are frequently presented to communities as such, reflecting not the nature of community planning but that of regulatory agencies. A regional planner we work with has called this the "environmental flavor of the month" syndrome.

The result is that even legally mandated initiatives may be doomed to failure by the sheer inertia involved in integrating new and complex information into the busy world of local land-use decision-making. Framing the issue of nonpoint source pollution in terms of imperviousness, although it may be a bit simplistic, appears to be an effective way of enabling local decision-makers to grasp the issue sufficiently to take action.

Conclusion

Water pollution is getting more complex, while at the same time the responsibility for water resource protection is shifting toward local authorities. The use of impervious surface coverage as an environmental indicator can assist planners to construct a game plan to protect their community's natural resources.

Imperviousness integrates the impacts of development on water resources, so it can help to cut through much of the complexity. It is measurable, and so appropriate for a wide range of planning and regulatory applications. It is a cross-cutting feature that is a frequently hidden, but nonetheless substantial, component of many current trends in road, neighborhood, and landscape design, so it can be used as a reinforcing connection between seemingly unrelated planning initiatives. Finally, the basic tenets of reducing imperviousness--retaining the natural landscape, minimizing pavement, promoting infiltration to the soil--are simple concepts that can be understood by a community and its residents.

Impervious cover is rarely specifically identified or addressed in community goals, policies, or regulations. It should be. In this article, we have tried to facilitate the use of this indicator by (1) reviewing the scientific literature to provide a comfort level with its appropriateness; (2) creating a framework for its use in overall planning, site-level planning, and regulation; and (3) providing real-world examples of such applications. With imperviousness as a foundation, planning that begins with water resources often leads to character, design, and aesthetic issues that, taken together, define much of the overall quality of life in a community.

TABLE 1. Site coverage for three land uses in Olympia, Washington

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Legend for Chart:

A - Surface Coverage Type
B - Average Approximate Site Coverage, % High Density
    Residential (3-7 units/acre)
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C - Multifamily (7-30 units/acre)
D - Commercial

A	B	C	D
1. Streets	16	11	03
2. Sidewalks	03	05	04
3. Parking/driveways	06	15	53
4. Roofs	15	17	26
5. Lawns/landscaping	54	19	13
6. Open space	n/a	34	n/a
Total impervious surface (1-4)	40	48	86
Road-related impervious surface (1-3)	25	31	60
(Road-related as a percentage of total impervious coverage)	(63%)	(65%)	(70%)

Adapted from City of Olympia 1995

TABLE 2. Surfaces exhibiting highest levels of runoff-borne pollutants, out of twelve surface types sampled in selected urban areas in Wisconsin

Legend for Chart:

A - POLLUTANT
B - Highest levels
C - SURFACE Second highest levels
D - Third highest levels

A	B C D
e. coli (pathogens)	residential feeder streets residential collector streets residential lawns
solids (sediment)	industrial collector streets industrial arterial streets residential feeder streets
total phosphorous	residential lawns industrial collector streets residential feeder streets
zinc	industrial roofs industrial arterial streets commercial arterial streets
cadmium	industrial collector streets industrial arterial streets commercial arterial streets
copper	industrial collector streets industrial arterial streets

residential collector streets	

Adapted from Schueler 1994d

FIGURE 3. Average percentage of impervious coverage by land use Source: Soil Conservation Service 1975

Residential Lot Size (acres)	Percent Impervisions
1	20
1/2	25
1/3	30
1/4	38
1/8	65
INDUSTRIAL	75
COMMERCIAL	85
SHOPPING CENTERS	95

PHOTO (BLACK & WHITE): FIGURE 1. Water cycle changes associated with urbanization Source: Environmental Protection Agency 1993a

GRAPH: FIGURE 2. Stylized relationship of imperviousness to stream health Modified from Schueler 1992

MAP: FIGURE 4. Impervious coverage analysis for Old Saybrook, CT

DIAGRAM: FIGURE 5. Clustering reduces overall site imperviousness. Source: John Alexopoulos, University of Connecticut

PHOTO (BLACK & WHITE): FIGURE 6. Sunken vegetated parking lot "islands" intercept and treat runoff. Source: John Alexopoulos, University of Connecticut

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By Chester L. Arnold, Jr. and C. James Gibbons
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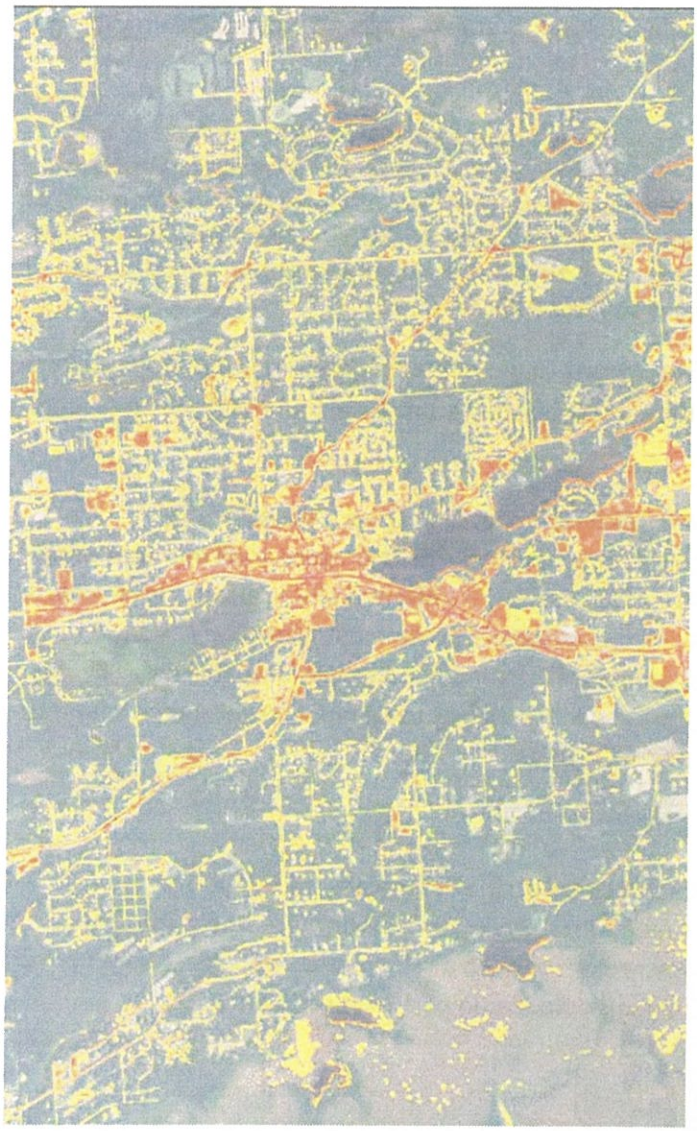

Mapping Impervious Surfaces in the Mat-Su

Measuring Development at the Subwatershed Scale

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The Nature Conservancy
Anchorage, Alaska
November 2011

QUESTION: How has impervious surface changed across the Matanuska-Susitna basin during the past decade of rapid population growth?

Research has shown that increased impervious cover levels can negatively impact water quality and flows leading to degraded stream health for fish (Schueler, R.,et.al; 2009). The Matanuska-Susitna Salmon Partnership identified minimizing impervious surfaces and their resultant storm water runoff as an objective in the Partnership's Strategic Action Plan (MatSu Salmon, 2008). Additionally, the release of 2010 Census data confirmed the Mat-Su Borough as Alaska's fastest growing region which further strengthened the need for a study of impervious surfaces (US Census, 2011).

METHODS: What are the most appropriate means to generate an updated impervious surface dataset of the highest accuracy and precision using existing source data and within the project budget?

Prior to this project, the US Geological Survey's (USGS) National Land Cover Dataset (NLCD) imperviousness layer functioned as the only basin wide baseline. The USGS generated this layer using LANDSAT satellite imagery from the years 1999-2001. While this dataset is of a relatively coarse nature with 30 meter pixels, it does characterize the relative extent of development within the region approximately one decade ago. This current project seeks to improve the level of spatial detail by more accurately delineating smaller impervious features. Additionally, by using more recent source data this new layer will reflect development over the past 8-10 years.

1) Which Method and What Source Data?

These two elements, method and source data, are linked as one determines the other. This necessitated an inventory of available source data with a particular focus on currentness and spatial resolution. By knowing which data can be used, we can develop a list of project options. A summary of data is charted on Appendix 1 (Source Imagery Considered for Impervious Surface Project).

Land Cover – Land Use Data

Impervious surface estimations elsewhere have employed land use/cover classifications which are then assigned an impervious surface coefficient based upon previous study results. Total impervious surface can then be calculated by multiplying the individual landcover areas by the coefficients which are expressed as a percentage and then summing each cover type's impervious area. This method is employed in highly developed areas which have detailed municipal land use data; however, neither of these conditions exists in the Mat-Su basin making it susceptible to significant errors and therefore unsuitable for this project. Another reason for dismissing this approach is that the most recent and perhaps only comprehensive land cover dataset for the Mat-Su region is the USGS's National Land Cover Dataset of 2001 which is the baseline dataset for this project to measure change. The overall thematic accuracy of the Alaska NLCD was calculated to be 76% with lower values for less abundant landcover types. Due to the relative scarcity of the developed area classes (less than 0.1%) across the entire state, these land cover types were not considered by this study. (Selkowitz, Stehman, 2011).

Aerial Photograph or Natural Color Satellite Image Delineation

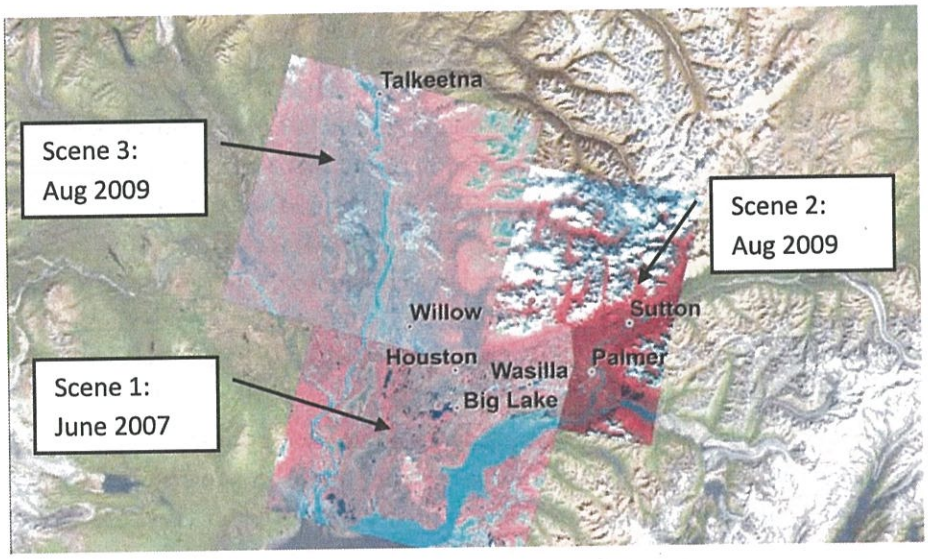
Other studies have utilized high resolution aerial photography to generate impervious surface layers. Manual plannimetric delineation methods were succeeded by computerized interpretation using a series of multiple training sites of known impervious surfaces to "train" the software to identify impervious areas. The Natural Resource Conservation Service (NRCS) of the US Department of Agriculture acquired orthrorectified color photography of much of the Mat-Su's developed lands in 2004-05. While these images offer excellent spatial resolution and an ability to finely demarcate smaller suburban features such as driveways and rooftops, the acquisition dates only provide an additional three to four years beyond the baseline dataset from 2001. The Nature Conservancy investigated purchasing commercial high resolution (0.5m-5m) imagery from the Quickbird, GeoEye, or RapidEye satellites. We were unable to find scenes that met our criteria of: cloud-free and snow-free images, sufficient spatial coverage, and within our project budget. Although we were unable to consider this methodology for the current study, the acquisition of high resolution orthophotography by the Mat-Su Borough during the summer of 2011 could lead to the development of a very fine scale impervious surface dataset in the future (Appendix 1:Source Imagery Considered for Impervious Surface Project).

NDVI – Normalized Difference Vegetation Index with Medium Resolution Satellite Data

The demand for remote sensing information has led to numerous satellites generating data of varying resolution and multiple bands. Much of these data are accessible via either commercial vendors or through academic research institutions. The University of Alaska's Alaska Satellite Facility (ASF) functions as a download and distribution center for the Japanese ALOS (Advanced Land Observation Satellite) data. The ALOS data are finer resolution than the baseline NLCD data (10meter vs. 30meter pixels) and offer four bands of information which permits standard remote sensing calculations such as the normalized difference vegetation index (NDVI). The NDVI is frequently referenced as a measure of greenness and is generated through the following equation where NIR = near infrared light wavelengths and VIS = visible light wavelengths.(NASA, 2011)

$$NDVI = (NIR-VIS)/ (NIR+VIS)$$

The NDVI value provides a simple and easily computed measure of vegetated landcover. Values can range from +1 (completely vegetated, vigorous growth) to -1 (devoid of vegetation). Pixels with negative NDVI values are interpreted as impervious surfaces. The ALOS data inventory includes relatively clear, summer scenes from the later part of the decade (2007, 2008, and 2009) which capture the more recent regional growth. The Alaska Satellite Facility's ability to acquire and process these scenes quickly and inexpensively met the final criteria for project data selection. The three ALOS scenes that were ultimately chosen and processed covered nearly 4,000,000 million acres, almost 16,000 square kilometers, or over 6,100 square miles. This area covers the entire Mat-Su core area of Palmer/Wasilla/Big Lake and runs north along the Parks Highway to Talkeetna.



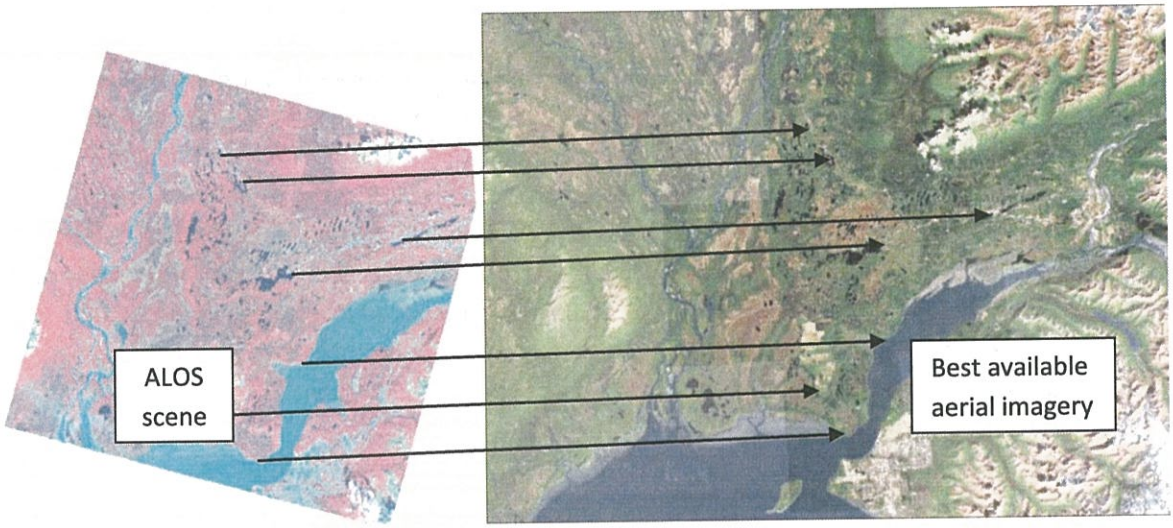
False color images of the ALOS scenes analyzed for this data layer. Note core developed areas and highway corridors are primarily clear and cloud free.

2) How to Process the Data:

This section will explain the basic processing steps used to generate the impervious surface through plain language and example graphics to illustrate the techniques as they were applied in this landscape. A more detailed accounting of the specific parameters and settings used for the data preparation can be found in the dataset's metadata available in multiple formats (html, pdf, xml)

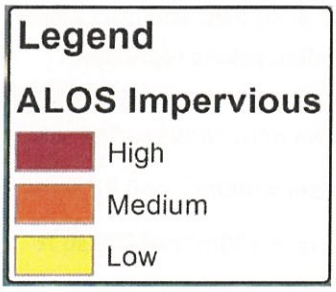
a) Georeferencing

Following the NDVI computation, the images were referenced to the best available aerial imagery for the area which was typically the 2004-2005 NRCS imagery. ASF staff used a rubbersheeting technique by selecting 70-90 control points on each ALOS image of easily identifiable locations (road intersections or lakes in remote areas) and then matched them to corresponding spots on the aerial photos.



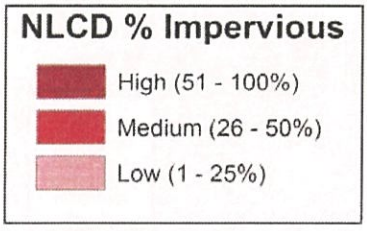
b) Converting NDVI to Impervious Surface Levels (high, medium, low thresholds)

The project's objective of comparing the more recent ALOS imagery to the 2001 NLCD imperviousness layer required a conversion from NDVI values ranging from +1 to -1 to values similar to the NLCD's percent impervious cover. Remote sensing experts at the Alaska Satellite Facility developed thresholds to delineate high, medium, and levels of impervious cover to facilitate analysis and comparison between watersheds and wit h the year 2001 impervious surface dataset. The exact threshold specifications for each ALOS satellite scene can be found in the final metadata file (impervious.html).



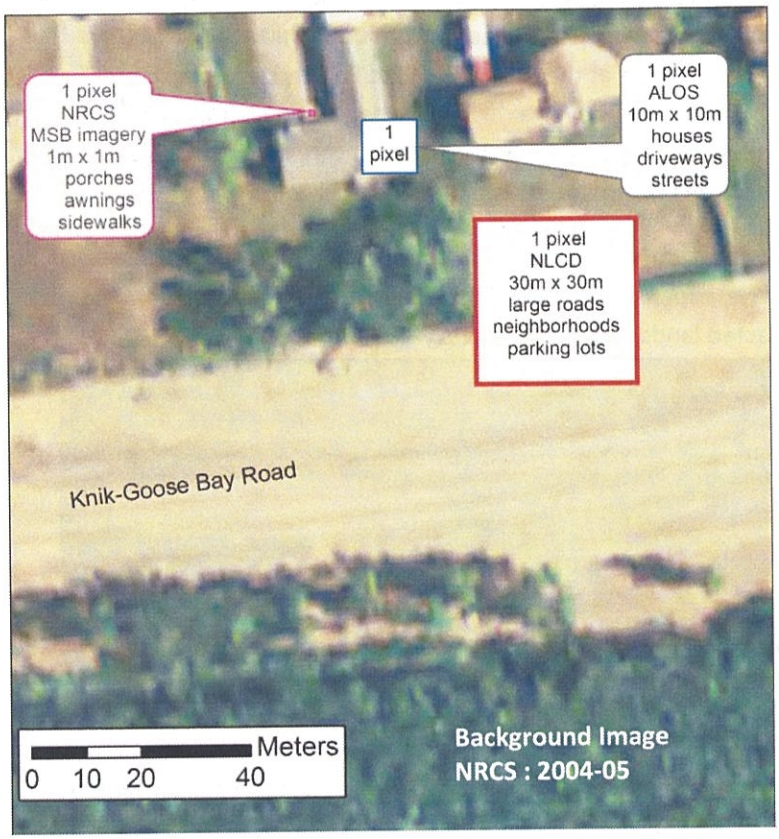
HIGH – large, contiguous areas of completely impervious surfaces: highways, expansive roofs and buildings, large parking lots, and heavily compacted lands within gravel pits

MEDIUM – most roads, moderately sized parking lots, and many residential and commercial structures



LOW – smaller roads including dirt and gravel roads, many smaller buildings and houses, some driveways

The coarse resolution of the NLCD imagery translates to pixels which are larger than most discrete impervious features that are to be measured in a rural/suburban environment (houses, small roads). On the ground this means that the NLCD pixels are often spanning areas that are not homogenous and therefore the pixel measures a percentage of impervious surface from 0-100%.



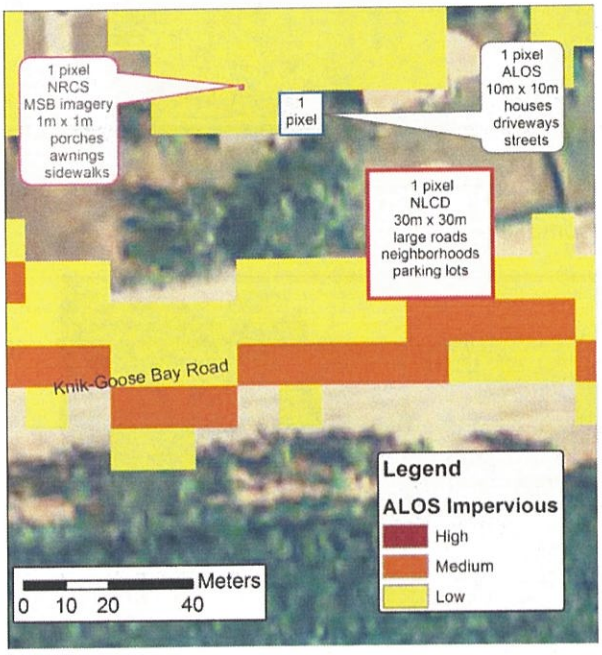
Example of various imagery sources' pixel sizes and how these varying dimensions represent different land cover types and their respective impervious surface levels

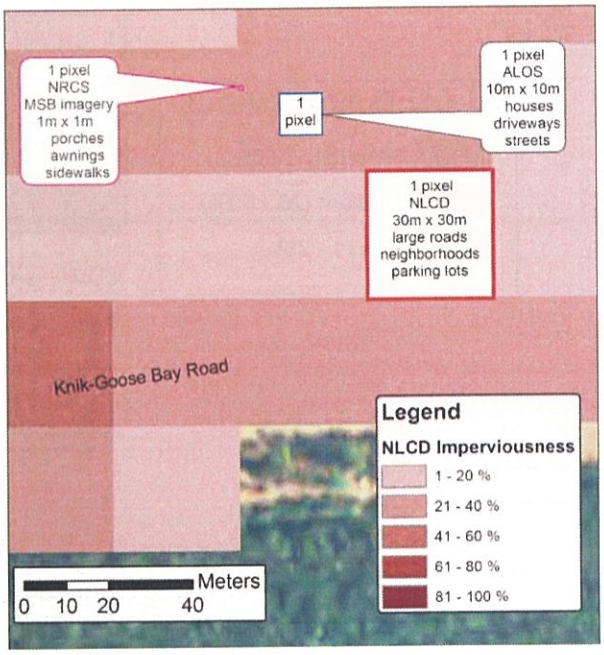
NLCD pixel = $900m^2$ or 0.22 acres

ALOS pixel = $100m^2$ or 1075 sq ft

(Below) The base NLCD pixels can only represent large features such as the road, most of the other pixels are a mix of impervious (houses) and vegetation (trees).

(Below) The ALOS pixel resolution delineates the road as well as the houses while not misclassifying the vegetation.

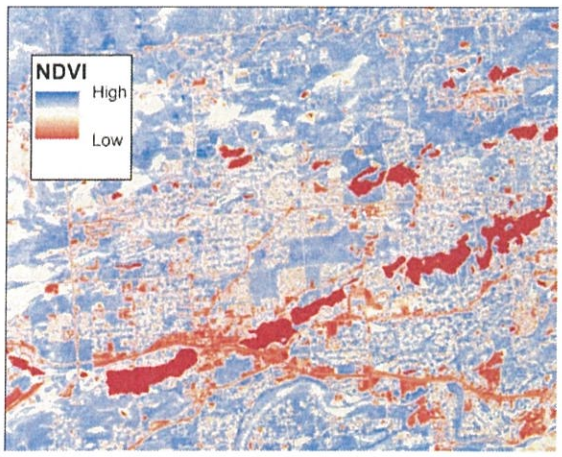




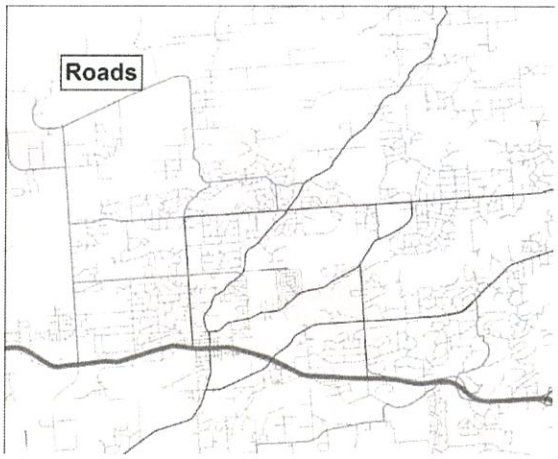
c) Roads

The unvegetated areas identified by the NDVI method required additional processing to develop a more accurate impervious surface layer to insure that known impervious surfaces were included. Numerous existing geographic information system (GIS) datasets were used to edit the raw NDVI. Alaska Satellite Facility staff converted the Matanuska-Susitna Borough's roads GIS layer into a raster layer and combined this data with the existing impervious layer to incorporate the roads. The current roads GIS layer does not include attributes such as road width or surface type (paved, gravel, dirt) so the roads raster layer was assigned a width of 10 meters and a moderate level of imperviousness. Future impervious surface datasets would benefit from such detailed road attributes.

Base NDVI



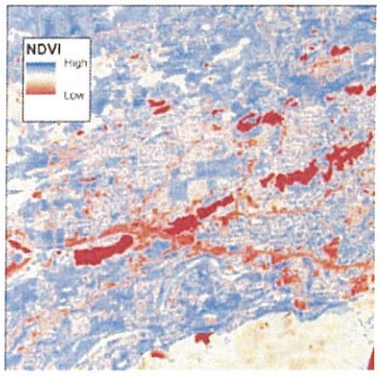
Vector Roads converted to 10m pixels



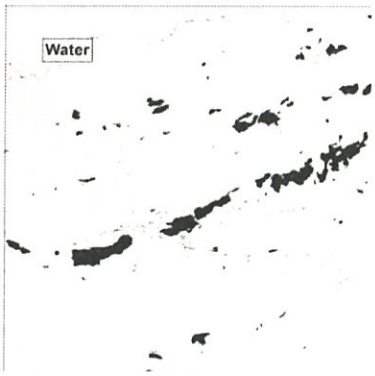
d) Water Mask

The NDVI calculation yields areas which are unvegetated yet it does not differentiate between human conversion and lands which are naturally devoid of vegetation. Using the ArcGIS Iso Cluster tool, ASF staff applied an initial water mask derived from the ALOS imagery to remove large water bodies from the impervious dataset. TNC staff then edited the data even further by converting the USGS' National Hydrographic Dataset of lakes and large rivers into a raster dataset to remove these areas.

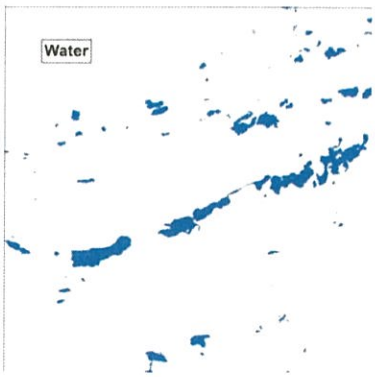
NDVI



subtract ASF water mask



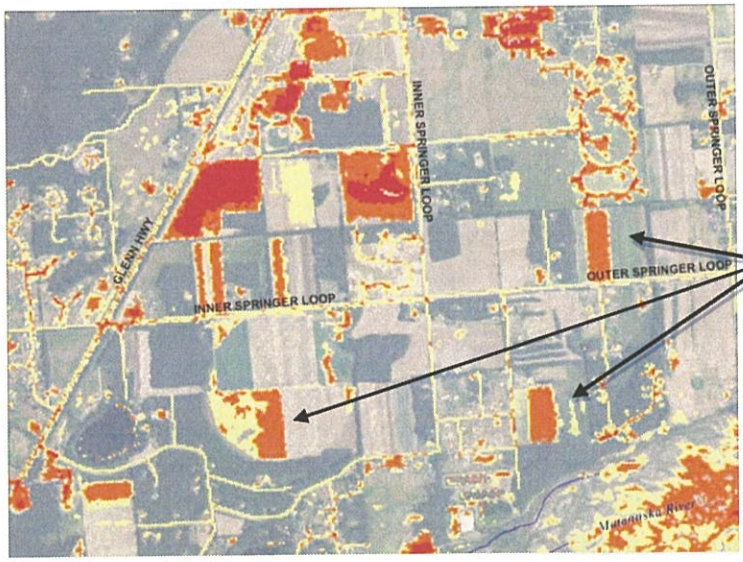
subtract TNC water mask



e) Manual Edits

TNC continued editing the data by manually removing pixels via onscreen editing at approximately 1:12,000 scale, using the most recent regional aerial photography for spot verification (NRCS, 2004, BING, 2010, ALOS – 2007-09). In cases where determining land cover (impervious or permeable) was difficult using the background imagery, Conservancy staff used Mat-Su Borough parcel level data to discern recent building construction activity (i.e. impervious surface development). The parcel data with taxable building values were selected and then symbolized to reflect the most recent construction which is not reflected in the 2004 NRCS imagery (Borough document date greater than 2004). Land uses with negative NDVI values that were most frequently removed from the impervious layers included: large gravel bars along major rivers, agricultural fields with differing NDVI values depending on cropping seasons, wetland complexes which had sufficient water content to decrease the NDVI, clouds, and lake shorelines and large rivers that extended beyond the NDVI and GIS derived water masks.

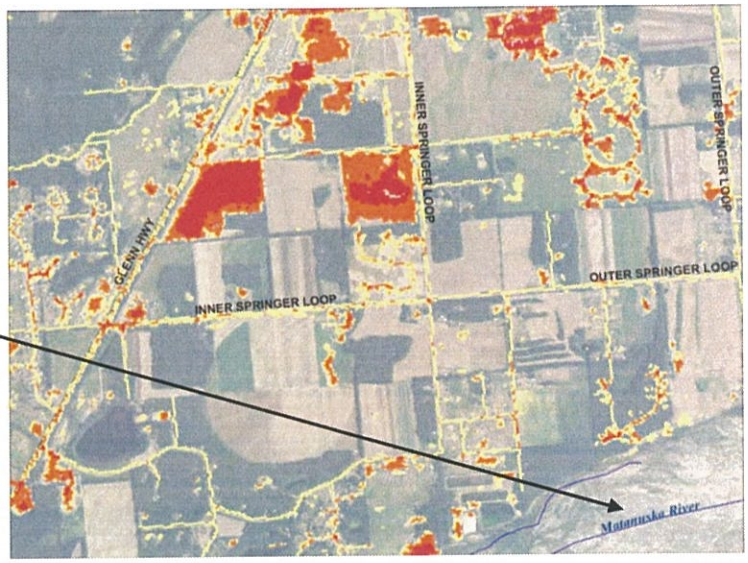
EXAMPLES (agricultural lands, gravel bars, and rivers)



2004 NRCS imagery background with raw (unedited) impervious surface overlay – Glenn Highway, Palmer – State Fairgrounds area.

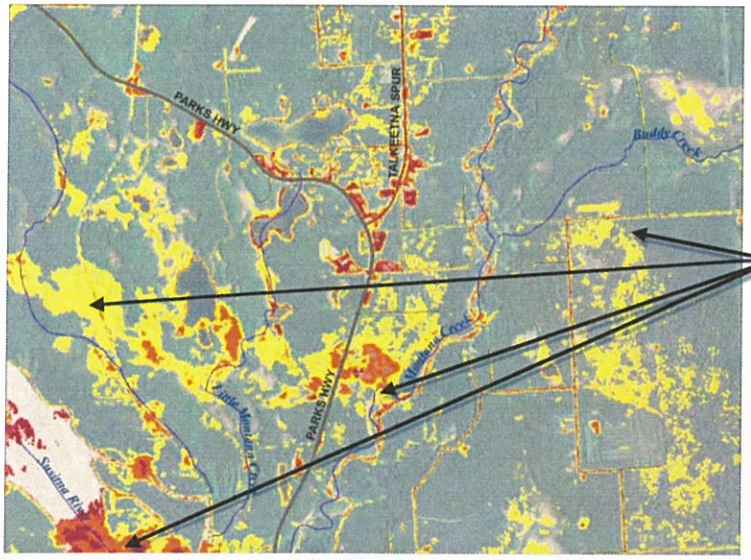
Agricultural lands miscoded in raw dataset, removed during editing

2004 NRCS imagery background with edited impervious surface overlay – Glenn Highway, Palmer State Fairgrounds area.



Matanuska River gravel bars removed from impervious dataset

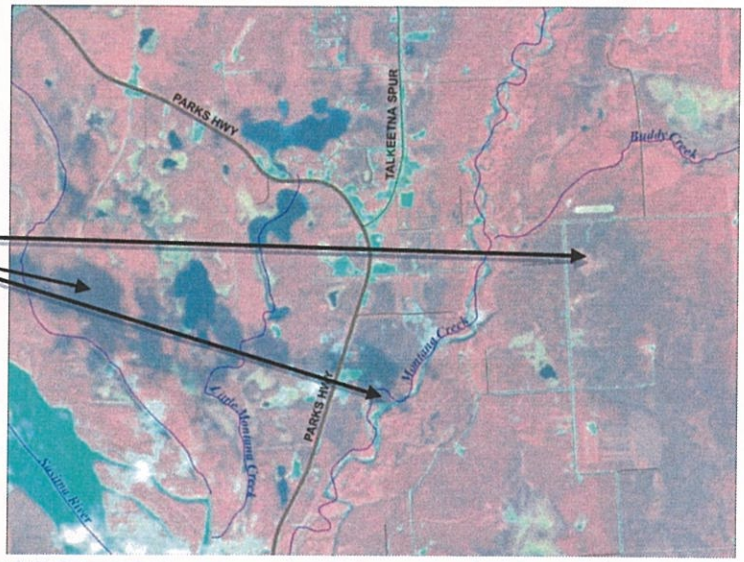
EDIT EXAMPLES continued (cloud removal, lakeshore edges)



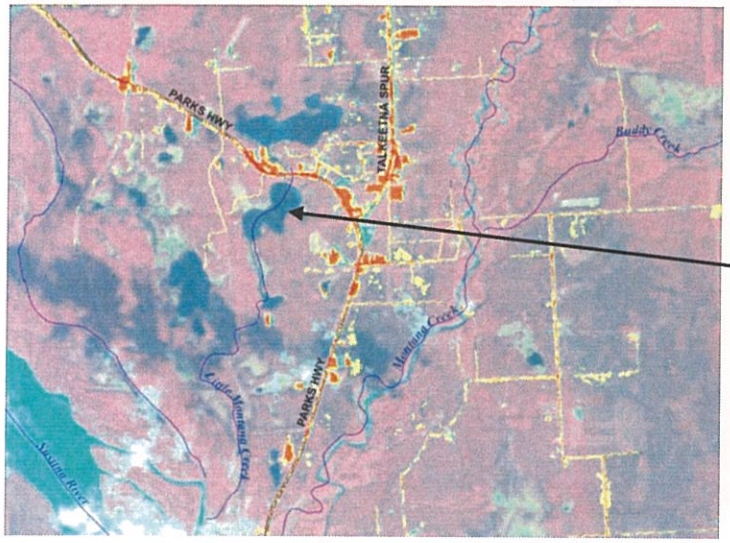
2004 NRCS imagery background with raw (unedited) impervious surface overlay – Parks Highway, Talkeetna "Y" area

Large impervious signal in region in a lightly developed area needs investigation

2009 ALOS false color imagery – Parks Highway, Talkeetna "Y" area.



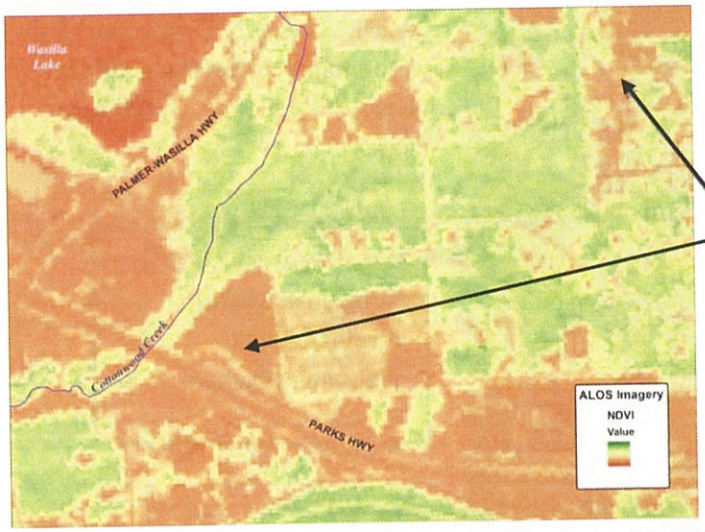
"Impervious signal" created by clouds and their shadows over the landscape



2009 ALOS false color imagery with final (edited) impervious surface dataset – Parks Highway, Talkeetna "Y" area.

Edits included removing clouds as well as this lakeshore rim effect created by misaligned water masks

EDIT EXAMPLES continued (verification with parcel data)

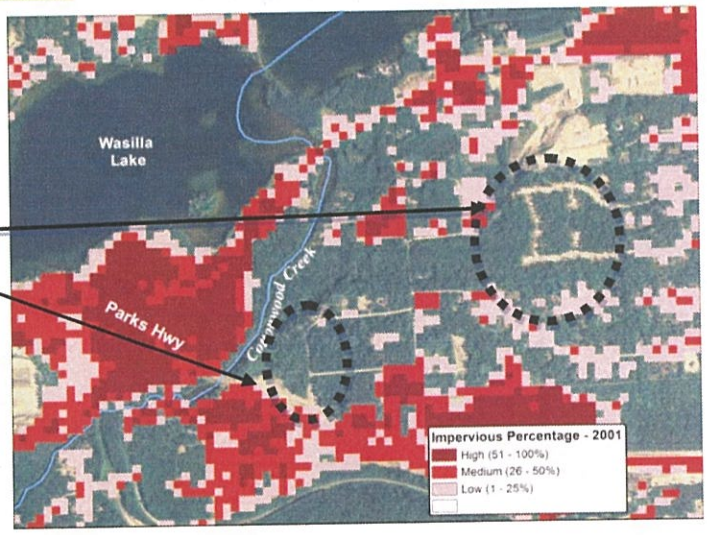


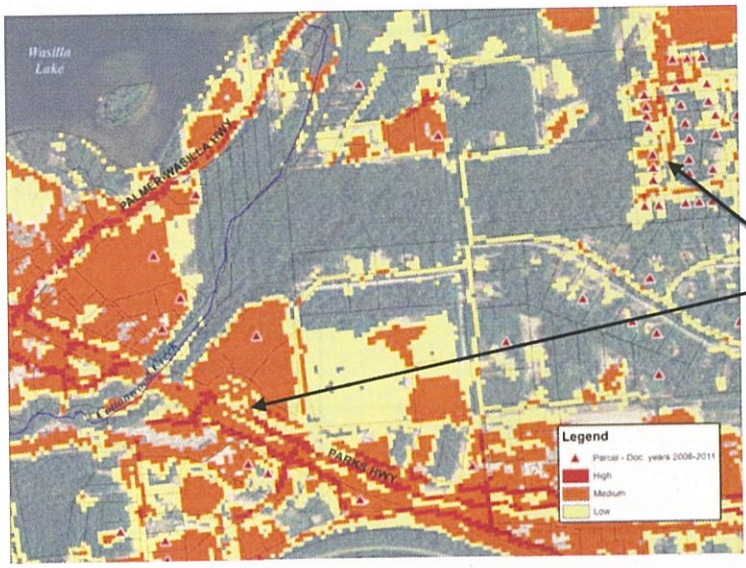
2007 ALOS NDVI imagery – Parks Highway, Cottonwood Creek area

Significant negative NDVI signal in areas not present in the 2001 NLCD data, warrants further investigation

2004 NRCS imagery with 2001 NLCD impervious surface data – Parks Highway, Cottonwood Creek area

Impervious surfaces not present in the 2001 NLCD, but with negative NDVI values shown





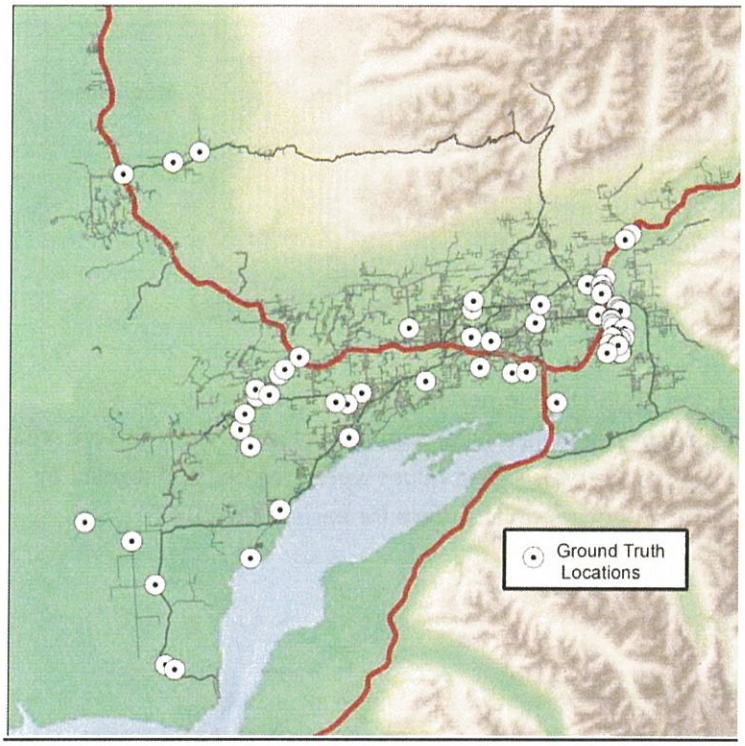
2004 NRCS imagery with TNC generated impervious surface dataset and MatSu Borough parcel data – Parks Highway, Cottonwood Creek area

Red triangles represent parcels developed between 2006-2011 (MatSu Borough), confirming impervious growth as shown by NDVI

10

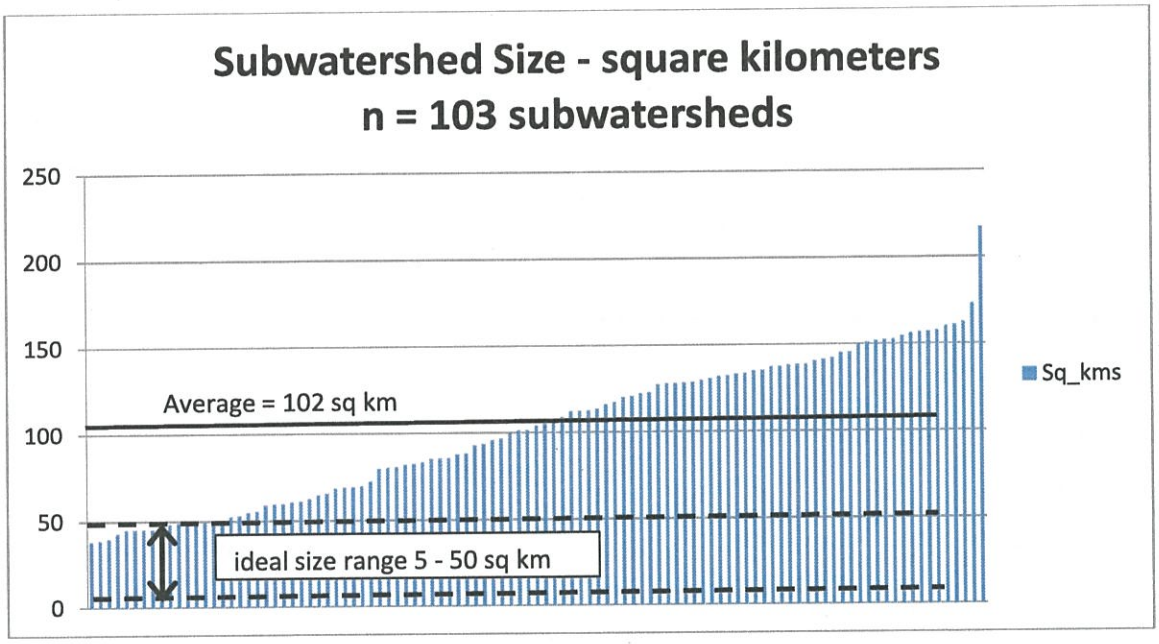
f) Ground truthing (field verification)

Four separate field trips to the study region were conducted to visually verify actual land cover types across a wide range of settings. TNC staff selected ground truthing sites that captured locations where the NDVI derived impervious surface layer seemed to generate false positives (e.g. agricultural lands, riverine gravel bars, confirm cloud shadows, etc.). Additional sites included development in salmon watersheds of the Matanuska-Susitna core area.



ANALYSIS:

A recent meta-analysis of 65 impervious surface studies identified an ideal subwatershed size range of 5 to 50 square kilometers for accurately measuring impervious cover levels and their relative impact to water quality (Schueler, 2009). The three ALOS satellite scenes chosen for the study provided NDVI derived impervious values for 103 subwatersheds, also known as 12 digit hydrologic units, or HUC12s. They are defined by the US Department of Agriculture's Natural Resource Conservation Service Watershed Boundary Dataset (NRCS, 201). Although these subwatersheds are the finest resolution drainages available for the region, the average subwatershed size is 102 km^2 and over twice the recommended maximum area. These relatively large analysis areas can translate into relatively low measures of impervious surface coverage by diluting developed regions across larger landscapes. A further delineation of finer scale drainages in the future may be warranted to more accurately characterize more meaningful impervious surface measures.



Using the ArcGIS Tabulate Area command, the ALOS/NDVI impervious raster layer from years 2007 - 2009 was combined with the 103 subwatersheds yielding a tabular summary of impervious surface area by subwatershed (high, medium, and low square meters). These values were summed and divided by the watershed area to generate an overall percent impervious surface for each of the 103 subwatersheds.

Impervious Surface Percentage for year 2008 =

$$\frac{(\text{Low Impervious Area} * 0.75) + \text{Medium Impervious} + \text{High}}{\text{Subwatershed Area}}$$

Considering the 2001 impervious surface dataset's relatively coarse pixel size and its values of percent imperviousness ranging from 1 to 100%, a proportional method of calculating overall percent impervious by watershed was implemented. After using a similar tabulate area method in ArcGIS with the NLCD impervious raster layer and the subwatersheds, TNC staff weighted the areas for each increment of impervious surface by multiplying the area for each of the values by its inverse and then summing across all categories from 1% through 100%.

Impervious Surface Percentage for year 2001 (n=100) =

$$\frac{(\text{square meters of 1\% impervious} * (1/100)) + (\text{m}^2 \text{ of 2\% impervious} * (2/100)) + \ldots.}{\text{Subwatershed Area}}$$

Impervious Growth Calculations:

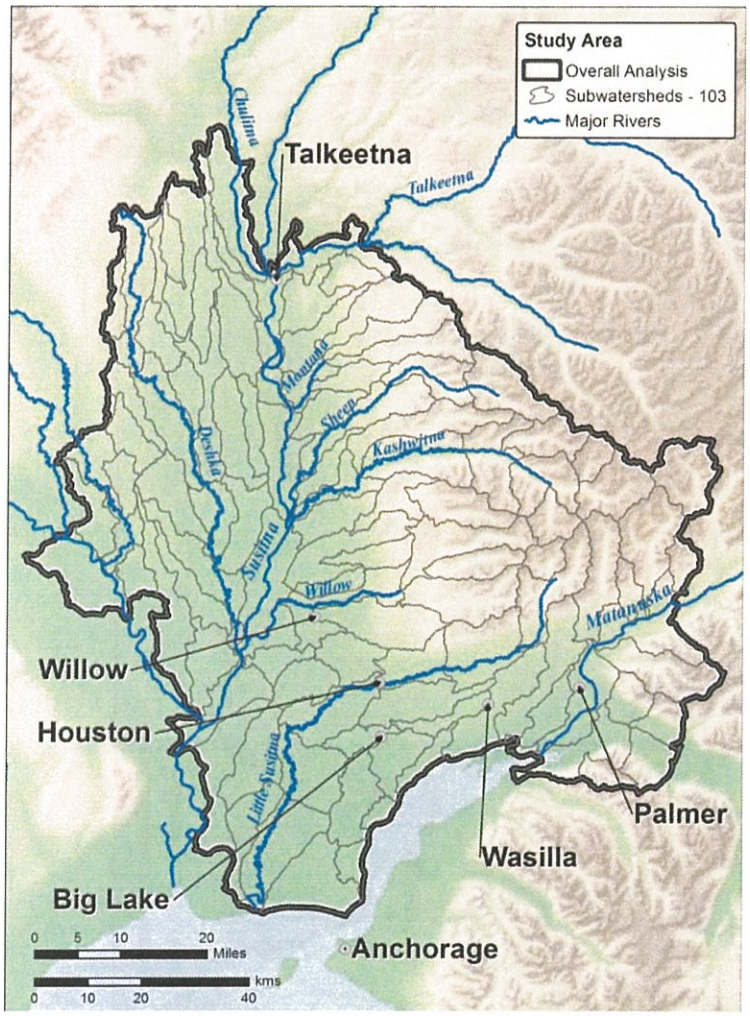
After computing values from the ALOS data and the NLCD data, the 2001 percentages were compared to the composite data from 2007-2009 to calculate impervious surface growth rates, both cumulative growth and an average annual growth rate over the approximately 7 years between source data.

$$\text{Cumulative Growth} = \frac{\text{2008(ALOS) Impervious Area} - \text{2001 (NLCD) Impervious Area}}{\text{2001 (NLCD) Impervious Area}}$$

$$\text{Annual Growth Rate} = \frac{\text{Cumulative Growth}}{\text{7 (years)}}$$

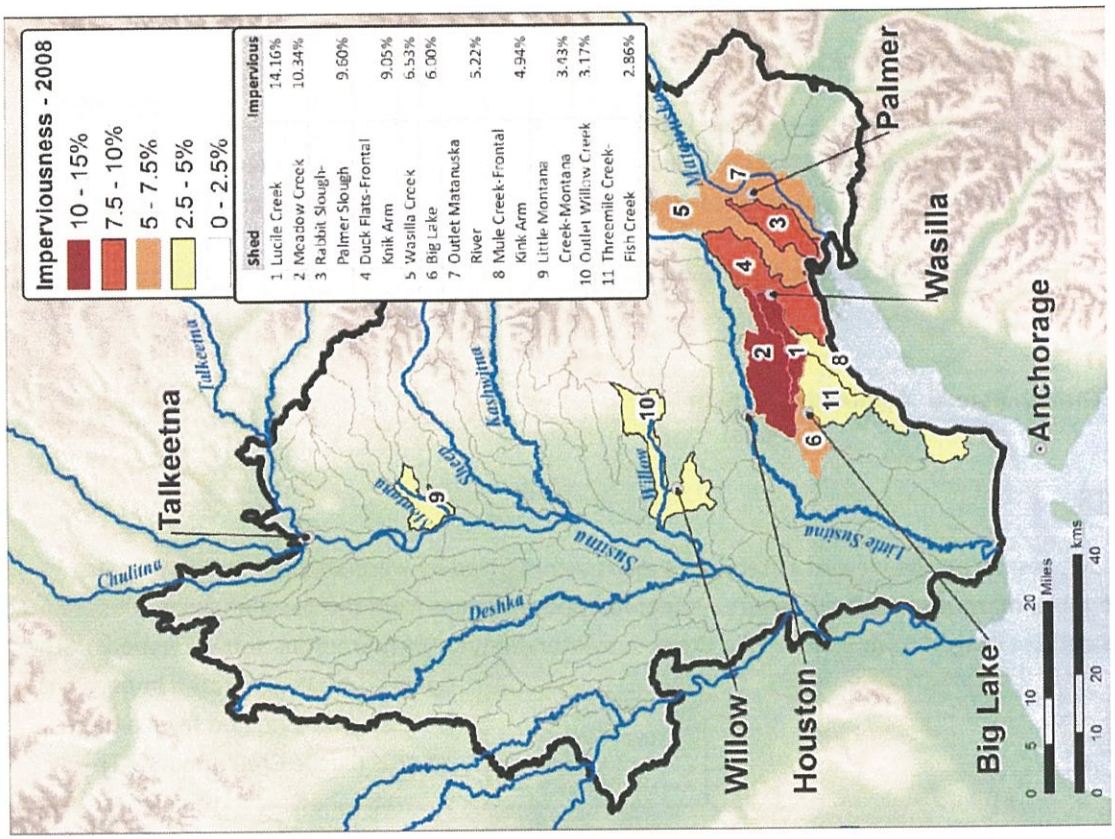
RESULTS:

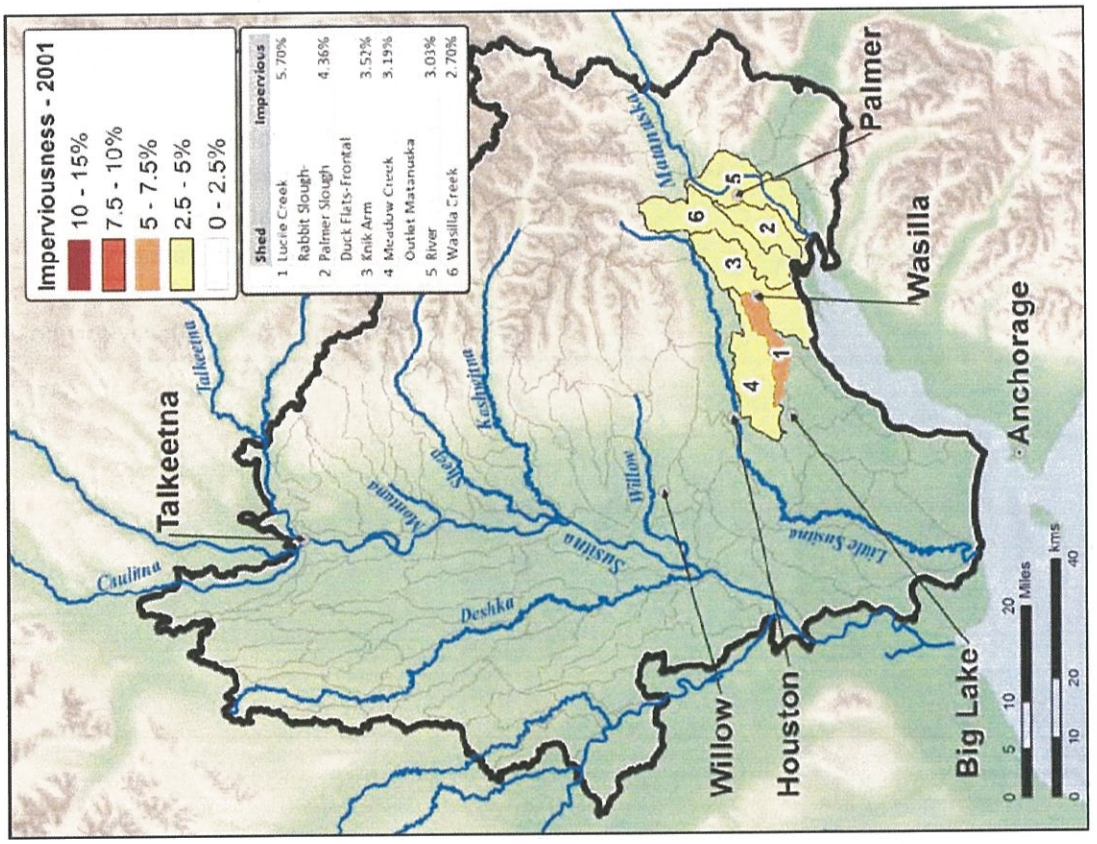
The study's results can be viewed as tables, as maps summarized by watershed, or in GIS formats suitable for numerous mapping software. Impervious cover values from the baseline, year 2001, NLCD derived dataset ranged from 5.7% (Lucile Creek subwatershed) to 0% (numerous subwatersheds). The updated ALOS generated impervious surface values ranged from a high 14.16% (Lucile Creek) to 0%. The subwatersheds with the highest impervious surface values can be found on the maps shown on the following page.



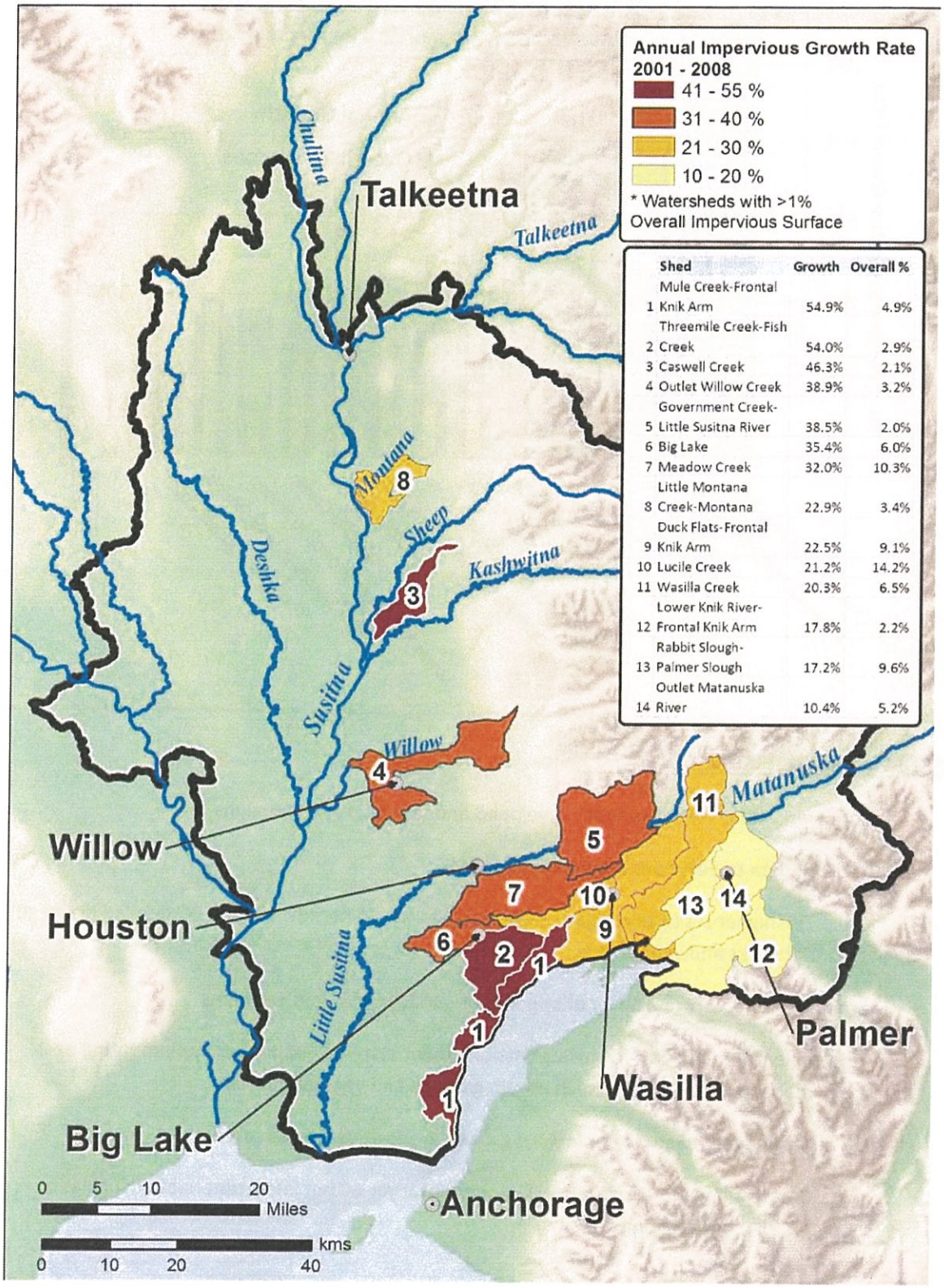
Study area encompasses 10,500 square kilometers, or 4048 square miles and includes the Mat-Su's core developed area stretching from Palmer west through Wasilla and Big Lake and then following the Parks Highway corridor north to Talkeetna.

Impervious Surface Percentages by Subwatershed: 2001 and 2008

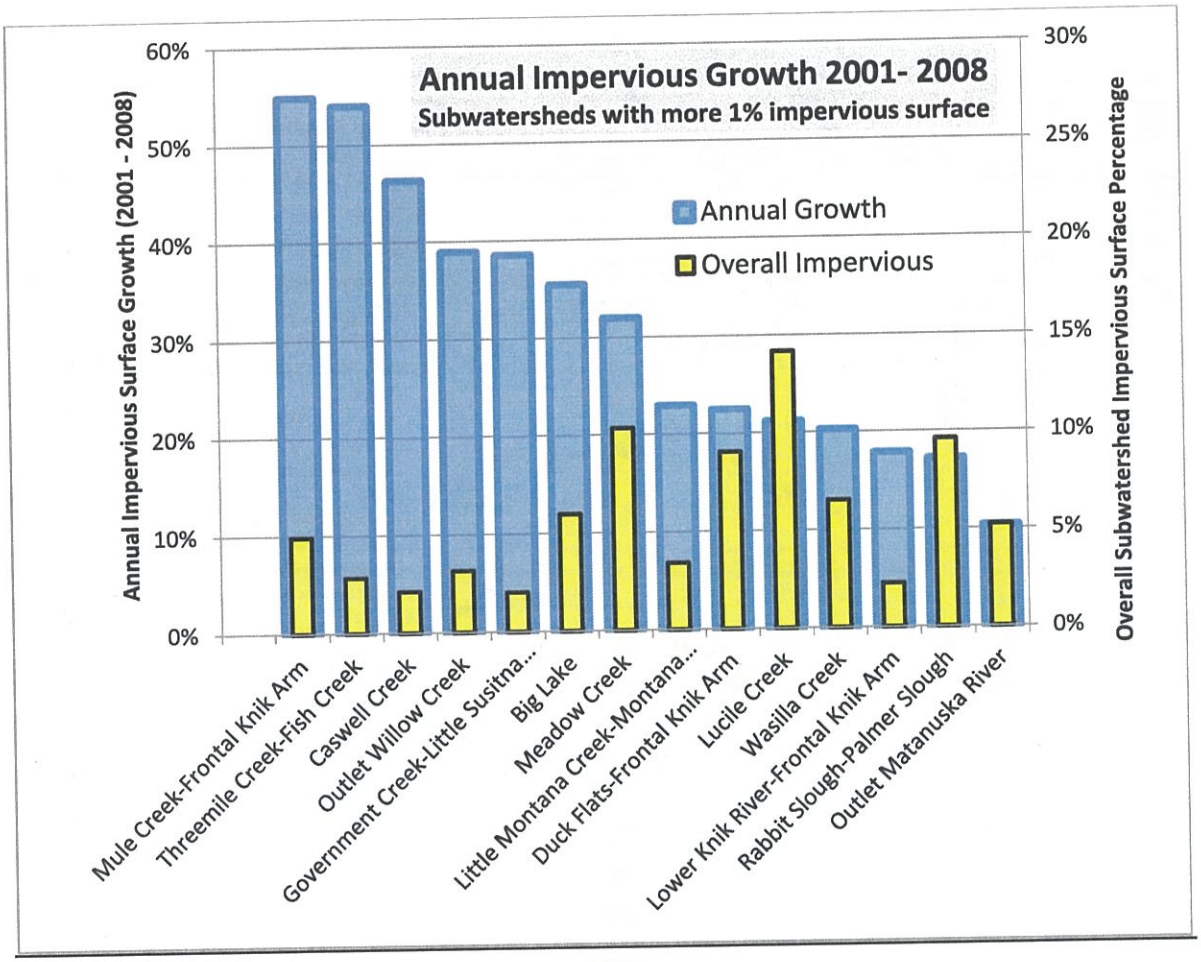




Watersheds with fastest impervious surface growth over the past seven years.



	Shed	Growth	Overall %
1	Mule Creek-Frontal Knik Arm	54.9%	4.9%
2	Threemile Creek-Fish Creek	54.0%	2.9%
3	Caswell Creek	46.3%	2.1%
4	Outlet Willow Creek	38.9%	3.2%
5	Government Creek-Little Susitna River	38.5%	2.0%
6	Big Lake	35.4%	6.0%
7	Meadow Creek	32.0%	10.3%
8	Little Montana Creek-Montana	22.9%	3.4%
9	Duck Flats-Frontal Knik Arm	22.5%	9.1%
10	Lucile Creek	21.2%	14.2%
11	Wasilla Creek	20.3%	6.5%
12	Lower Knik River-Frontal Knik Arm	17.8%	2.2%
13	Rabbit Slough-Palmer Slough	17.2%	9.6%
14	Outlet Matanuska River	10.4%	5.2%



DISCUSSION AND RECOMMENDATIONS:

- Future work should focus on most developed and fastest growing regions
- Use LiDAR data to delineate finer scale drainages
    - The higher resolution digital elevation data would permit creation of detailed drainage networks and watersheds
- Examine hydrologic connectivity of impervious surfaces to salmon streams
    - Inventory regional stormwater management systems, map areas implementing best management practices such as rain gardens and vegetated drains.
- 2011 aerial imagery to study impervious growth in sensitive riparian areas
    - Create a fine scale (one meter) impervious layer within important habitat such as a riparian buffer along streams.

ACKNOWLEDGEMENTS:

This dataset was created with financial support from the US Fish and Wildlife Service's Coastal Program in the Anchorage (Alaska) Field Office, Wallace Research Foundation, and Conoco Phillips Alaska, Inc. and through a partnership with Dr. Don Atwood and Moritz Wurth at the Alaska Satellite Facility at the University of Alaska Fairbanks.

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APPENDIX 1: Source Imagery considered for Impervious Surface Project

Notes: The Nature Conservancy investigated purchasing commercial satellite imagery from Quickbird and GeoEye, however these sources did not have adequate snow-free/cloud-free coverage of the project area or were deemed too expensive for the current project (75 - 125% of the budget).

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Effects of Urbanization on Benthic Macroinvertebrate Communities in Streams, Anchorage, Alaska

Water-Resources Investigations Report 01–4278

Oblique aerial view of downtown Anchorage and Cook Inlet, Alaska (photograph taken in 2001 by author)

U.S. DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

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Anchorage, Alaska
2001

U.S. DEPARTMENT OF THE INTERIOR
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FOREWORD

The U.S. Geological Survey (USGS) is committed to serve the Nation with accurate and timely scientific information that helps enhance and protect the overall quality of life and facilitates effective management of water, biological, energy, and mineral resources. (URL: <http://www.usgs.gov/>). Information on the quality of the Nation's water resources is of critical interest to the USGS because it is so integrally linked to the long-term availability of water that is clean and safe for drinking and recreation and that is suitable for industry, irrigation, and habitat for fish and wildlife. Escalating population growth and increasing demands for the multiple water uses make water availability, now measured in terms of quantity and quality, even more critical to the long-term sustainability of our communities and ecosystems.

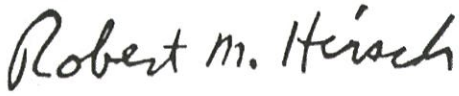
The USGS implemented the National Water-Quality Assessment (NAWQA) program to support national, regional, and local information needs and decisions related to water-quality management and policy. (URL: <http://water.usgs.gov/nawqa>). Shaped by and coordinated with ongoing efforts of other Federal, State, and local agencies, the NAWQA program is designed to answer: What is the condition of our Nation's streams and ground water? How are the conditions changing over time? How do natural features and human activities affect the quality of streams and ground water, and where are those effects most pronounced? By combining information on water chemistry, physical characteristics, stream habitat, and aquatic life, the NAWQA program aims to provide science-based insights for current and emerging water issues and priorities. NAWQA results can contribute to informed decisions that result in practical and effective water-resources management and strategies that protect and restore water quality.

Since 1991, the NAWQA program has implemented interdisciplinary assessments in more than 50 of the Nation's most important river basins and aquifers, referred to as study units. (URL: <http://water.usgs.gov/nawqa/nawqamap.html>). Collectively, these study units account for more than 60 percent of the overall water use and population served by public water supply and are representative of the Nation's major hydrologic landscapes, priority ecological resources, and agricultural, urban, and natural sources of contamination.

Each assessment is guided by a nationally consistent study design and methods of sampling and analysis. The assessments thereby build local knowledge about water-quality issues and trends in a particular stream or aquifer while providing an understanding of how and why water quality varies regionally and nationally. The consistent, multiscale approach helps to determine if certain types of water-quality issues are isolated or pervasive, and allows direct comparisons of how human activities and natural processes affect water quality and ecological health in the Nation's diverse geographic and environmental settings. Comprehensive assessments on pesticides, nutrients, volatile organic compounds, trace metals, and aquatic ecology are developed at the national scale through comparative analysis of the study-unit findings. (URL: <http://water.usgs.gov/nawqa/natsyn.html>).

The USGS places high value on the communication and dissemination of credible, timely, and relevant science so that the most recent and available knowledge about water resources can be applied in management and policy decisions. We hope this NAWQA publication will provide you the needed insights and information to meet your needs, and thereby foster increased awareness and involvement in the protection and restoration of our Nation's waters.

The NAWQA program recognizes that a national assessment by a single program cannot address all water-resources issues of interest. External coordination at all levels is critical for a fully integrated understanding of watersheds and for cost-effective management, regulation, and conservation of our Nation's water resources. The program, therefore, depends extensively on the advice, cooperation, and information from other Federal, State, interstate, Tribal, and local agencies, nongovernment organizations, industry, academia, and other stakeholder groups. The assistance and suggestions of all are greatly appreciated.



Robert M. Hirsch
Associate Director for Water

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CONVERSION FACTORS, WATER-QUALITY AND OTHER METRIC UNITS, and VERTICAL DATUM

Multiply	by	To obtain
inch (in.)	25.4	millimeter
foot (ft)	0.3048	meter
mile (mi)	1.609	kilometer
square mile (mi^2)	2.590	square kilometer
mile per square mile (mi/mi^2)	0.6212	kilometer per square kilometer
cubic foot per second (ft^3/s)	0.02832	cubic meter per second

In this report, water temperature is reported in degrees Celsius (°C), which can be converted to degrees Fahrenheit (°F) by the equation

$$°F = 1.8\ (°C) + 32$$

and ambient (air) temperature is reported in degrees Fahrenheit(°F), which can be converted to degrees Celsius (°C) by the equation

$$°C = (°F - 32) / 1.8$$

Abbreviated water-quality and other metric units used in this report: Chemical concentration in water, or solute mass per unit volume (liter) of water, is given in milligrams per liter (mg/L) or micrograms per liter (µg/L). (A concentration of 1,000 µg/L is equivalent to a concentration of 1 mg/L. For concentrations less than 7,000 mg/L, the numerical value is about the same as for concentrations in parts per million.) Specific conductance is given in microsiemens per centimeter (µS/cm) at 25 degrees Celsius. Other metric units used are micron (µm), centimeter (cm), and square meter (m^2). The unit used for algal standing crop is milligram per square meter (mg/m^2). Standard units are used for pH.

Sea level: In this report, "sea level" refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929, formerly called "Sea-Level Datum of 1929"), which is derived from a general adjustment of the first-order leveling networks of the United States and Canada.

Effects of Urbanization on Benthic Macroinvertebrate Communities in Streams, Anchorage, Alaska

By Robert T. Ourso

Abstract

The effect of urbanization on stream macroinvertebrate communities was examined by using data gathered during a 1999 reconnaissance of 14 sites in the Municipality of Anchorage, Alaska. Data collected included macroinvertebrate abundance, water chemistry, and trace elements in bed sediments. Macroinvertebrate relative-abundance data were edited and used in metric and index calculations. Population density was used as a surrogate for urbanization. Cluster analysis (unweighted-paired-grouping method) using arithmetic means of macroinvertebrate presence–absence data showed a well-defined separation between urbanized and nonurbanized sites as well as extracted sites that did not cleanly fall into either category. Water quality in Anchorage generally declined with increasing urbanization (population density). Of 59 variables examined, 31 correlated with urbanization. Local regression analysis extracted 11 variables that showed a significant impairment threshold response and 6 that showed a significant linear response. Significant biological variables for determining the impairment threshold in this study were the Margalef diversity index, Ephemeroptera–Plecoptera–Trichoptera taxa richness, and total taxa richness. Significant thresholds were observed in the water-chemistry variables conductivity, dissolved organic carbon, potassium, and total dissolved solids. Significant thresholds in trace elements in bed sediments included arsenic, iron, manganese, and lead. Results suggest that sites in Anchorage that have ratios of population density to road density greater than 70, storm-drain densities greater than 0.45 miles per square mile, road densities greater than 4 miles per square mile, or population densities greater than 125–150 persons per square mile may require further monitoring to determine if the stream has become impaired. This population density is far less than the 1,000 persons per square mile used by the U.S. Census Bureau to define an urban area.

INTRODUCTION

The U.S. Geological Survey's (USGS) National Water-Quality Assessment (NAWQA) program began studies in the Cook Inlet Basin (COOK) study unit in 1997. The goal of the COOK study is to describe the status and trends in the quality of water in the basin and to relate that to an understanding of the natural and human factors controlling water quality.

Increasing urban populations, and the urban sprawl associated with the increase in population, are known to alter drainage basins and the streams that drain these urbanized catchments. Point sources of pollution in the U.S. and most developed countries have been studied intensely and regulated more closely since the passage of the Clean Water Act. The understanding of point-source pollution and its effects has shown that other factors contribute to the degradation of urban water quality as streams still show impairment. Many prior studies describe the effects of nonpoint-source pollution on water quality, especially in urban areas (Klein, 1979; Milner and Oswood, 1989; Wear and others, 1998; Winter and Duthie, 1998). Nonpoint-source pollution factors that are commonly cited as detrimental to water quality are increases in conductivity due to road deicing, organic pollution from high-density livestock facilities, nutrient enrichment from fertilizers, and petroleum byproducts from the use of vehicles, among many others.

Associated with increases in population is increased impervious area, which leads to elevated runoff and streamflows over short time periods. As water in the catchment exits the system more rapidly owing to increases in impervious cover, low flows tend to decrease, and the overall habitat availability for stream-dwelling organisms correspondingly decreases. Increases in pollutants, which also are attributed to increasing populations and impervious areas, exacerbate the problems associated with lowered discharges: Because less water is available for dilution of pollutants, resident organisms are subjected to increasing stress. Macroinvertebrate-community structures have shifted from greater numbers of specialist feeders in undisturbed areas to greater numbers of generalists in less-diverse disturbed areas (Whiting and Clifford, 1983; Garie and McIntosh, 1986).

Anchorage presents a unique opportunity to study the effects of urbanization on benthic macroinvertebrates. Streams in Anchorage originate in undisturbed catchments and then course through areas having different population densities before emptying into Cook Inlet. This report generally describes the results of site reconnaissance for a study examining the changes in water quality along an urban gradient and specifically examines the response of benthic macroinvertebrates to changes in water quality along a gradient of urbanization in five stream basins within the Municipality of Anchorage, Alaska.

BASIN CHARACTERIZATION

The hydrology of Anchorage is dominated by five stream basins, all having headwaters in the Chugach Mountains, which border the municipality on the east side. Each stream courses through the city on the way to its mouth along the Cook Inlet. Anchorage, the most populated city in the State, is located within the Cook Inlet Basin in south-central Alaska. More than one-third of Alaska's population lives in Anchorage. Estimated population of the municipality as of 1996 was approximately 254,000 (Municipality of Anchorage, 1996). The mean annual precipitation is 20 to 25 in. and average temperature is about 27°F (Brabets and others, 1999).

Streams are affected by ice cover for a significant part of the year. Ice typically forms over the streams in late November to early December and open water reappears around the beginning of April. The time of ice cover varies according to the elevation of a particular segment of the stream.

The geology consists primarily of unconsolidated Quaternary alluvial or glacial deposits in the lower elevations and Mesozoic metamorphic, volcanic, and igneous rock in the Chugach Mountains on the east side (Brabets and others, 1999).

Land cover is dominated by moist herbaceous and shrub tundra. Open and closed spruce forest, low and tall shrub, and alpine tundra and barrens cover smaller areas (Brabets and others, 1999). Within the area under investigation in this study, land use is principally forest (military lands and State parklands) and urban (residential and commercial).

STUDY SITES

The five stream basins within the Municipality of Anchorage (**fig. 1**, **fig. 2**, **table 1**) that were chosen for the study were, from north to south, Ship Creek, Chester Creek, Campbell Creek, Rabbit Creek, and Little Rabbit Creek. During August–September 1999, 14 stream sites (**appendix 1**) were selected to represent these 5 basins—2 sites in the Ship Creek Basin and 3 in each of the other 4 basins. Total basin areas range from 125 mi^2 (Ship Creek) to 6.4 mi^2 (Little Rabbit Creek). Snowmelt from the Chugach Mountains is the primary contributor to surface-water flow within the five basins studied.

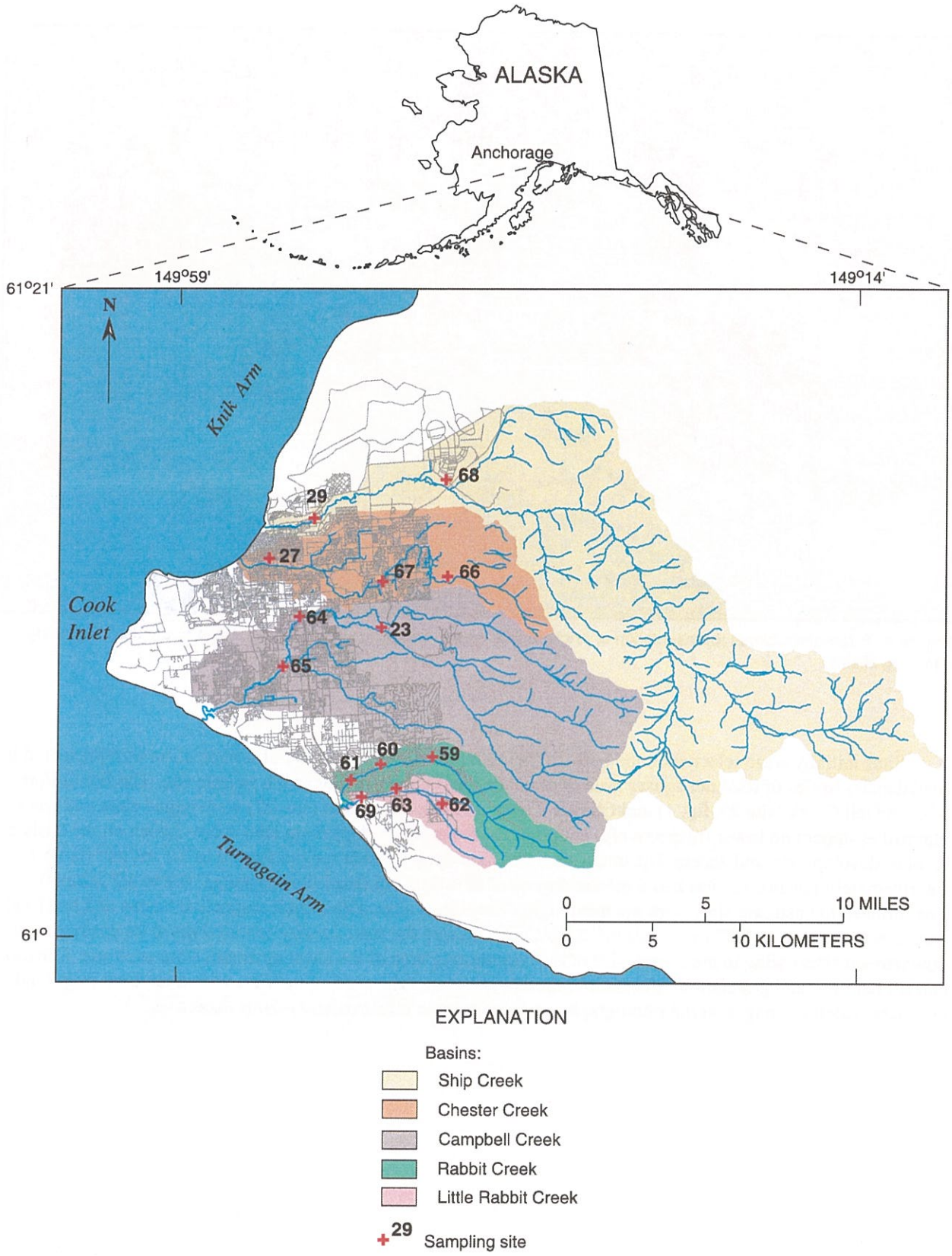

Figure 1. Anchorage area, showing stream basins and sampling sites. Site numbers (appendix 1) correspond to those introduced by Brabets and others (1999) in their National Water-Quality Assessment environmental-setting study.

Figure 2. Three-dimensional representation of Anchorage area and sampling sites. (See fig. 1 and appendix 1 regarding sampling sites.)

Sites initially were selected on the basis of their position along a gradient of urbanization as represented by road density (miles of road per square mile of drainage area) upstream from each sample site. The South Fork of Campbell Creek (site 23, fig. 1) and Chester Creek at Arctic Boulevard (site 27) were gaged sites and were planned as upper and lower (respectively) endpoints of the gradient. Upstream sites were chosen on the basis of level of development and access. Upstream sites had road densities that ranged from 0 to 2.1 mi/mi^2 (table 1). Intermediately positioned sites had a greater degree of development (road-density range, 0.9 to 4.2 mi/mi^2). The farthest downstream sites were the most highly developed sites within their respective basins and had road densities ranging from 0.57 to 9.2 mi/mi^2. Ship Creek skewed the road-density calculations at its upstream and downstream sites owing to the overall size of the contributing area of the basin upstream from each site. The most current land-use and population information, used to calculate urbanization metrics, was assembled from land-use maps, satellite images, aerial photography, and geographic information systems databases.

Table 1. Description of sites

[Site no.: Number used in this report (see figs. 1 and 2 for site locations); corresponds to site number assigned by Brabets and others (1999) in earlier National Water-Quality Assessment report. Sites are ordered from least to greatest population density]

Site no.	U.S. Geological Survey station		Elevation (feet above sea level)	Upstream watershed area (square miles)	Discharge (cubic feet per second)	Specific conductance (microsiemens per centimeter at 25°C)	pH (standard units)	Water temperature (degrees Celsius)	Dissolved oxygen (milligrams per liter)	Road density (miles per square mile)	Population density (persons per square mile)	Storm-drain density (miles of storm sewers per square mile)	Ratio of population density to road density
	Station number	Name											
66	15274796	South Branch of South Fork Chester Creek at Tank Trail	358	4.3	3.4	113	8.2	4.5	11.4	0	0	0	0
68	15276200	Ship Creek at Glenn Highway	286	103.4	148	156	7.5	7	11.8	.1	0	.00	0
23	15274000	South Fork Campbell Creek	233	29.2	58	72	7.7	4	12.7	.33	9	0	29.42
29	15276570	Ship Creek below powerplant at Elmendorf Air Force Base	47	113.3	224	169	7.6	9.5	10.7	.6	28	.08	48.28
59	15273020	Rabbit Creek at Hillside Drive	876	9.8	30	86	7.3	3.5	12.2	.98	32	0	32.68
62	15273090	Little Rabbit Creek at Nickleen Street	1,230	2.6	6.2	109	7.7	1	12.6	2.12	60	0	28.36
63	15273097	Little Rabbit Creek at Goldenview Drive	590	5.6	15	128	7.9	2.5	12.8	4.2	125	0	29.86
60	15273030	Rabbit Creek at East 140th Avenue	436	11.3	28	90	7.6	6	12.5	2.97	136	0	45.92
64	15274395	Campbell Creek at New Seward Highway	98	45.9	78	84	7.6	5	11.6	.89	176	.45	198.48
69	15273100	Little Rabbit Creek	92	6.4	15	137	7.9	3	12.4	4.77	182	0	38.39
61	15273040	Rabbit Creek at Porcupine Trail	121	13.3	34	96	7.6	6	12.2	4.04	262	0	64.93
65	15274557	Campbell Creek at C Street	52	65.7	89	92	7.9	8	8.9	3.55	662	1.59	186.52
67	15274830	South Branch of South Fork Chester Creek at Boniface Parkway	197	14.8	12	168	7.7	8	11.7	4.14	1,222	3.22	295.1
27	15275100	Chester Creek at Arctic Boulevard	16	27.3	31	242	8.1	11.5	10.4	9.24	2,736	6.95	296.2

FIELD METHODS

Water-chemistry data (major ions, nutrients, dissolved and suspended organic carbon), field properties (stream discharge, specific conductance, dissolved oxygen, pH, and water temperature), concentrations of trace elements in streambed sediments, macroinvertebrate relative abundances, and chlorophyll-*a* data were collected to assess water quality along the urban gradient. For most sites, data were collected during August 23 to September 23, 1999; for the South Fork of Campbell Creek (site 23), data collected in late July 1999 as part of the NAWQA basic fixed-site sampling regime was used.

Water samples for major ions and nutrients and streambed-sediment samples for trace elements were collected according to NAWQA protocols (Shelton, 1994; Shelton and Capel, 1994) and sent to the USGS National Water-Quality Laboratory (NWQL) for constituent analysis. Major ions and trace elements addressed in this report include calcium, magnesium, sodium, potassium, sulfate, chloride, phosphorus, iron, manganese, aluminum, arsenic, cadmium, cobalt, copper, chromium, lead, mercury, molybdenum, nickel, selenium, silver, sulfur, and zinc.

Epilithic periphyton (algae attached to rocks) was collected using quantitative methods described by Porter and others (1993) and fluorometrically analyzed for chlorophyll-*a* concentrations at the University of Alaska at Fairbanks. Three algae samples comprising five rocks each were collected in each reach. These concentrations were averaged to measure algal standing crop in milligrams per square meter.

Macroinvertebrate samples were collected according to NAWQA protocols (Cuffney and others, 1993). The richest targeted habitat (RTH or semiquantitative) method was designed to provide identification and enumeration of species within a given area. Riffles, which are known to support a taxonomically rich macroinvertebrate community (Hynes, 1970), were targeted for semiquantitative sampling. Five samples, each representing a sampling area of 0.25 m^2, were collected in riffles within each reach by using a 425-µm mesh Slack sampler. Bed sediment within the sample area was disturbed to a depth of approximately 10 cm for approximately one minute. Large rocks were scrubbed to remove any adhering organisms. The five samples then were composited and packaged for shipment. The samples were submitted to the Biological Unit of the NWQL for taxonomic determination. The resulting data was entered into a database for further manipulation (see **appendix 2** for raw data). Macroinvertebrate metrics were calculated and categorized according to richness, composition, tolerance, and feeding measures (**table 2**).

ANALYSIS

Macroinvertebrate identification and presence–absence data were entered into a database and sorted for further analysis. An unweighted-paired-grouping-method (UPGM) cluster analysis using arithmetic means was applied to Bray–Curtis distance matrices and was performed by using lowest identifiable taxa data. Dendrograms were generated to aid in relating clusters of sites. UPGM clustering refers to the measurement of the distance between two clusters as measured by the average of all sampling units within each group (Pielou, 1984; Ludwig and Reynolds, 1988). The resultant dendrogram grouped the sites on the basis of dissimilarities (**fig. 3**). Groupings that have larger Bray–Curtis dissimilarity values (approaching 1) are more dissimilar.

Table 2. Biological metrics and expected response of macroinvertebrates to perturbation

[Data modified from Kerans and Karr (1994); Barbour and others (1996); and Fore and others (1996). EPT, insect orders Ephemeroptera, Plecoptera, and Trichoptera]

Biological metric	Definition and remarks	Expected response to increasing perturbation
	Abundance category	
EPT abundance	Number of EPT individuals	Decrease
	Composition category	
Margalef diversity index (lowest practical taxonomic level of identification)	Measure of species richness (measured to the lowest practical taxonomic level of identification).	Decrease
Margalef diversity index (family level)	Measure of species richness (measured to the family level of identification).	Decrease
Shannon diversity index	Index that uses richness and evenness to measure general diversity and composition.	Decrease
Percentage Chironomidae	Percentage midge larvae	Increase
Percentage Ephemeroptera	Percentage mayfly nymphs	Decrease
Percentage Plecoptera	Percentage stonefly nymphs	Decrease
Percentage Trichoptera	Percentage caddisfly larvae	Decrease
Percentage Oligochaeta	Percentage aquatic worms	Variable
Ratio of EPT to Chironomidae abundances	Measure of balance between two indicator groups	Decrease
	Feeding category	
Percentage filterers	Percentage of macrobenthos that filter from water column or sediment	Variable
Percentage collectors (gatherers)	Percentage of macrobenthos that feed by gathering	Variable
Percentage predators	Percentage of macrobenthos that feed upon other organisms	Variable
Percentage scrapers	Percentage of macrobenthos that scrape or graze on periphyton	Decrease
Percentage shredders	Percentage of macrobenthos that shred leaf material	Decrease
	Richness category	
Total taxa richness (lowest practical taxonomic level of identification)	Measure of overall variety of macroinvertebrates at lowest taxa identified	Decrease
Total taxa richness (family level)	Measure of overall variety of macroinvertebrates at family level of identification.	Decrease
EPT taxa richness	Number of EPT taxa represented	Decrease
	Tolerance category	
Hilsenhoff family-level biotic index	Index that uses tolerance values to weight family-level identifications to evaluate organic pollution.	Increase
Percentage two dominant taxa	Percentage composition of the two most abundant taxa	Increase
Ratio of Baetidae to Ephemeroptera abundances	Relative abundance of pollution-tolerant mayflies	Increase

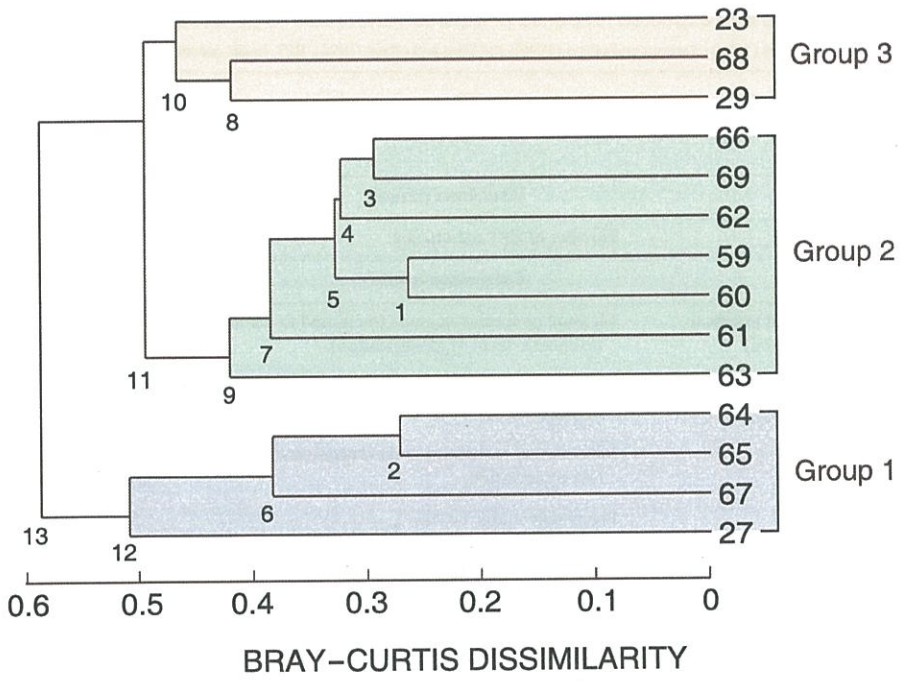

Figure 3. Cluster analysis (unweighted-paired-grouping method) using arithmetic means of macroinvertebrate presence–absence data. Values approaching 1 are more dissimilar. Nodes (13, 11, 10, 12, and others) represent clusters and facilitate assessment of dissimilarity. Group 1 sites are considered "urban impacted"; group 2 sites are "non-impacted"; group 3 sites are considered to be possibly anomalous compared to other two groups. (See fig. 1 and appendix 1 regarding sampling sites.)

Variables for water chemistry (major ions and nutrients) and bed-sediment chemistry (trace elements) that were below detection limits were removed from analysis because of the limited number of sites in the data set. A correlation table of the significant variables ($p < 0.05$, $r > |0.7|$) against population density was generated to determine those variables associated with urbanization for further analysis (**table 3**).

Population, road, and storm-drain densities were calculated by using data provided by the Municipality of Anchorage. Population density was defined as number of persons/mi^2 of basin; road density was defined as linear miles of road per square mile of basin; storm-drain density was defined as miles of storm drains per square mile of basin. The ratio of population density to road density, or PDRD ratio, was calculated as the number of persons per mile of road. Each of these calculations incorporates all basin area upstream from each site.

Local regression analysis, performed by using the statistical package S-Plus 2000 (Mathsoft, Inc., 2000), was used to examine the variables associated with urbanization (measured as population density in this study) for the presence of a threshold response or of a linear response. Threshold responses, visually identified by a breakpoint in or change in slope of a smooth-fit line, suggest a point at which further increases in population density could have a significant effect on stream condition with respect to the particular constituent or metric. Scatterplot smoothing was used to remove noise (that is, extraneous information that reduces our ability to see patterns in the data) from a data set and to produce a more easily interpreted fit. After the threshold had been identified visually on the plot, the breakpoint was tested by determining if the slopes of the two lines converging at the breakpoint differed significantly. A *t*-test (Zar, 1996) was used to check the equality of two population regression coefficients; a linear response indicates that any increase in population density (the independent variable, x) relates to an increase or decrease (depending on the variable) in the dependent variable (y) in a linear fashion without a significant change in the slope of the line at a breakpoint.

Table 3. Coefficients of correlation between each metric or constituent or field property and population density

[Blue shading indicates that correlation is significant at $p < 0.05$, n =14. EPT, insect orders Ephemeroptera, Plecoptera, and Trichoptera]

Biological metric or constituent	Coefficient of correlation with population density
Biological variables	
Margalef diversity index (lowest practical taxonomic level of identification)	-0.78
Margalef diversity index (family level)	-.36
Shannon diversity index (lowest practical taxonomic level of identification)	-.81
Total abundance	-.18
EPT abundance	-.33
Hilsenhoff family-level biotic index	.78
Percentage Chironomidae	-.23
Percentage Ephemeroptera	-.38
Percentage Plecoptera	-.43
Percentage Trichoptera	-.36
Percentage Oligochaeta	.71
Percentage filterers	-.34
Percentage collectors	.1
Percentage predators	-.56
Percentage scrapers	-.63
Percentage shredders	-.37
Total taxa richness (lowest practical taxonomic level of identification)	-.73
Total taxa richness (family level)	-.56
Percentage two dominant taxa	.82
Percentage EPT	-.62
EPT taxa richness	-.85
Ratio of EPT to Chironomidae abundances	-.34
Ratio of Baetidae to Ephemeroptera abundances	.65
Chlorophyll-*a*	.35
Water chemistry and field properties	
Silica	.66
Calcium	.61
Chloride	.97
Sodium	.92
Potassium	.95
Magnesium	.84
Sulfate	.27
Total dissolved solids	.76
Organic carbon, dissolved	.74
Discharge	-.15
Specific conductance	.76
pH	-.04
Temperature	.36
Oxygen, dissolved	-.17
Mercury	-.26
Copper	.64
Sulfur	.64
Cobalt	.41
Chromium	.55
Bed-sediment chemistry	
Phosphorus	.15
Sodium	.01
Magnesium	.25
Potassium	-.27
Iron	.85
Calcium	.04
Aluminum	-.15
Selenium	-.27
Arsenic	.86
Cadmium	.97
Silver	.81
Zinc	.98
Lead	.98
Nickel	.5
Molybdenum	.05
Manganese	.84

RESULTS

A UPGM cluster analysis of macroinvertebrate-species abundance data using Bray–Curtis distance matrices is shown in figure 3. The sites separated into three primary groupings based on cluster analysis. These groupings illustrate a delineation between urban-impacted (group 1) and nonimpacted sites (group 2), as well as substantiate the differences between Ship Creek (group 3) and the rest of the basins in the Anchorage Bowl. The South Fork of Campbell Creek site (site 23, group 3) appears anomalous, possibly due to a different sampling time compared to the other sites. The PDRD ratio appears to support the separation of sites in group 1 from those in groups 2 and 3 but does not distinguish group 3 from group 2 (table 1, fig. 3, **fig. 4**). Storm-drain density also supports the separation of group 1 from groups 2 and 3. All group 1 sites had storm-drain densities ≥0.45.

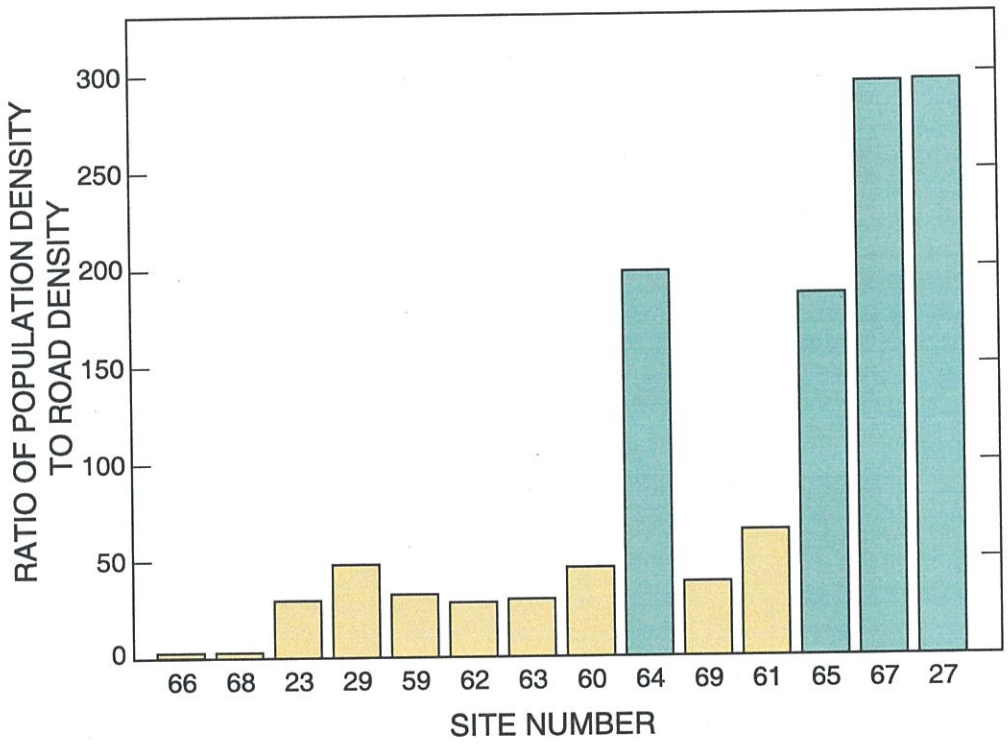

Figure 4. Ratio of population density to road density, comparing group 1 sites (green), which are urban impacted, with groups 2 and 3 sites (yellow), which are nonimpacted and anomalous, respectively. (See fig. 1 and appendix 1 regarding sampling sites.)

Correlation coefficients between chosen metrics or constituents and population density are shown in table 3 ($p < 0.05$, $n = 14$). Of these variables, 12 biological variables (appendix 2 and **appendix 3**), 12 water-chemistry variables (**appendix 4**), and 7 trace-element-in-bed-sediments variables (**appendix 5**) were shown to be significant ($p < 0.05$).

The PDRD ratio was greatest for those sites rated as urban impacted (table 1, fig. 4). The ratios for sites 27, 67, 65, and 64 (members of group 1 in the cluster analysis, fig. 3) were an order of magnitude higher than for all other sites, which had PDRD ratios of less than 70. No difference with respect to the PDRD ratio was evident between UPGM cluster groupings 2 and 3.

Locally weighted regression analysis was performed on 31 macroinvertebrate metrics, water-chemistry variables, field properties, and bed-sediment variables that correlated significantly ($p < 0.05$) with population density (table 3). Of these 31 variables, 11 showed a threshold response of the constituent to population densities when plotted and tested for significance (**fig. 5**, **fig. 6**, **fig. 7**, **table 4**), and 7 exhibited a linear response (no significant breakpoint in the line) (**fig. 8**, table 4).

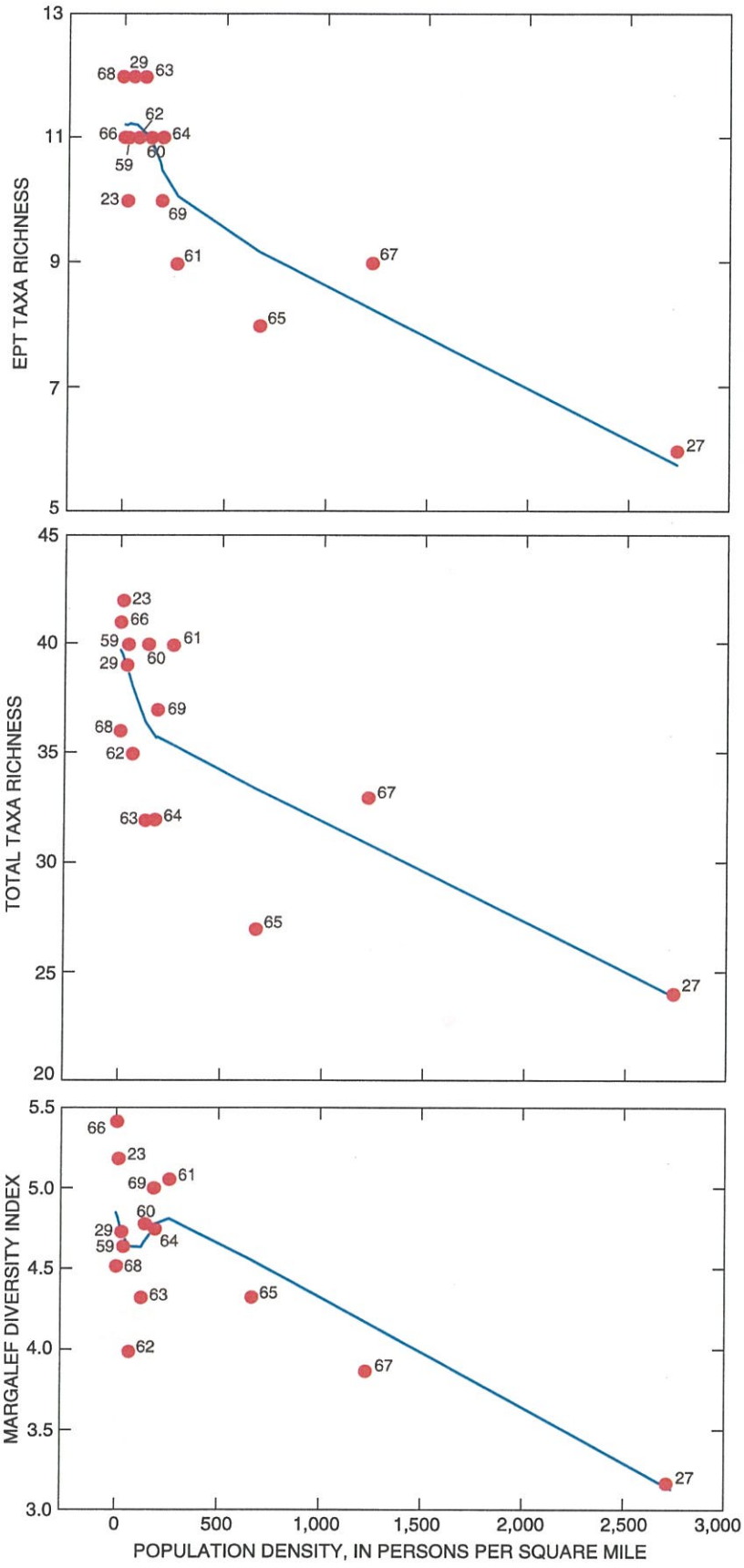

Figure 5. Variable-span bivariate smoothed scatterplot of three significant biological variables ($p < 0.05$, $n = 14$), showing threshold response against population density. Total taxa richness and Margalef diversity index: both at lowest practical taxonomic level of identification. EPT, insect orders Ephemeroptera, Plecoptera, and Trichoptera. (See fig. 1 and appendix 1 regarding sampling sites.)

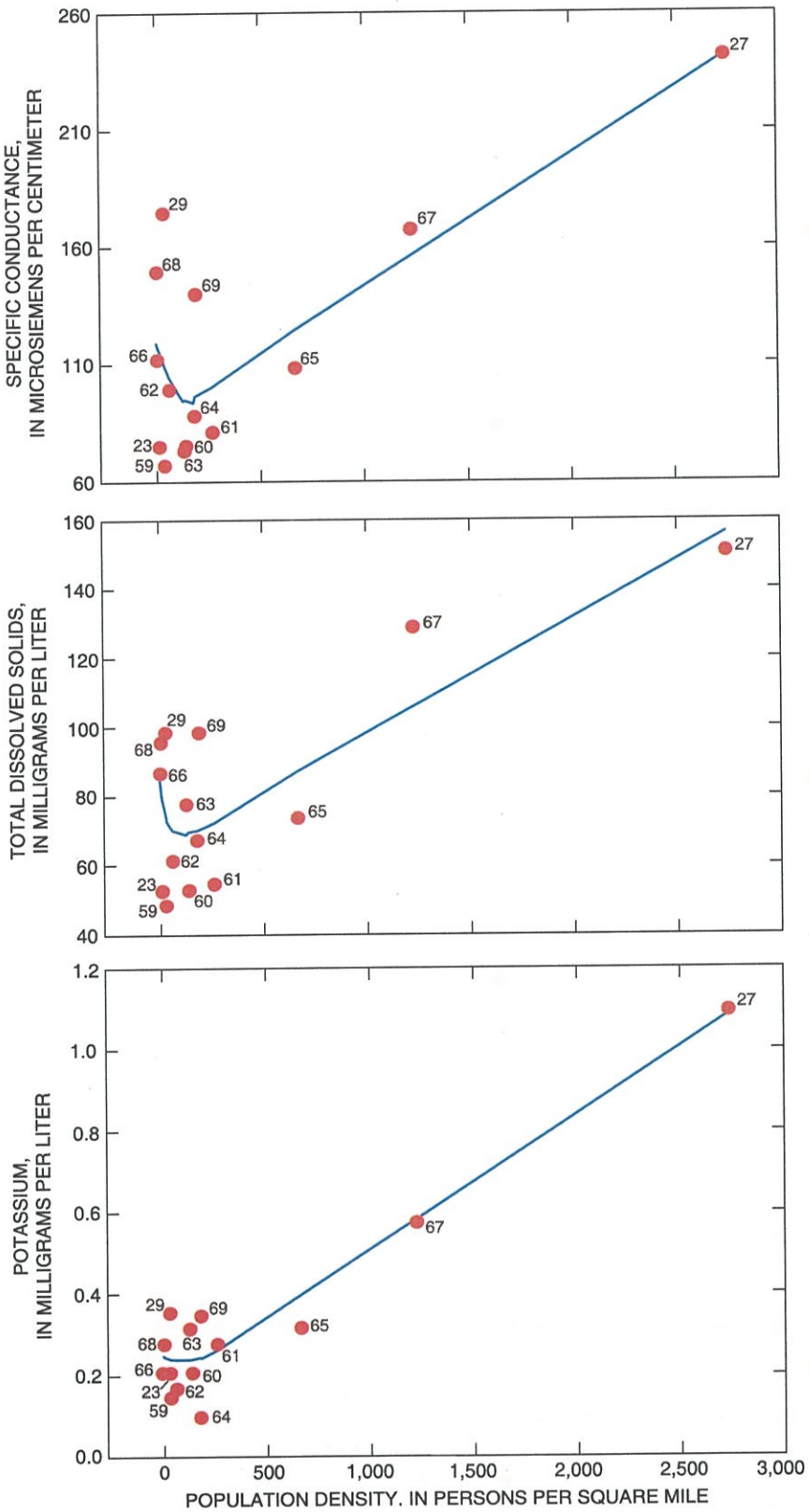

Figure 6. Variable-span bivariate smoothed scatterplot of four significant water-chemistry variables ($p < 0.05$, $n = 14$), showing threshold response against population density. (See fig. 1 and appendix 1 regarding sampling sites.)

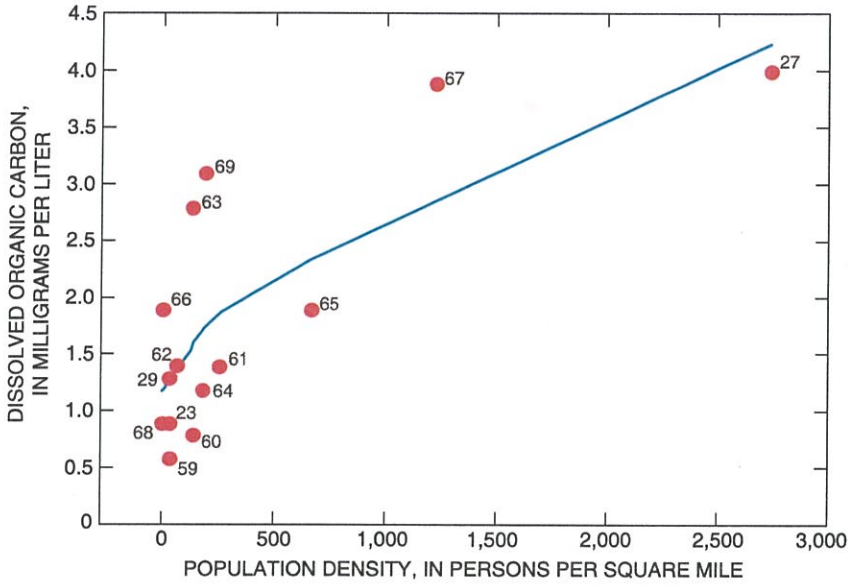

Figure 6.—*Continued*

DISCUSSION

The Bray–Curtis distance measures revealed three distinguishable groupings. Group 1 or the "urban-impacted" group is under the 12th node (dissimilarity index, 0.510). These sites (27, 67, 65, and 64) have the relatively high population densities, road densities, and storm-drain densities (≥0.45). Each of these sites also had PDRD ratios greater than 185. The separation of these sites is due primarily to the presence of oligochaetes (worms) and mayflies of the family Baetidae, both of which commonly are associated with diminished water quality. This is supported further by the metric percentage composition of the two most common taxa (PDT2), higher values of which commonly are associated with impaired water quality (Barbour and others, 1999). Because all the group 1 sites had higher PDT2 values than all other sites, these sites were considered to be urban-impacted sites. At these sites, we observed higher levels of fine sediments in the bed materials, which make better oligochaete habitat (Thorp and Covich, 1991). The two major families, Naididae and Tubificidae, continuously feed on the sediments through which they burrow. Algae and other periphytic materials are the primary food source for most naidids, whereas bacteria are the preferred food source for most tubificids (Brinkhurst and Gelder, 1991). Both these food sources are found in abundance at urban-impacted sites. Epiphytic algal blooms can be related to an increase in nutrients (lawn fertilizers, etc.) entering the stream after a storm event via storm drains, and bacteria in streams are most commonly associated with sewage or other organic pollution (such as from a large population of waterfowl, livestock, etc.). Both of these nutrient sources are common at or near the group 1 sites.

Sites in group 2 or the "nonimpacted" group (63, 61, 60, 59, 62, 69, 66), which is beneath the ninth node (dissimilarity index, 0.421), generally have considerably lower population, road, and storm-drain densities than sites have in the urban-impacted group. Two sites in the group (61 and 69) do have relatively high population densities, but this is offset by the lower PDRD ratio when compared to the urban-impacted sites. The primary macroinvertebrate groups driving this separation in the cluster analysis are those sensitive to perturbation—the mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Trichoptera).

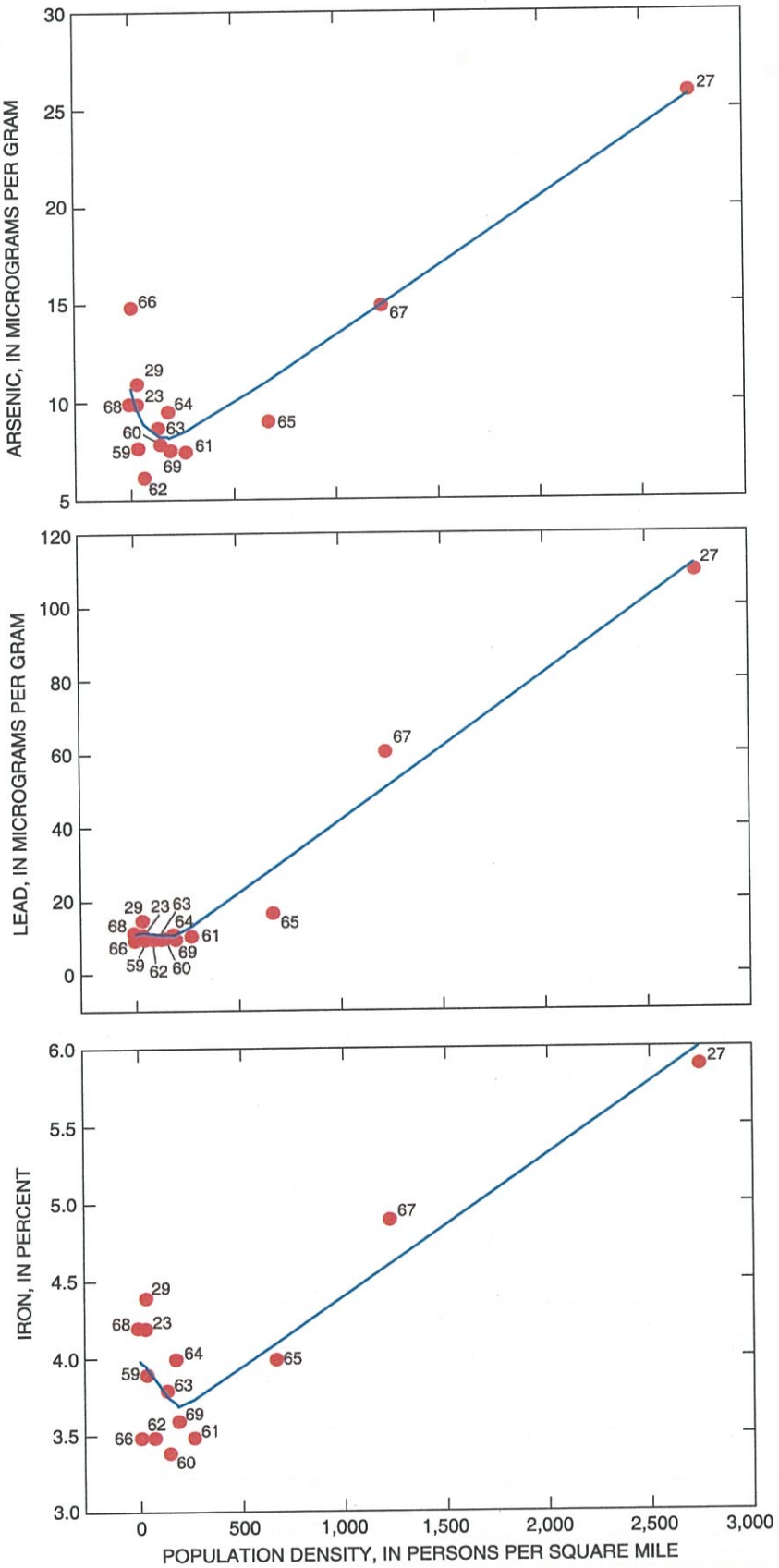

Figure 7. Variable-span bivariate smoothed scatterplot of four significant trace-elements-in-bed-sediments variables ($p < 0.05$, $n = 14$), showing threshold response against population density. (See fig. 1 and appendix 1 regarding sampling sites.)

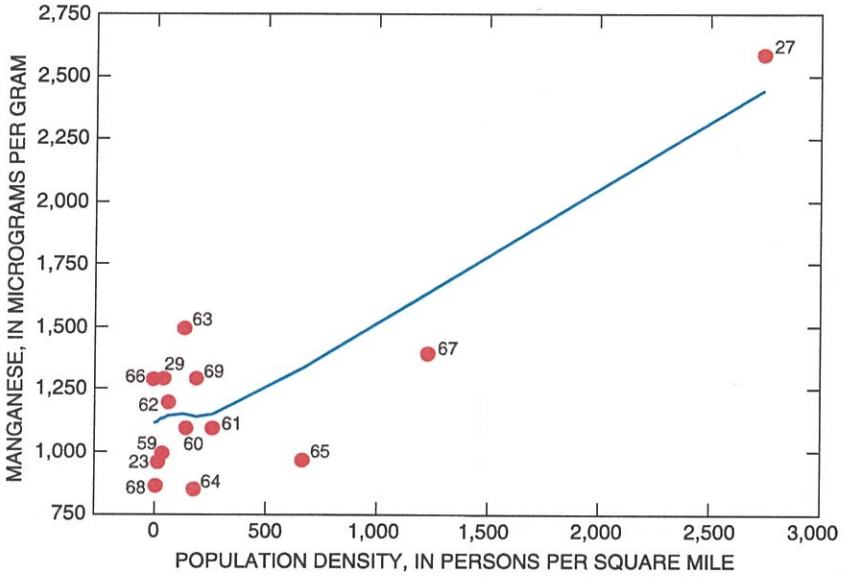

Figure 7.—*Continued*

Table 4. Coefficients of determination (r^2) as calculated by linear and local regression analysis and significance (p)

[Threshold population-density range: Range of values that includes breakpoint. EPT, insect orders Ephemeroptera, Plecoptera, and Trichoptera. <, less than; —, not applicable]

Biological metric or constituent	Linear-regression model, coefficient of determination, r^2	Significance, p	Local-regression model, coefficient of determination, r^2	Threshold population-density range (persons per square mile)	Type of response
Biological metrics					
Margalef diversity index[1]	0.62	0.0008	0.78	125–137	Threshold
Hilsenhoff family biotic index	.61	.001	.57	—	Linear
Percentage Oligochaetes	.52	.003	.63	—	Linear
Percentage dominant two taxa	.68	.0002	.27	—	Linear
EPT taxa richness	.72	.001	.8	262–662	Threshold
Total taxa richness[1]	.54	.002	.26	125–137	Threshold
Water chemistry (major ions)					
Chloride	.94	<.0001	.98	—	Linear
Potassium	.9	<.0001	.91	177–183	Threshold
Magnesium	.7	.002	.79	—	Linear
Sodium	.84	<.0001	.93	—	Linear
Conductivity	.55	.002	.68	125–137	Threshold
Dissolved organic carbon	.55	.002	.66	125–137	Threshold
Total dissolved solids	.58	.001	.6	177–183	Threshold
Bed-sediment chemistry (trace elements)					
Lead	.96	<.0001	.99	177–183	Threshold
Zinc	.95	<.0001	.99	—	Linear
Arsenic	.75	<.0001	.92	32–60	Threshold
Iron	.73	<.0001	.81	137–177	Threshold
Manganese	.72	.0001	.89	125–137	Threshold

[1]Lowest practical taxonomic identification.

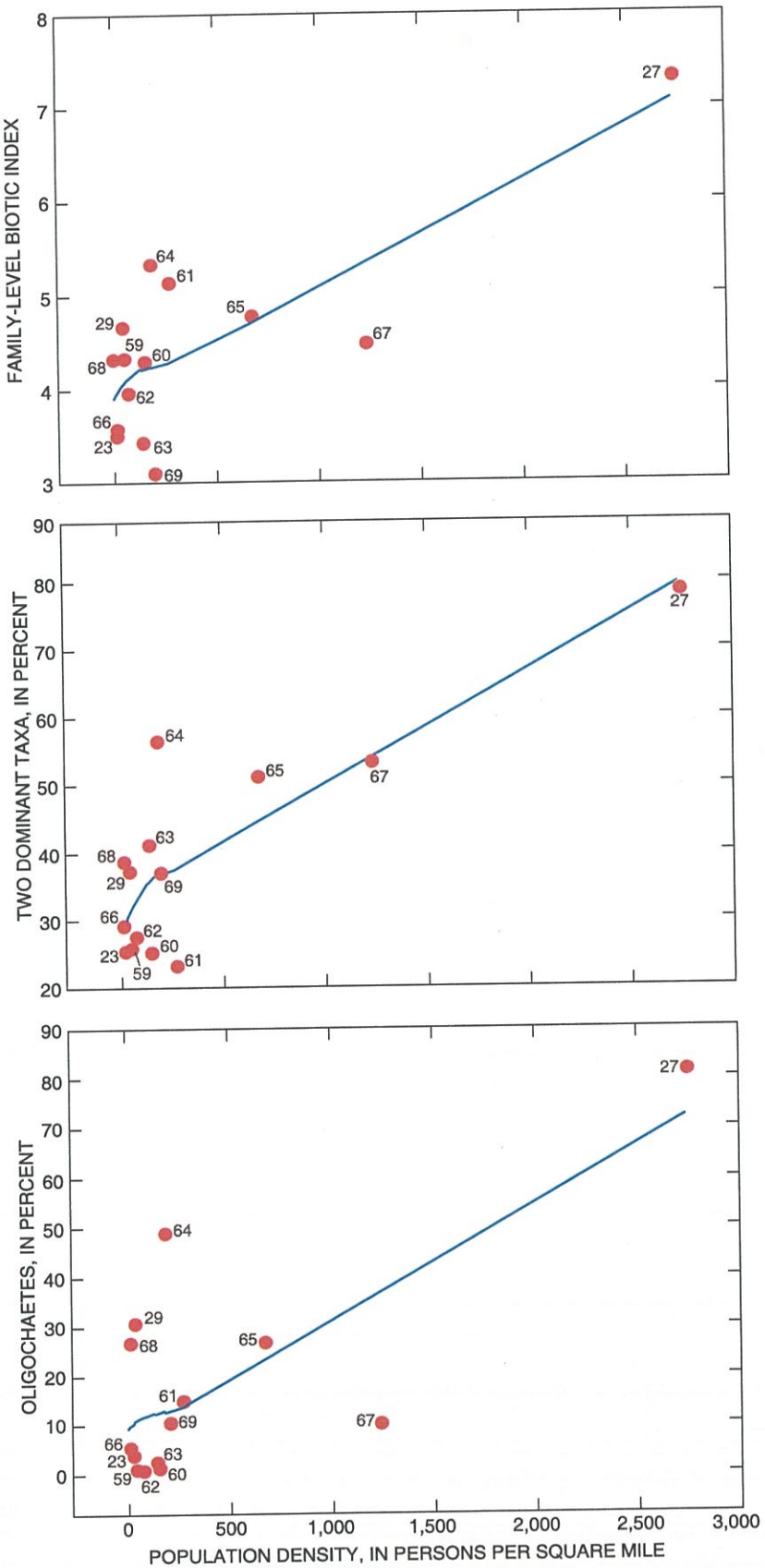

Figure 8. Variable-span bivariate smoothed scatterplot of seven other significant biological and chemical variables ($p < 0.05$, $n = 14$), showing linear response against population density. (See fig. 1 and appendix 1 regarding sampling sites.)

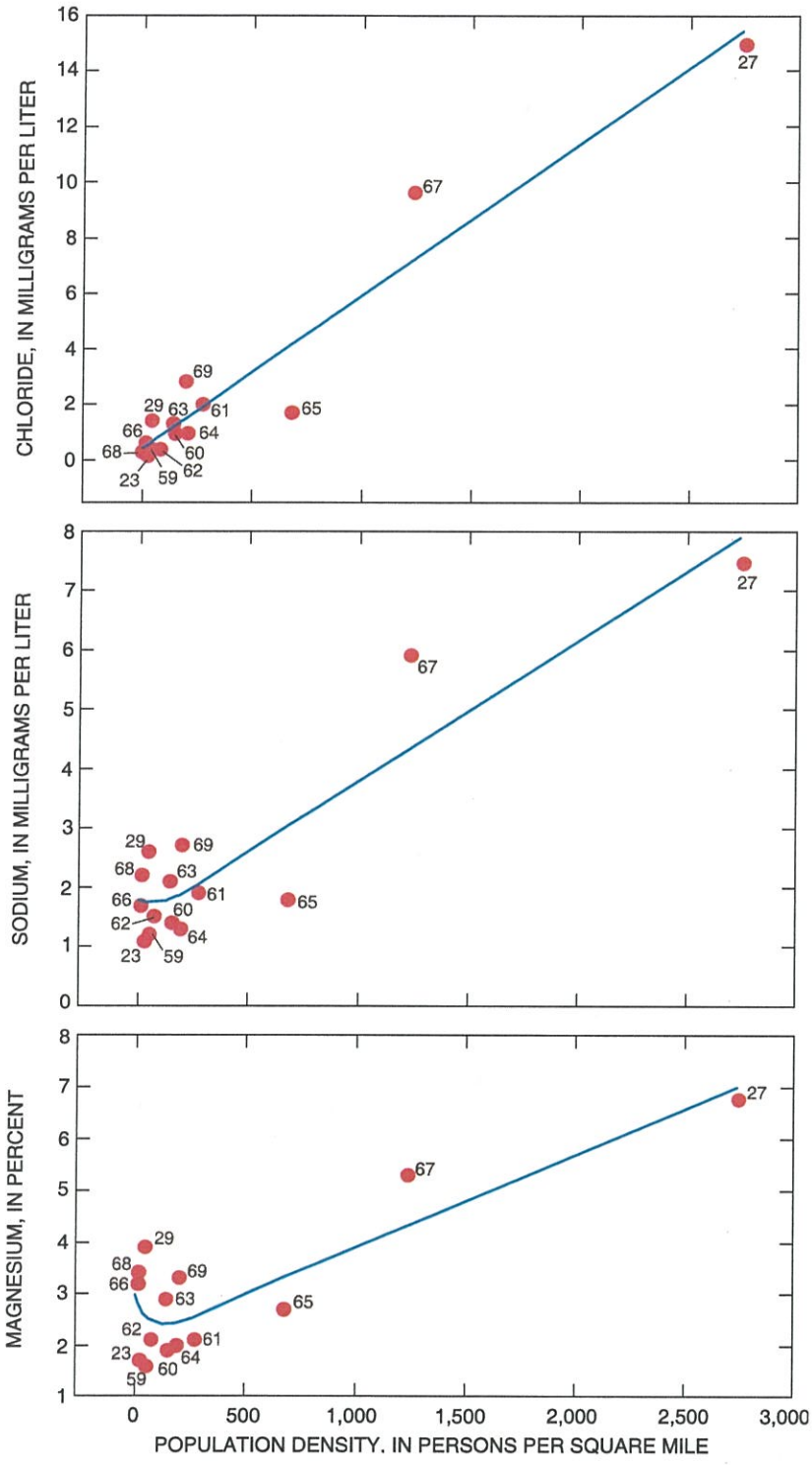

Figure 8.—*Continued*

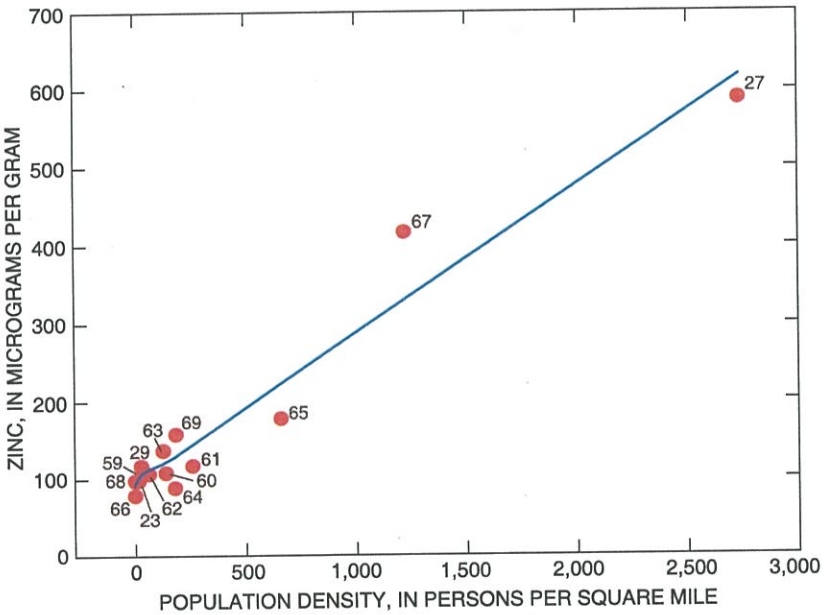

Figure 8.—*Continued*

The last group in the cluster analysis is made up of the two Ship Creek sites (29 and 68) and the reference site for Campbell Creek (site 23). The Ship Creek sites are considered anomalous because of the size of the basin compared to the other basins in the study and the fact that the creek has been regulated through the building of two small dams. Salmon are no longer able to pass to the upper site (68) because of obstructions. Therefore, the replenishment of instream nutrients from salmon carcasses no longer occurs, depriving many macroinvertebrates of an important food source and thereby limiting occurrence and abundance. Another confounding factor relates to the drying of the streambed at the upper site (29) during winter low flows in some years. Discharge for the Ship Creek sites is also considerably greater than the other sites. The South Fork of Campbell Creek site (23) grouped with the Ship Creek sites, probably because of a shift in macroinvertebrate-community structure influenced by the date at which the sample was collected compared to the other sites. Food-type availability could be a driving factor in the separation of this site from group 2. This site was sampled in July and would not have had the abundance of leaf litter found during the later sampling period when all other sites were sampled. That a shift from a feeding regime dominated by grazing (of algae) to one dominated by shredding (of leaf litter) probably had not yet taken place is shown by the relative percentages of scrapers and shredders. We predict that an upstream site having few known urban factors would fit into group 2 if sampled during the same time period.

The PDRD ratio and storm-drain density appear useful for separation of urban-impacted from nonimpacted sites. High PDRD ratios (>70) are associated with areas that have a high percentage impervious cover. As population densities increase, more roads, parking, and housing are required to meet basic needs. Accumulation of pollutants (deicing salts, petroleum products, combustion byproducts, etc.) on road and parking surfaces has been modeled for small watersheds and was shown to have a potentially negative impact on the quality of water in streams when runoff events occur (Novotny and others, 1985). The potentially greater input of pollutants into streams in areas of increased population density and hence high road density may have a significant role in the separation of urban-impacted from nonimpacted areas. Group 1 sites had storm-drain densities ≥0.45. Increased storm-drain density adds to the number of artificial channels that in turn rapidly pass water to the streams, thereby circumventing the natural hydrologic cycle (May and others, 1997). This rapid channeling diminishes infiltration and storage of water in shallow aquifers and hence reduces baseflows during periods of reduced precipitation. Reduced baseflows have the effect of reducing habitat suitable for aquatic species, thereby negatively impacting the "natural state" of the stream.

Regression analysis of the most significant variables, with respect to population density, revealed that the majority exhibited a threshold response to urbanization (table 4, fig. 5, fig. 6, fig. 7). This finding suggests that streams in the Anchorage Bowl are able to accommodate the effects of urbanization only up to a point; beyond that, stream structure and function are impaired.

Three of the six biologically significant variables ($p < 0.05$, $r^2 > 0.5$) showed threshold responses (table 4). Two variables (EPT taxa richness and total taxa richness) are richness measures, and one (Margalef diversity) is an index of the macroinvertebrate community. These biological variables tend to support the separation of urban-impacted from nonimpacted sites revealed by the cluster analysis, especially when related to the PDRD ratio rather than exclusively to population density. Both taxa richness and macroinvertebrate diversity decrease in a downstream direction. In contrast, the percentage oligochaetes, the Hilsenhoff family-level biotic index (FBI) (Hilsenhoff, 1988), and the PDT2 increase downstream; all three exhibit linear responses to population density (fig. 8, table 4). Oligochaetes were generally one of the major components making up the PDT2 at the urban-impacted sites. The FBI, which is a measure of organic pollution and the subsequent response by macroinvertebrates based on tolerance values, also increased downstream. FBI values greater than 5 suggest the probability of organic pollution. Sites that had PDRD ratios greater than 50 had FBI values greater than 5. Urban-impacted sites tended to have fewer species of more-tolerant, generalist organisms, whereas nonimpacted sites had greater numbers of more-sensitive species. Negative impact in general, with respect to the biological variables exhibiting a threshold response, appears to occur near population densities of 140 persons/mi^2. EPT taxa richness shows a break in slope between 262 and 662 persons/mi^2, but this threshold is due in part to the occurrence of the generally perturbation-tolerant Baetid family of mayflies (Ephemeroptera). Removal of this group from the metric calculations increases the sensitivity of the measure and brings it in line with the other two threshold variables.

The major ions (inorganic constituents in water samples) found to be significant with respect to population density include magnesium, sodium, potassium, and chloride (table 4). Magnesium, sodium, and chloride are found in low concentrations in natural streams. The elevated levels found in the urban-impacted sites are probably a result of the application of deicing salts and subsequent runoff and possibly also a result of leakage of domestic wastewater. The linear trends in the fitted curves of the analyses for these three constituents (fig. 8, table 4) suggest that any increase in population density would result in a corresponding increase in the concentration of these constituents in water in Anchorage. Potassium, which showed a threshold response (fig. 6), is an essential element for growth in both plants and animals. Elevated levels in urban areas are generally attributed to nonpoint-source pollution due to the application of fertilizers. The variables conductivity, total dissolved solids, and dissolved organic carbon also showed threshold responses (fig. 6, table 4). The breakpoints for water-chemistry variables reflect the threshold range for the biological metrics (table 4).

Significant trace elements in bed sediments (arsenic, lead, iron, manganese) (fig. 7, table 4), displayed a threshold-response curve with respect to population density (fig. 7). Although Klein (1979) considered the constituents lead and zinc to be good urban-signature constituents with respect to impervious area, zinc exhibited a linear response to population density in this study (fig. 8, table 4). The primary sources for both metals are vehicles, piping, and commercial and industrial nonpoint-source activity. Arsenic, iron, and manganese were more likely from natural sources, but because of organic pollution and the reducing (anaerobic) environment it helps to create in the sediments, they were more readily detected in the highly urbanized areas. The breakpoint for lead, at a population density between 60 and 125 persons/mi^2, suggests that it is a potentially sensitive urbanization variable. Iron and arsenic levels were probably at background levels at upstream sites; changes in concentration were noted at urban-impacted site 65 and increased in a downstream direction. Manganese was in line with the biological metrics; its regression shows a breakpoint at a population density between 125 and 137 persons/mi^2 (fig. 7).

CONCLUSIONS

Site-based reconnaissance data allowed us to visualize the effect of urbanization on stream macroinvertebrates in Anchorage. Population density appears to be a reasonable surrogate of urbanization, but further testing of the PDRD ratio as a rapid urbanization variable is needed. A threshold effect was observed for most of the significant variables. Adversely impacted sites typically had higher human population, road, and storm-drain densities. As trace-element and salt concentrations increased with increasing population, road, and storm-drain densities, macroinvertebrate diversity decreased. PDRD ratios greater than 70, road densities greater than 4.0 mi/mi^2, and(or) population densities of 125–150 persons/mi^2 (a conservative approximation) can be used to warn of the heightened potential of urbanization-induced degradation of streams in Anchorage. Exceptions to this are the Ship Creek sites, which may have skewed the data. Contributing factors may include disproportionate basin size and relative lack of development normally associated with urbanization over much of its area, localized industrialization, impoundments, and cessation of flow during winter months. Incremental areas between sites also should be examined for integration into calculations to determine if a more robust explanation can be generated.

The U.S. Census Bureau (1990) defines urban areas as having minimum population densities of 1,000 persons/mi^2; this criterion is met by only two of the sites in this study, though many of the other sites meet criteria to be designated "urban fringe". Wear and others (1998) suggested that two main areas along an urban–rural gradient may significantly impact water quality—at the edge of urban expansion and at the most undeveloped parts of the basin. According to results of our study, stream impairment appears to begin within the urban fringe. Areas having population densities of 125–150 persons/mi^2 appear to be the first to start showing signs of stream impairment. We readily could see evidence of changes in the streams and surrounding riparian areas at those sites near or at this threshold. For example, channels had been modified, the riparian zones were altered, manmade litter was observed, and the distance between roads and streams had decreased. The PDRD ratio complemented the results of the cluster analysis, at least with respect to differentiating urban-impacted and nonimpacted sites. Further study of this ratio as a rapid assessment of potential urban impact is warranted.

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APPENDIXES

Appendix 1. Cook Inlet Basin National Water-Quality Assessment site-numbering system

[Site numbers used in this report (shown in **bold** and shaded blue; see fig. 1 and fig. 2 for site locations) follow numbering system for stream-gaging stations that was introduced in National Water-Quality Assessment Cook Inlet Basin environmental-setting report (Brabets and others, 1999). Total number of sites listed reflects assignments as of this writing. Sequence of site numbers generally parallels order used in U.S. Geological Survey data-station identification]

Site number	U.S. Geological Survey station	
	Number	Name
1	15238820	Barabara Creek near Seldovia
2	15239500	Fritz Creek near Homer
3	15239000	Bradley River near Homer
4	15239050	Middle Fork Bradley River near Homer
5	15239900	Anchor River near Anchor Point
6	15240000	Anchor River at Anchor Point
7	15241600	Ninilchik River at Ninilchik
8	15242000	Kasilof River near Kasilof
9	15244000	Ptarmigan Creek at Lawing
10	15246000	Grant Creek near Moose Pass
11	15248000	Trail River near Lawing
12	15254000	Crescent Creek near Cooper Landing
13	15258000	Kenai River at Cooper Landing
14	15260000	Cooper Creek near Cooper Landing
15	15264000	Russian River near Cooper Landing
16	15266300	Kenai River at Soldotna
17	15266500	Beaver Creek near Kenai
18	15267900	Resurrection Creek near Hope
19	15271000	Sixmile Creek near Hope
20	15272280	Portage Creek at Portage Lake outlet near Whittier
21	15272550	Glacier Creek at Girdwood
22	15273900	South Fork Campbell Creek at Canyon Mouth near Anchorage
23	15274000	**South Fork Campbell Creek near Anchorage**
24	15274300	North Fork Campbell Creek near Anchorage
25	15274600	Campbell Creek near Spenard
26	15275000	Chester Creek at Anchorage
27	15275100	**Chester Creek at Arctic Boulevard at Anchorage**
28	15276000	Ship Creek near Anchorage
29	15276570	**Ship Creek below powerplant at Elmendorf Air Force Base**
30	15277100	Eagle River at Eagle River
31	15277410	Peters Creek near Birchwood
32	15281000	Knik River near Palmer
33	15282000	Caribou Creek near Sutton
34	15284000	Matanuska River near Palmer
35	15290000	Little Susitna River near Palmer
36	15291000	Susitna River near Denali
37	15291200	Maclaren River near Paxson
38	15291500	Susitna River near Cantwell
39	15292000	Susitna River at Gold Creek
40	15292400	Chulitna River near Talkeetna
41	15292700	Talkeetna River near Talkeetna
42	15294005	Willow Creek near Willow
43	15294010	Deception Creek near Willow
44	15294100	Deshka River near Willow
45	15294300	Skwentna River near Skwentna
46	15294350	Susitna River at Susitna Station
47	15294410	Capps Creek below North Capps Creek near Tyonek
48	15294450	Chuitna River near Tyonek
49	15294500	Chakachatna River near Tyonek
50	15283700	Moose Creek near Palmer
51	585750154101100	Kamishak River near Kamishak
52	15294700	Johnson River above Lateral Glacier near Tuxedni Bay
53	15266010	Kenai River below Russian River near Cooper Landing
54	15266020	Kenai River at Jims Landing near Cooper Landing
55	15266110	Kenai River below Skilak Lake outlet near Sterling
56	15267160	Swanson River near Kenai
57	631629149352000	Colorado Creek near Colorado
58	631018149323700	Costello Creek near Colorado
59	15273020	**Rabbit Creek at Hillside Drive near Anchorage**
60	15273030	**Rabbit Creek at East 140th Avenue near Anchorage**

Appendix 1. Cook Inlet Basin National Water-Quality Assessment site-numbering system—*Continued*

Site number	U.S. Geological Survey station	
	Number	Name
61	15273040	**Rabbit Creek at Porcupine Trail Road near Anchorage**
62	15273090	**Little Rabbit Creek at Nickleen Street near Anchorage**
63	15273097	**Little Rabbit Creek at Goldenview Drive near Anchorage**
64	15274395	**Campbell Creek at New Seward Highway near Anchorage**
65	15274557	**Campbell Creek at C Street near Anchorage**
66	15274796	**South Branch of South Fork Chester Creek at tank trail near Anchorage**
67	15274830	**South Branch of South Fork Chester Creek at Boniface Parkway near Anchorage**
68	15276200	**Ship Creek at Glenn Highway near Anchorage**
69	15273100	**Little Rabbit Creek near Anchorage**
70	15239070	Bradley River near tidewater near Homer
71	594507151290000	Beaver Creek 2 miles above mouth near Bald Mountain near Homer
72	594734151142900	Anchor River near Bald Mountain near Homer
73	15239840	Anchor River above Twitter Creek near Honmer
74	595126151391000	Chakok River 7.5 miles above mouth near Anchor Point
75	595506152403300	Stariski Creek 2 miles below unnamed tributary near Ninilchik
76	15240300	Stariski Creek near Anchor Point
77	600107151112800	North Fork Deep Creek 4 miles above mouth near Ninilchik
78	600047151383100	Deep Creek 0.4 mile above Clam Creek near Ninilchik
79	600204151401800	Deep Creek 0.6 mile above Sterling Highway near Ninilchik
80	600945151210900	Ninilchik River 1.5 miles below tributary 1 near Ninilchik
81	600321151325000	Ninilchik River below tributary 3 near Ninilchik
82	601100151000000	Nikolai Creek near Kasilof
83	613430150255000	Susitna River above Yentna River near Susitna Station
84	15281500	Camp Creek near Sheep Mountain Lodge
85	15292780	Susitna River at Sunshine
86	622302150083000	Susitna River 5 miles above Talkeetna River near Talkeetna
87	623705150005000	Susitna River at Curry
88	623850147225000	Oshetna River near Cantwell
89	623840147260000	Goose Creek near Cantwell
90	624658147562000	Kosina River near Cantwell
91	624953148151500	Watana Creek near Cantwell
92	625000149223500	Portage Creek near Gold Creek
93	624718149393600	Indian River near Gold Creek
94	15283550	Moose Creek above Wishbone Hill near Sutton
95	15292302	Camp Creek at mouth near Colorado
96	15292304	Costello Creek below Camp Creek near Colorado
97	625012150182700	Crystal Creek at mouth near Talkeetna
98	625014150183200	Coffee River above Crystal Creek near Talkeetna
99	623834150543300	Bear Creek near Talkeetna
100	623920150540300	Wildhorse Creek near Talkeetna
101	623510150450400	Long Creek near Talkeetna
102	623501151112900	Hidden Creek near Talkeeetna
103	623324151321600	Snowslide Creek at mouth near Talkeetna
104	623325151321800	Cripple Creek above Snowslide Creek near Talkeetna
105	622522151592200	Cascade Creek at mouth near Talkeetna
106	621936151582700	Fourth of July Creek at mouth near Talkeetna
107	621759152410500	Morris Creek at mouth near Talkeetna
108	621800152410600	Kichatna River above Morris Creek near Talkeetna
109	15294345	Yentna River near Susitna Station
110	600826152554400	Kona Creek 3 miles above mouth above Lateral Glacier near Tuxedni Bay
111	600803152552400	Kona Creek 2.5 miles above mouth above Lateral Glacier near Tuxedni Bay
112	600635152550900	Kona Creek tributary above Lateral Glacier near Tuxedni Bay
113	600636152551400	Kona Creek 0.8 mile above mouth above Lateral Glacier near Tuxedni Bay
114	600739152570701	Spring 1 near Johnson Glacier near Tuxedni Bay
115	600715152572800	North Fork Ore Creek near mouth near Johnson Glacier near Tuxedni Bay
116	600713152574000	East Fork Ore Creek near mouth near Johnson Glacier near Tuxedni Bay
117	600658152581400	Ore Creek near mouth near Johnson Glacier near Tuxedni Bay
118	600609152561100	Johnson River tributary above Lateral Glacier near Tuxedni Bay

Appendix 2. Abundance and distribution of benthic macroinvertebrates collected at 14 sites in Anchorage in 1999

[Taxon: Phyla are shown in **bold**. Site number: See fig. 1, fig. 2, and appendix 1 regarding site locations and numbering; sites are ordered from least to greatest population density. L, larvae; P, pupae; A, adults]

Taxon	Site number													
	66	68	23	29	59	62	63	60	64	69	61	65	67	27
Platyhelminthes														
Turbellaria	84	18	25	25	302	70	20	158	52	12	36	23	0	0
Nematoda	9	0	0	0	14	14	0	11	0	0	14	0	11	0
Cnidaria														
Hydridae														
Hydra sp.	0	0	0	0	0	0	0	0	0	0	0	0	11	0
Mollusca														
Gastropoda														
Hydrobiidae	0	0	0	0	0	0	0	11	0	4	0	0	0	4
Planorbidae	5	0	0	8	0	0	0	0	0	4	0	3	0	0
Valvatidae	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Bivalvia														
Sphaeriidae	0	0	0	0	0	0	0	0	0	0	0	0	137	28
Annelida	0	0	109	0	0	0	0	0	0	0	0	0	0	0
Oligochaeta	0	0	0	34	0	0	2	0	2	0	0	1	2	8
Enchytraeidae	0	0	0	67	0	14	4	0	6	16	24	5	21	36
Lumbriculidae	79	84	0	512	58	29	20	53	0	20	0	0	0	0
Naididae	0	534	0	294	0	0	4	0	320	28	240	97	305	904
Tubificidae	5	0	0	34	0	0	0	0	2	76	66	4	63	208
Arthropoda														
Arachnida	14	36	269	76	158	112	24	42	12	72	72	25	126	48
Insecta														
Collembola	0	0	0	0	0	0	4	0	0	24	54	0	11	0
Ephemeroptera	0	0	8L	0	0	0	0	0	0	0	0	0	0	0
Ameletidae														
Ameletus sp.	0	12L	0	0	0	0	0	0	0	0	0	0	0	0
Baetidae	196L	84L	8L	622L	72L 14A	546L	228L	84L	16L	12L	12L	1L	1691L	28L
Acentrella sp.	5L	0	0	0	0	0	0	0	0	0	0	0	0	0
Acentrella turbida	0	0	168L	8L	0	0	0	0	0	0	0	1L	0	0
Baetis bicaudatus	5L	12L	25L	0	30L	14L	0	1L	0	4L	0	0	0	0
Baetis tricaudatus	0	0	0	18L	0	0	0	0	0	0	0	0	0	0

Appendix 2. Abundance and distribution of benthic macroinvertebrates collected at 14 sites in Anchorage in 1999—*Continued*

[Taxon: Phyla are shown in **bold**. Site number: See fig. 1, fig. 2, and appendix 1 regarding site locations and numbering; sites are ordered from least to greatest population density. L, larvae; P, pupae; A, adults]

Taxon	Site number													
	66	68	23	29	59	62	63	60	64	69	61	65	67	27
Arthropoda—*Continued*														
Insecta—*Continued*														
Ephemeroptera—*Continued*														
Heptageniidae	140L 5A	186L	17L	8L	101L	392L	92L	168L	6L	8L	42L	0	0	0
Cinygmula sp.	5L	0	202L	0	158L	0	0	189L	0	4L	42L	0	0	0
Epeorus sp.	159L	3L	302L	0	763L	420L	308L	420L	2L	108L	222L	0	0	0
Ephemerellidae														
Drunella doddsi	93L	354L	386L	60L	202L	210L	60L	117L	18L	9L	78L	0	0	0
Ephemerella aurivillii	0	30L	1L	0	0	0	0	0	0	0	0	0	0	0
Plecoptera														
Taeniopterygidae														
Taenionema sp.	0	12L	0	8L	29L	0	12L	105L	32L	0	6L	3L	0	0
Nemouridae														
Zapada sp.	75L	24L	42L	17L	144L	420L	40L	263L	3L	0	48L	0	11L	0
Zapada cinctipes	9L	48L	8L	42L	43L	70L	28L	53L	2L	52L	42L	1L	210L 11A	24L
Leuctridae														
Despaxia augusta	5L	0	0	0	43L	57L	4L	0	0	0	0	0	0	0
Capniidae	5L	6L	0	17L	0	14L	4L	21L	4L	4L	0	3L	63L	0
Eucapnopsis brevicauda	0	18L	0	0	0	0	0	0	0	0	0	0	0	0
Perlodidae	5L	1A	8L	0	14L	0	0	32L	8L	4L	0	1L	53L	4L
Isoperla sp.	0	12L	1L	68L	0	84L	8L	0	0	0	0	0	0	1L
Chloroperlidae	0	102L	25L	34L	72L	84L	17L	42L	38L	0	12L	15L	0	16L
Suwallia sp.	44L	0	25L	0	187L	29L	44L	85L	0	40L	1L	0	0	0
Coleoptera														
Staphylinidae	0	0	0	0	14A	0	0	0	0	0	0	0	0	0

Appendix 2. Abundance and distribution of benthic macroinvertebrates collected at 14 sites in Anchorage in 1999—*Continued*

[Taxon: Phyla are shown in **bold**. Site number: See fig. 1, fig. 2, and appendix 1 regarding site locations and numbering; sites are ordered from least to greatest population density. L, larvae; P, pupae; A, adults]

Taxon	Site number													
	66	68	23	29	59	62	63	60	64	69	61	65	67	27
Arthropoda—*Continued*														
Insecta—*Continued*														
Diptera														
Ceratopogonidae														
Ceratopogoninae	5L	6L	0	0	0	0	0	11L	0	0	0	0	0	0
Chironomidae	0	6P	42P 25L	0	14P 130A	0	4A	11L 21P	0	8P 24A	66P 6L	1P 4A	0	0
Tanypodinae														
Macropelopiini														
Macropelopia sp.	0	0	0	0	0	14L	0	0	0	0	0	0	0	0
Pentaneurini	0	0	0	0	0	0	0	0	0	0	0	1L	105L	16L
Diamesinae	0	0	0	8P	0	0	0	0	0	0	0	0	0	0
Diamesini														
Diamesa sp.	0	0	0	25L	0	0	0	0	0	0	0	0	0	0
Pagastia sp.	42L	318L	160L	185L	230L	140L	4L	63L	20L	12L	60L	109L	74L	16L
Potthastia sp.	0	0	0	25L	0	0	0	0	0	20L 12P	0	5L	32L	40L
Prodiamesinae														
Prodiamesa sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	4L
Orthocladiinae	23L 5P	30L	210L 59P	151L 25P	403L 101P	28L	0	85L 53P	2P 2L	0	120L 108P	0	420L	0
Corynoneura sp.	0	0	8L	0	0	0	0	11L	0	0	0	0	0	0
Thienemanniella sp.	0	0	25L	0	0	0	0	0	0	0	0	0	0	0
Brillia sp.	23L	0	0	17L	274L	140L	20L	420L	2L	36L	276L	6L	105L	0
Cricotopus sp.	0	0	0	0	0	0	0	0	0	0	0	0	11L	0
Eukiefferiella sp.	5L	0	50L	17L	130L	504L	4L	32L	0	4L	48L	0	32L	0
Heleniella sp.	9L	0	0	0	0	0	0	0	22L	0	6L	4L	0	0
Orthocladius sp.	0	0	8L	0	14L	14L	0	11L	0	0	6L	0	0	0
Parakiefferiella sp.	0	0	0	0	14L	14L	0	0	0	0	0	0	0	0
Paraphaenocladius sp.	5L	0	25L	0	0	0	0	0	0	0	0	0	0	0
Parorthocladius sp.	0	0	0	0	101L	0	0	0	0	0	12L	0	0	0
Rheocricotopus sp.	5L	6L	0	0	14L	14L	0	11L	0	0	0	0	0	0
Rheosmittia sp.	0	0	0	0	0	0	0	0	2L	0	0	0	0	0
Synorthocladius sp.	0	0	0	0	0	0	0	21L	0	0	0	0	0	0
Tvetenia sp.	5L	6L	17L	25L	72L	0	0	21L	0	24L	0	0	0	0

Appendix 2. Abundance and distribution of benthic macroinvertebrates collected at 14 sites in Anchorage in 1999—*Continued*

[Taxon: Phyla are shown in **bold**. Site number: See fig. 1, fig. 2, and appendix 1 regarding site locations and numbering; sites are ordered from least to greatest population density. L, larvae; P, pupae; A, adults]

Taxon	Site number													
	66	68	23	29	59	62	63	60	64	69	61	65	67	27
Arthropoda—*Continued*														
Insecta—*Continued*														
Diptera—*Continued*														
Chironomidae—*Continued*														
Chironominae	0	0	25P	0	0	0	0	0	0	0	0	0	0	0
Chironomini	0	0	0	0	0	0	0	0	0	0	0	0	11L	0
Parachironomus sp.	0	0	0	0	0	0	0	147L	0	0	6L	0	0	0
Polypedilum sp.	0	6L	0	8L	0	0	0	0	0	4L	0	0	0	0
Tanytarsini	0	0	0	0	0	0	0	11L	0	0	0	0	0	0
Micropsectra sp.	65L	0	0	17L	144L	154L	16L	462L	0	60L	192L	0	0	0
Rheotanytarsus sp.	0	0	0	0	0	0	0	0	6L	0	0	11L	84L	0
Stempellina sp.	5L	0	25L	0	0	0	0	0	0	0	0	0	0	0
Psychodidae	5L	0	8L	0	14L	28L	0	0	2L	24L	48L	0	0	4L
Simuliidae	84L 5P	0	101L	0	0	840L	172L	0	2L	4L	6L 6P	0	0	0
Simulium sp.	0	6L	17L 34P	8L	1L	0	0	0	0	0	0	0	0	0
Tipulidae														
Tipula sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	1L
Dicranota sp.	6L	6L	0	25L	30L	14L	0	11L	6L	4L	0	9L	43L	4L
Hesperoconopa sp.	0	6L	0	0	0	0	0	0	14L	12L	6L	1L	0	0
Pedicia sp.	0	0	0	0	0	0	4L	0	0	0	0	1L	0	0
Empididae	0	0	0	34L	14P	0	0	0	0	0	0	0	0	0
Clinocera sp.	0	0	8L	0	0	28L	0	0	0	24L	6L	0	0	0
Oreogeton sp.	1L	0	0	0	43L	0	0	0	0		6L	0	0	0
Hemerodromiinae	23L	36L	8L	0	72L	14L	0	21L	2L	16L	12L	6L	32L	0
Stratiomyidae	0	0	0	0	0	0	0	0	0	0	6L	0	0	0
Sciomyzidae	0	0	0	0	0	0	0	0	0	0	0	0	32L	0

Appendix 2. Abundance and distribution of benthic macroinvertebrates collected at 14 sites in Anchorage in 1999—*Continued*

[Taxon: Phyla are shown in **bold**. Site number: See fig. 1, fig. 2, and appendix 1 regarding site locations and numbering; sites are ordered from least to greatest population density. L, larvae; P, pupae; A, adults]

Taxon	Site number													
	66	68	23	29	59	62	63	60	64	69	61	65	67	27
Arthropoda—*Continued*														
Insecta—*Continued*														
Trichoptera														
Hydropsychidae														
Ceratopsyche sp.	0	0	0	0	0	0	0	0	0	0	0	0	11L	4L
Rhyacophilidae														
Rhyacophila sp.	23L	0	0	0	15L	280L	24L	43L	0	44L	37L	0	0	0
Glossosomatidae	0	0	0	0	0	0	100L	0	0	0	0	0	0	0
Glossosoma sp.	271L	204L	168L	126L	43L	112L	0	42L	60L	380L	6L	52L 4P	33L 11P	0
Brachycentridae														
Brachycentrus sp.	0	42L	0	0	0	0	0	0	0	0	0	0	63L	0
Brachycentrus americanus	0	1L	8L	314L	0	0	0	0	4L	0	0	0	13L	0
Limnephilidae	23L	36L	0	84L	29L	98L	16L	63L	2L	108L	78L	6L	11L	8L
Apatania sp.	0	0	0	8L	0	0	0	0	0	0	0	0	11L	0
Ecclisomyia sp.	0	15L	9L	3L	45L	0	8L	63L	2L	0	6L	0	0	0
Ecclisocosmoecus scylla	1L	0	0	0	0	17L	4L	11L	0	0	0	0	0	0
Hesperophylax sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	1L
Onocosmoecus unicolor	0	0	1L	1L	0	0	0	0	0	0	6P	0	0	0
Psychoglypha subborealis	0	0	1L	0	0	0	0	0	0	0	0	0	0	1P
Lepidoptera														
Pyralidae														
Crambus sp.	9L	0	0	0	0	0	4L	0	0	0	0	0	0	0

Appendix 3. Biological metrics calculated from macroinvertebrate data collected at 14 sites in Anchorage in 1999

[Site number: See fig. 1, fig. 2, and appendix 1 regarding site locations and numbering; sites are ordered from least to greatest population density. EPT, insect orders Ephemeroptera, Plecoptera, and Trichoptera]

Biological metric	Site number													
	66	68	23	29	59	62	63	60	64	69	61	65	67	27
Margalef diversity index (lowest practical taxonomic level of identification)	5.42	4.52	5.19	4.73	4.65	3.99	4.32	4.78	4.76	5.01	5.06	4.33	3.87	3.17
Margalef's diversity index (family level)	3.12	2.58	2.28	2.87	2.39	2.35	3.07	2.33	3.22	3.2	2.73	2.83	2.54	2.21
Shannon diversity index	2.93	2.59	3.06	2.79	3.18	2.86	2.56	3.10	2.16	2.85	3.16	2.33	2.34	1.46
Hilsenhoff family-level biotic index	3.54	4.33	3.53	4.66	4.32	3.96	3.43	4.30	5.34	3.11	5.14	4.77	4.48	7.30
Percentage Chironomidae	12.0	16.1	25.2	16.4	37.6	20.3	3.7	39.4	8.3	15.4	44.3	35.0	22.6	5.4
Percentage Ephemeroptera	37.9	29.5	41.4	23.4	30.7	31.4	52.8	28.0	6.2	11.0	17.9	.5	43.8	2.0
Percentage Plecoptera	9.5	9.7	4.0	6.1	12.2	15.1	12.0	17.2	12.9	7.6	4.9	5.7	9.0	3.2
Percentage Trichoptera	19.8	12.9	6.9	17.5	3.0	10.1	11.7	6.3	10.1	40.3	6.0	15.4	4.0	1.0
Percentage Oligochaeta	5.2	26.8	4.0	30.8	1.3	.9	2.3	1.5	49.0	10.6	14.9	26.6	10.1	81.6
Percentage filterers	17.5	18.3	31.4	27.0	37.6	37.0	16.9	39.4	9.2	15.7	44.8	35.0	28.4	7.6
Percentage collectors	24.2	24.5	22.1	42.1	8.9	16.4	23.6	7.3	5.9	11.0	9.2	1.7	45.5	17.5
Percentage predators	5.4	5.2	2.5	3.3	7.9	10.0	7.1	6.1	6.8	8.5	3.3	4.0	2.2	1.5
Percentage scrapers	41.4	17.8	26.5	5.2	31.3	19.8	38.4	27.9	17.8	38.8	15.7	19.6	1.1	.0
Percentage shredders	8.0	5.9	2.3	5.6	7.7	13.4	8.0	13.3	4.3	13.3	8.4	4.5	7.4	2.5
Total taxa richness (lowest practical taxonomic level of identification)	41	36	42	39	40	35	32	40	32	37	40	27	33	24
Total taxa richness (family level)	24	21	19	24	21	21	23	20	22	24	22	18	22	17
Percentage two dominant taxa	29.1	38.5	25.5	37.1	25.7	27.5	41.1	25.2	56.5	36.9	23.3	51.1	53.1	78.5
Percentage EPT	67.2	52.1	52.4	47.0	45.9	56.6	76.5	51.5	29.3	58.8	28.9	21.6	56.8	6.1
EPT taxa richness	11	12	10	12	11	11	12	11	11	10	9	8	9	6
Ratio of EPT to Chironomidae abundances	85	76	68	74	55	74	95	57	78	79	39	38	71	53
Ratio of Baetidae to Ephemeroptera abundances	34	14	18	91	9	35	33	9	38	11	3	100	100	100

Appendix 4. Nutrient and major-Ion concentrations in water samples from 14 sites in Anchorage in 1999

[Site number: See fig. 1, fig. 2, and appendix 1 regarding site locations and numbering; sites are ordered from least to greatest population density. E, estimated value. —, none]

Nutrient, major ion, or physical property	Site number													
	66	68	23	29	59	62	63	60	64	69	61	65	67	27
Water temperature, in degrees Celsius	7.5	7	9.5	9.5	6	8.5	9.5	7.5	11.5	9.5	7.5	9	10	10
Discharge, in cubic feet per second	6.2	148	44	224	18	4.4	6.3	18	71	7	23	99	8.9	31
Specific conductance (laboratory), in microsiemens per centimeter at 25°C	109	156	76	169	68	87	116	60	103	136	86	111	217	242
Oxygen, dissolved, in milligrams per liter	11	11.8	11	10.7	12	11	11.1	12	10.2	11.8	11.6	10.5	10.2	11.3
Field pH, in standard units	7.7	7.5	7.7	7.6	7.4	7.8	7.6	7	7.9	7.9	7.6	7.4	7.3	7.7
Laboratory pH, in standard units	7.8	7.8	7.7	7.8	7.7	7.7	7.9	7.7	7.7	7.9	7.5	7.4	7.3	7.6
Ammonia as nitrogen, in milligrams per liter as N	.002	.003	.009	.004	<.002	.002	.003	.002	.004	<.002	.003	.005	.012	.024
Nitrite as nitrogen, in milligrams per liter as N	.001	<.001	.001	.002	<.001	<.001	.001	<.001	.001	.001	<.001	.001	<.001	.009
Ammonia as nitrogen plus organic nitrogen, in milligrams per liter as N	.14	E .10	<.10	E .10	E .10	.11	.11	E .10	E .10	.17	E .10	<.10	.18	.17
Ammonia plus organic nitrogen, in milligrams per liter as N	.23	E .09	E .07	E .09	E .09	.14	.19	E .09	.1	.15	.16	.14	.26	.22
Nitrite and nitrate, dissolved, in milligrams per liter as N	.412	.106	.064	.356	.282	.194	.437	.287	.098	.505	.318	.228	.462	.629
Total phosphorous, dissolved, in milligrams per liter as P	.022	<.004	<.004	.009	.004	.008	.008	<.004	.008	.009	.014	.012	.026	.022
Phosphorous, dissolved, in milligrams per liter as P	<.004	<.004	<.004	<.004	<.004	<.004	.005	<.004	<.004	<.004	<.004	<.004	.004	.008
Orthophosphorus, in milligrams per liter as P	.004	<.001	.001	<.001	<.001	.002	<.001	<.001	.002	.002	.001	<.001	<.001	.004
Organic carbon, dissolved, in milligrams per liter as C	1.9	.9	.9	1.3	.6	1.4	2.8	.8	1.2	3.1	1.4	1.9	3.9	4
Organic carbon, suspended, in milligrams per liter as C	.2	<.20	.2	<.20	—	—	<.20	<.20	.2	—	.2	<.20	—	.4
Calcium, dissolved, in milligrams per liter as Ca	17	24	13	25	9.6	12	17	11	14	20	12	16	25	29
Magnesium, dissolved, in milligrams per liter as Mg	3.2	3.4	1.7	3.9	1.6	2.1	2.9	1.9	2	3.3	2.1	2.7	5.3	6.8
Sodium, dissolved, in milligrams per liter as Na	1.7	2.2	1.1	2.6	1.2	1.5	2.1	1.4	1.3	2.7	1.9	1.8	5.9	7.5
Potassium, dissolved, in milligrams per liter as K	.21	.28	.21	.36	.15	.17	.32	.21	<.10	.35	.28	.32	.58	1.1
Chloride, dissolved, in milligrams per liter as Cl	.46	.34	.2	1.4	.33	.37	1.3	.96	<.10	2.8	2	1.7	9.6	15
Sulfate, dissolved, in milligrams per liter as SO_4	11	29	13	25	8.9	14	13	7.9	14	16	8.9	14	17	22
Fluoride, dissolved, in milligrams per liter as F	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10
Silica, dissolved, in milligrams per liter as SiO_2	10	5.7	6	6.8	7.3	7.3	8.5	7.7	6	8.7	7.8	6.7	11	11
Iron, dissolved, in micrograms per liter as Fe	<10	<10	<10	E 7.5	<10	<10	13	<10	28	12	E 5.8	46	200	160
Manganese, dissolved, in micrograms per liter as Mn	<3.0	<3.0	<3.0	22	<3.0	3.9	3.4	<3.0	5.6	E 2.1	<3.0	16	70	67
Dissolved-solids residue at 180°C, in milligrams per liter	87	96	53	99	49	62	78	53	68	99	55	74	129	151
Specific conductance (field), in microsiemens per centimeter	129	164	87	177	74	96	124	82	101	151	93	120	206	251

Appendix 5. Trace-element concentrations in streambed sediments collected from 14 sites in Anchorage in 1999

[Site number: See fig. 1, fig. 2, and appendix 1 regarding site locations and numbering; sites are ordered from least to greatest population density. <, below detection limit]

Trace element	Site number													
	66	68	23	29	59	62	63	60	64	69	61	65	67	27
Aluminum, in percent	4.6	6.8	6.5	7.1	6.5	6.3	6.1	5.7	6.3	6.4	5.7	6.3	6.3	5.8
Antimony, in micrograms per gram	.6	1.2	1	1.2	1.4	1	1	1.2	.9	.9	1.2	1	1.4	2.4
Arsenic, in micrograms per gram	15	10	10	11	7.7	6.2	8.8	7.9	9.6	7.6	7.6	9.1	15	26
Barium, in micrograms per gram	410	660	720	650	650	670	660	600	610	670	580	610	550	600
Beryllium, in micrograms per gram	1	2	1	2	1	1	1	1	1	1	1	1	1	1
Bismuth, in micrograms per gram	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cadmium, in micrograms per gram	.2	.2	.2	.2	.2	.2	.3	.2	.2	.2	.2	.3	.7	1
Calcium, in percent	2.8	1.7	2.1	1.8	2	1.9	2	1.9	2	1.9	2	2	2.2	2
Cerium, in micrograms per gram	29	49	46	49	41	44	42	44	45	43	45	44	43	32
Cobalt, in micrograms per gram	14	19	21	20	18	15	16	16	17	15	16	18	20	20
Chromium, in micrograms per gram	81	95	110	110	72	62	63	85	99	64	91	110	110	120
Copper, in micrograms per gram	38	48	50	61	47	44	41	43	40	37	45	49	53	64
Europium, in micrograms per gram	<1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gallium, in micrograms per gram	9	16	14	16	13	12	12	12	13	12	13	14	12	13
Gold, in micrograms per gram	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Holmium, in micrograms per gram	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Iron, in percent	3.5	4.2	4.2	4.4	3.9	3.5	3.8	3.4	4	3.6	3.5	4	4.9	5.9
Lanthanum, in micrograms per gram	14	24	22	24	20	22	21	23	21	21	23	22	20	18
Lead, in micrograms per gram	10	11	11	15	10	10	10	10	11	10	11	17	61	110
Lithium, in micrograms per gram	21	40	32	40	31	30	31	28	28	31	28	30	29	27
Magnesium, in percent	.9	1.2	1.2	1.4	1	.94	.96	.98	1.1	.99	1	1.2	1.1	1.2
Manganese, in micrograms per gram	1,300	870	970	1,300	1,000	1,200	1,500	1,100	860	1,300	1,100	970	1,400	2,600
Mercury, in micrograms per gram	.16	.18	.81	.16	.34	.21	.25	.29	.61	.22	.36	.33	.17	.17
Molybdenum, in micrograms per gram	2	1	2	1	1	3	2	1	1	2	1	1	1	2
Neodymium, in micrograms per gram	15	23	21	24	20	21	21	22	20	21	22	21	19	17
Nickel, in micrograms per gram	29	43	44	46	32	28	30	35	40	31	36	62	47	50
Niobium, in micrograms per gram	<4	6	6	7	5	6	6	6	6	6	6	6	5	8
Phosphorus, in percent	.22	.12	.14	.13	.16	.13	.14	.12	.13	.12	.12	.12	.18	.15
Scandium, in micrograms per gram	11	17	17	18	15	14	15	15	16	15	15	17	15	16
Selenium, in micrograms per gram	5.8	.9	2.2	.8	2.1	2.1	2.1	1.5	1.4	1.6	1.5	1.1	1.4	1.1
Silver, in micrograms per gram	.2	.2	.3	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.5
Sodium, in percent	1.2	1.7	1.6	1.8	1.6	1.8	1.7	1.7	1.8	1.8	1.7	1.7	1.8	1.6
Strontium, in micrograms per gram	270	270	240	270	240	270	250	250	250	260	250	240	240	250
Sulfur, in percent	.2	.06	.1	.06	.09	.1	.12	.06	.1	.08	.07	.1	.18	.2
Tantalum, in micrograms per gram	<1	1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Thorium, in micrograms per gram	2	4	4	4	3	3	3	4	4	4	4	4	4	3
Tin, in micrograms per gram	<1	1	1	2	<1	1	<1	<1	1	<1	<1	1	2	4
Titanium, in percent	.33	.43	.52	.47	.47	.48	.4	.36	.49	.41	.41	.4	.37	.39
Uranium, in micrograms per gram	2.4	1.6	2.1	1.6	1.5	1.5	1.5	1.4	1.7	1.4	1.5	1.7	1.4	1.3
Vanadium, in micrograms per gram	100	140	140	150	120	110	110	120	120	110	120	130	120	130
Ytterbium, in micrograms per gram	1	2	2	2	2	2	2	2	2	2	2	2	2	2
Yttrium, in micrograms per gram	15	20	20	22	20	18	19	20	19	19	20	20	18	20
Zinc, in micrograms per gram	82	100	100	120	110	110	140	110	92	160	120	180	420	590
Organic carbon, in percent	16	3.16	6.32	2.9	7.26	5.51	6.74	5.07	4.99	4.3	5.71	4.63	6.93	6.04
Inorganic carbon, in percent	.13	.02	.03	.02	.03	.03	.06	.02	.02	.03	.03	.02	.04	.05
Total, organic plus inorganic carbon, in percent	16.2	3.18	6.35	2.92	7.29	5.54	6.8	5.09	5.01	4.33	5.74	4.65	6.97	6.09

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Identification of linear and threshold responses in streams along a gradient of urbanization in Anchorage, Alaska*

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Abstract

We examined biotic and physiochemical responses in urbanized Anchorage, Alaska, to the percent of impervious area within stream basins, as determined by high-resolution IKONOS satellite imagery and aerial photography. Eighteen of the 86 variables examined, including riparian and instream habitat, macroinvertebrate communities, and water/sediment chemistry, were significantly correlated with percent impervious area. Variables related to channel condition, instream substrate, water chemistry, and residential and transportation right-of-way land uses were identified by principal components analysis as significant factors separating site groups. Detrended canonical correspondence analysis indicated that the macroinvertebrate communities responded to an urbanization gradient closely paralleling the percent of impervious area within the subbasin. A sliding regression analysis of variables significantly correlated with percent impervious area revealed 8 variables exhibiting threshold responses that correspond to a mean of 4.4 – 5.8% impervious area, much lower than mean values reported in other, similar investigations. As contributing factors to a subbasin's impervious area, storm drains and roads appeared to be important elements influencing the degradation of water quality with respect to the biota.

Introduction

Anchorage is unique with respect to urbanization effects on streams (Milner & Oswood, 2000), as it has a relatively large population (~260 000) and exhibits a steep urbanization gradient over short distances. This includes rapid changes from uninhabited wilderness along mountains in upper reaches of the basins to densely populated, urbanized areas near the mouths of streams draining the city. In most other regions, areas upstream from urban development have been disturbed by logging, mining, agriculture, or additional urbanization.

Numerous studies document the effects of nonpoint source contamination from urban runoff on water quality and stream biota (Klein, 1979; Sloane-Richey et al., 1981; Whiting & Clifford, 1983; Garie & McIntosh, 1986; Winter & Duthie, 1998; Paul & Meyer, 2001). Nonpoint source contaminants detrimental to water quality include salts from road deicing, pathogens from wildlife and pets, nutrients from fertilizer application to gardens, and oil and gasoline runoff from roadways. Urbanization can also alter the hydrologic characteristics of a stream by increasing the magnitude and frequency of peak discharges (Booth, 1991). As urbanization encroaches on riparian areas, the sources of woody debris to stream channels may be reduced or lost (Booth, 1991), resulting in increased channelization and decreased habitat complexity. Although riparian vegetation buffer zones typically improve local stream habitat conditions, watershed- or landscape-scale land use may be more important to biotic integrity (Roth et al., 1996).

In general, urbanization within a watershed may be characterized in terms of land cover changes or,

more specifically, as the percentage of impervious area (PIA) (Arnold & Gibbons, 1996, Booth & Jackson, 1997; Wear et al., 1998; McMahon & Cuffney, 2000; Paul & Meyer, 2001). The percentage of impervious area at which degradation of water quality begins is varied, ranging from 4–5% (May et al., 1997) to 10–12% (Klein, 1979; Booth & Jackson, 1997; Wang et al., 2000). Land cover reported as total impervious area may be misleading in that the effective impervious area may be substantially less (Dinicola, 1989). Effective impervious area relates to the 'connectedness' of impervious area to a watercourse and intuitively has a greater effect on water quality than does impervious area separated from the watercourse. In other words, buffer areas and open space near water bodies are important in controlling runoff from impervious areas. In addition to buffer areas, the reduction of impervious area also must be considered. This was demonstrated in planned subdivisions where reduced individual lot sizes and increased open space resulted in a decrease in total impervious area for the subdivision from 17.5% to 10.7% (Arnold & Gibbons, 1996).

The goals of this study were (1) to determine those variables most closely related to the chosen urbanization surrogate, percent impervious area, within the boundaries of the Municipality of Anchorage, and (2) to characterize the nature of the biotic and physiochemical responses to urbanization as defined by percent impervious area.

Study area

The Municipality of Anchorage encompasses a large area (~4900 km^2) north and west toward the top of the Knik Arm and south and east past the start of the Turnagain Arm, the majority of the land being undeveloped, remote, and mountainous terrain. Twelve sites in four stream basins (Chester, Campbell, Rabbit and Little Rabbit Creeks) were selected lying within the Municipality of Anchorage (Table 1; Fig. 1). Campbell Creek was considered a 4th-order stream near the mouth, whereas the other streams were 2nd order. All four basins lay immediately downslope of the western edge of the Chugach Mountains and proximal to the intersection of the Knik and Turnagain Arms of Cook Inlet.

The geology of the Anchorage area is primarily unconsolidated alluvium and glacial deposits, typical of the Cook Inlet-Susitna Lowlands physiographic region (Brabets et al., 1999). This lowland region is also the most developed and populated area in Alaska, accounting for more than 50% of the State's population. Climate in the Cook Inlet Basin in the vicinity of Anchorage is considered 'transitional' (between continental and maritime climates) and is characterized by annual precipitation of about 50 cm/yr. The mean annual temperature is approximately −3°C (Brabets et al., 1999).

The sites were selected on the basis of the degree of upstream urban development and density of roads as determined from U.S. Geological Survey (USGS) topographic maps (1:25 000 for developed areas and 1:63 360 for undeveloped, remote areas) and coverages based on geographic information system (GIS) source data of the area provided by the Municipality of Anchorage. The coverages included land use (residential, commercial, industrial, institutional, military, parks, vacant, waterbodies, and transportation right-of-ways), roads, sewers and storm drains, and census tracks. Three sites per basin were selected. Upstream sites were considered reference or low-impact sites, followed by intermediate sites with increasing amounts of impervious area. The downstream-most sites were the most urbanized, that is, comprised the greatest percentage of impervious area, within each basin. The increasing urbanization in a downstream direction presented a potential problem with observed impacts being confounded by natural downstream changes. However, this was considered when reaching practical conclusions regarding urban impacts related to impervious area.

Methods and materials

Macroinvertebrate, water-chemistry, and habitat data were collected during the summer low-flow period (June/July) in 2000. Sediment-chemistry data were collected the previous summer during site reconnaissance. All data represent an instantaneous sampling regime: only one sample was collected and used for each parameter or constituent in the subsequent analyses in this paper. While this presents limitations, such as identifying variation in biological communities and chemical constituents, this project was designed as a synoptic study and the one-time sampling efforts were utilized to identify potentially problematic stream conditions related to urbanization in the Anchorage area.

Table 1. Description of urban synoptic sites. Map ID's correspond to site locations on Figure 1.Sites are ordered from least to greatest percent impervious area [Dishcharge, Conductivity, pH, Water Temperature, and Dissolved Oxygen Concentration measured at time of collection of macroinvertebrate samples]

Site ID	USGS Station ID	Description	Elevation (m)	Subbasin Area (km^2)	Discharge (m^3/s)	Conductivity ($\mu S/cm$)	pH	Water Temperature (°C)	Dissolved Oxygen Concentration (mg/l)	Subbasin Road Density (km/km^2)	Subbasin Population Density ($no./km^2$)	Subbasin Storm Drainage Density (km storm sewers/km^2)	Subbasin Percent Impervious Area
CH1	15274796	South Branch Of South Fork Chester Creek at Tank Trail	109	11	0.10	117	8.2	4.5	11.4	0	0	0	0
C1	15274000	South Fork Campbell Creek near Anchorage	71	76	1.64	72	7.7	4	12.7	0.2	4	0	0.3
R1	15273020	Rabbit Creek at Hillside Drive	267	25	0.85	86	7.3	3.5	12.2	0.6	12	0	0.4
LR1	15273090	Little Rabbit Creek at Nickleen Street	375	7	0.18	109	7.7	1	12.6	1.0	23	0	1.2
LR2	15273097	Little Rabbit Creek at Goldenview Drive	180	8	0.42	128	7.9	2.5	12.8	3.5	70	0	3.4
C2	15274395	Campbell Creek at New Seward Highway	30	43	2.21	84	7.6	5	11.6	1.0	180	0.77	3.7
R2	15273030	Rabbit Creek at East 140th Avenue	133	4	0.79	90	7.6	6	12.5	6.4	323	0	7.5
R3	15273040	Rabbit Creek at Porcupine Trail	37	5	0.96	96	7.6	6	12.2	7.3	378	0	8.1
LR3	15273100	Little Rabbit Creek near Anchorage	28	2	0.42	137	7.9	3	12.4	5.7	222	0.74	8.5
CH2	15274830	South Branch of South Fork Chester Creek at Boniface Parkway	60	27	0.34	162	7.7	8	11.7	3.5	665	2.82	10.6
C3	15274557	Campbell Creek at C Street	16	51	2.52	92	7.9	8	8.9	6.1	690	2.61	20.6
CH3	15275100	Chester Creek at Arctic Blvd	5	32	0.88	265	8.1	11.5	10.4	9.4	1747	7.05	39.9

Instream habitat

Reaches 90–150 m in length were chosen according to a combination of factors including representative habitat features for the immediate upstream and downstream area, the repetition of geomorphic channel units (pool, riffle, run) within the reach, meander frequency, and location of obstructions that would limit reach length (such as culverts) (Fitzpatrick et al., 1998). Channel, bank, and riparian characteristics (for example, bankfull channel width, bank vegetative cover) were recorded at each of 11 equidistant transects delineating the reach. Water depth, current velocity, and substrate particle size were also measured. Each stream reach was surveyed using total station equipment that was georeferenced with a survey-grade global-positioning system (GPS). The variables collected were used in metric calculations and subsequent correlation analyses.

Macroinvertebrates

Semiquantitative macroinvertebrate samples were collected during June/July of 2000 from five riffle locations within each reach using a 0.5-m-wide rectangular net with 425-μm mesh. Large particles were brushed by hand to dislodge macroinvertebrates, and finer grained sediments were disturbed to a depth of 10 cm within a 0.25-m^2 area in front of the net opening for 1 min (Cuffney et al., 1993). The five samples collected from each reach were composited into a single sample and elutriated onsite. Organisms were identified to the lowest practical taxonomic level (usually genus) at the Biological Unit of the USGS National Water-Quality Laboratory (NWQL) in Denver, Colorado (Moulton et al., 2000).

Ambiguous taxa were removed where low-level identification of damaged or immature specimens was not possible or because the lack of appropriate keys prevented a finer level of identification. In most cases, the higher level taxa abundances were proportioned among the lower levels relative to the abundances of the lower levels. In cases where lower level abundances were lower than or equal to the higher level abundances, lower level abundances were combined with higher-level abundances. Terrestrial macroinvertebrates were removed.

Water and sediment chemistry

Water-chemistry sampling (major ions, nutrients, and field parameters – pH, dissolved oxygen, specific conductance, and temperature) was performed as described by Shelton (1994). Stream water was collected with a handheld, depth-integrating sampler using the equal-width-increment sampling method. Water samples were collected at the same cross section as the discharge measurement. Samples were processed in the field, then shipped to and analyzed by the NWQL before being used in analyses.

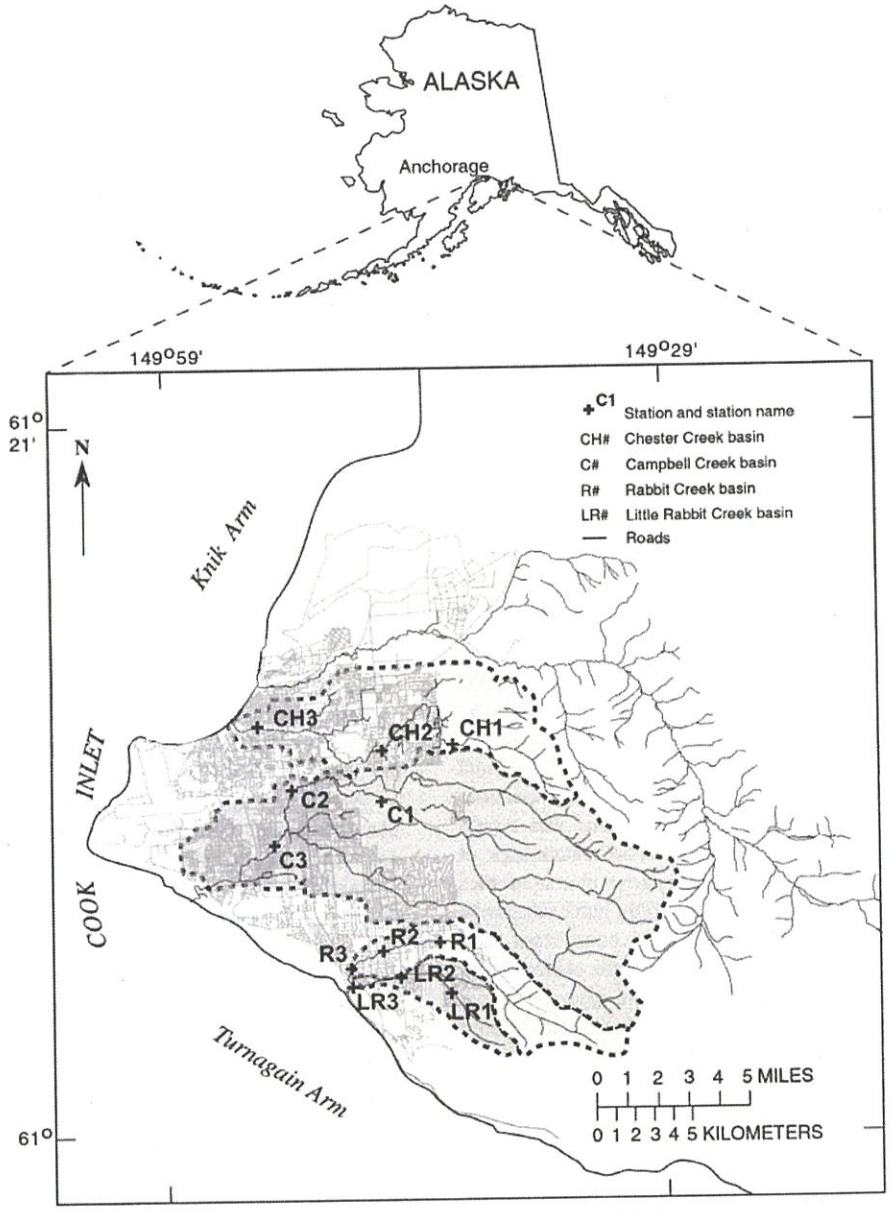

Figure 1. Basins, sites and roads in the Municipality of Anchorage.

Streambed sediments were sampled for trace elements as described by Shelton & Capel (1994). Fine-grained materials were collected from depositional areas of study reaches and wet-sieved in the field to less than 63 μm. Sieved sediments were sent to the NWQL for analysis of trace elements and major metals, such as aluminum and iron. The samples were dried, subjected to complete strong-acid digestion, and analyzed by atomic spectroscopy. Major constituents measured included aluminum, arsenic, cadmium, iron, lead, manganese, nickel, organic carbon, selenium, and zinc (Shelton & Capel, 1994).

Geographic characterization

Spatial data were determined from USGS 1:25 000 and 1:63 360 topographic maps, source data, land-use coverages (Municipality of Anchorage), satellite imagery (IKONOS 4-m multispectral images), and aerial photography (1-m grayscale Digital Orthorectified Quarter Quads [DOQQ]) and were entered into a GIS database. Subbasins were delineated from USGS maps and basin coverages were defined as the catchment area from a reach to the next reach upstream, or to the source from the furthest upstream reaches (Fig. 1). This strategy of creating incremental subbasins instead of cumulative subbasins reduces autocorrelation between sites within a basin. Associated spatial data were fit into each of the respective subbasins for future analysis.

Impervious area

Multispectral IKONOS satellite imagery with a resolution of 4 m and red and near-infrared bands generated a modified normalized difference vegetation index (NDVI), which was then used to isolate impervious areas. NDVI is a mathematical classification technique to determine pixel illumination condition (Deering et al., 1975). Values <0.32 were delineated as impervious areas. Verification involved a visual inspection of the imagery and groundtruthing, as well as inspection of 1-m grayscale panchromatic IKONOS imagery and USGS DOQQs.

Data analysis

Correlations and multivariate analysis

Spearman rank correlation analysis was used to identify response variables related to percent impervious area (PIA) (Statsoft Inc., 2001). Variables significantly correlated ($P < 0.05$) with impervious area were retained for additional analyses. Habitat, water and sediment chemistry variables, as well as land-use types were analyzed using principal components analysis (PCA) to reduce the number of variables in a detrended canonical correspondence analysis (DCCA). All variables used in the correlation analysis, except macroinvertebrate metrics, were grouped according to type and were used in PCA. Variables were separated into four groups; (1) variables associated with riparian and geomorphic characteristics (channel condition factors), (2) variables associated with instream cover and sediment characteristics (instream habitat factors), (3) land-use types, and (4) water- and sediment-chemistry (chemical factors). The first component PCA site scores were calculated for each of the four groups for use as environmental variables in the DCCA.

A direct gradient analysis (DCCA) using the abundance of macroinvertebrate taxa at all 12 sites was performed using the Multivariate Statistical Package (MVSP, 1999). Direct gradient analysis methods allow species data to be related directly to environmental data. DCCA assumes that the species exhibit distributions with a single mode along environmental gradients based on environmental variables.

The macroinvertebrate community was described relative to a gradient of urbanization by using a Spearman correlation of the first DCCA axis score against macroinvertebrate metric calculations. The macroinvertebrate metrics that were used are listed in appendix 1. Functional feeding group classifications followed those outlined by the U. S. Environmental Protection Agency (Barbour et al., 1999). This technique provided greater insight into the groups of macroinvertebrates driving the gradient with respect to biological properties, such as tolerance to perturbation, feeding ecology, and taxonomic diversity.

Determination of threshold response

A sliding regression was performed on each of the correlated variables with respect to PIA. The technique is based on a modification of linear regression comparison as described by Zar (1996). The PIA values were arcsine transformed to normalize the data. Response variables were either arcsine or log transformed to generate a more normal distribution. Beginning with the four sites containing the lowest PIA (group 1 – CH1, C1, R1, LR1), a regression line was fit to the points (subbasins). A regression line then was fit to the remaining eight sites (group 2 – LR2, C2, R2, R3, LR3, CH2, C3, CH3), and the slopes of the two lines were tested for significant differences. This procedure was repeated with the exception that the lowest PIA site within group 2 was moved into group 1 and the comparison of slopes was performed again. This process was repeated until a significant difference in slopes was noted or until all but the four highest PIA sites were left within group 2. If no significant difference in slope was identified, the variable was considered to exhibit a linear response. Variables with significantly different slopes were con-

Table 2. Significant ($P < 0.05$) Spearman correlations (r_S) between physical habitat, macroinvertebrate metrics, water and sediment chemistry variables, and subbasin percent impervious area (PIA)

PIA vs Variable	Spearman r_S	P-level
Channel Condition		
Sinuosity	–0.844	0.0006
Percent Bank Erosion	–0.671	0.0168
Instream Habitat		
Percent Reach >20% Embedded	0.587	0.0448
Macroinvertebrate Metrics		
EPT Abundance	–0.734	0.0065
Percent EPT	–0.587	0.0446
EPT Family Txa Richness	–0.740	0.0059
Hilsenhoff Family-Level Biotic Index	0.748	0.0051
Percent Shredders	–0.608	0.0358
Total Family Richness	–0.651	0.0218
Water Chemistry		
Sodium	0.610	0.0351
Chloride	0.788	0.0023
Iron	0.732	0.0068
Manganese	0.800	0.0018
Sediment Chemistry Selenium	–0.913	<0.0001
Cadmium	0.659	0.0198
Zinc	0.866	0.0003
Lead	0.651	0.0219
Nickel	0.650	0.022

sidered to exhibit a threshold response if the slope of the regression of the greatest number of sites differed significantly from the slope of the regression of all sites. The threshold values were derived by determining the range between the highest PIA site in group 1 and the lowest PIA site in group 2.

Results

Water-chemistry response

Four water chemistry variables of 17 analyzed were significantly correlated with PIA; sodium, chloride, iron, and manganese (Table 2). Sodium concentrations were typically high in downstream subbasins, with the exception of the Campbell Creek Basin. Concentrations were found at CH3 (7.3 mg/l, Table 3) exceeding mean concentrations for the Cook Inlet Basin. Chloride was also high at CH3. Iron was highest at CH2 (130 μg/l), and the next-highest concentration was at CH3 (70 μg/l) (reddish-brown sediments from oxidized iron were observed upstream from the sample point at CH2). Iron concentrations did not exceed mean concentrations for the Cook Inlet Basin.

Water-chemistry variables did not show a significant threshold response, although both sodium and iron exhibited breaks during the first iteration of the sliding regression (7.5–8.1% and 8.5–10.7%, respectively). Chloride (Fig. 3A) and manganese displayed the highest coefficients of determination (0.72 and 0.70, respectively) of the four water-chemistry variables, exhibiting strong linear responses to increasing PIA.

Magnesium had the highest PCA loading of all chemical variables (water and sediment). Specific conductance, calcium, manganese, sulfate, potassium, sodium, and chloride also showed high relative loadings on the first component, which accounted for 46% of the variance. Dissolved oxygen was the only constituent of water or sediment chemistry that loaded negatively on the first component. Water chemistry appears to have greater relative importance (explains more of the variance) with respect to the first component than sediment chemistry has. Site scores are shown in Table 4.

Sediment-chemistry response

Five of the 19 sediment-chemistry variables were significantly correlated with PIA: selenium, cadmium, zinc, lead, and nickel (Table 2). Selenium, the most highly correlated sediment-chemistry variable ($r_S = -0.913$, $P < 0.01$), was negatively correlated with PIA, whereas the remaining trace elements were positively correlated with PIA. Concentrations of selenium were highest at the upstream subbasins (5.8–2.1 μg/g), with CH1 concentrations more than double the next highest value (Table 3).

Cadmium concentrations were highest at CH2 and CH3 (0.7 and 1.0 μg/g, respectively). Concentrations in all other subbasins were relatively stable at 0.2–0.3 μg/g and were comparable to the mean concentrations at other sites throughout the Cook Inlet Basin (Frenzel, 2000). Concentrations of zinc and lead were high at CH2 and CH3 (Table 3) and exceeded the Cook Inlet Basin mean concentrations. Nickel concentrations significantly increased with increasing PIA, though no exceptionally high concentrations were noted.

Table 3. Variables and metrics significantly correlated with percent impervious area (PIA). Sites are arranged from lowest to highest PIA [CIB mean values = Cook Inlet Basin mean values as determined from Glass (1999) and Frenzel (2000)]

Sites	Macroinvertebrate Metrics							Water Chemistry				Sediment Chemistry				
		Habitat		Hilsenhoff Family-Level Biotic Index	Percent Shredders	Total Taxa Richness (family)	EPT Taxa Richness (family)									
	Sinuosity	Percent Bank Erosion	>20 Percent Embedded					Sodium (mg/l)	Chloride (mg/l)	Iron (µg/l)	Manganese (µg/l)	Selenium (µg/g)	Cadmium (µg/g)	Zinc (µg/g)	Lead (µg/g)	Nickel (µg/g)
CH1	1.47	77	6	3.74	6.4	18	8	1.8	0.7	10	1	5.8	0.2	82	10	29
C1	1.99	50	0	4.19	4.7	20	10	1	0.2	5	1	2.2	0.2	100	11	44
R1	1.9	50	6	3.75	6.1	17	8	1.3	0.4	5	1	2.1	0.2	110	10	32
LR1	1.19	32	45	3.83	8.2	22	11	1.7	0.7	10	2	2.1	0.2	110	10	28
LR2	1.36	45	64	3.51	2.5	19	7	2.2	2.2	20	5	2.1	0.3	140	10	30
C2	1.32	59	61	3.6	3.9	18	9	1.3	0.6	30	5	1.4	0.2	92	11	40
R2	1.34	32	12	4.02	4.9	17	7	1.7	1.1	5	1	1.5	0.2	110	10	35
R3	1.21	36	0	4.26	6.5	19	9	2.1	1.7	10	2	1.5	0.2	120	11	36
LR3	1.21	14	18	5.59	5.5	18	7	2.9	3.4	20	3	1.6	0.2	160	10	31
CH2	1.01	0	55	5.55	1.3	16	5	2.5	2.6	130	30	1.4	0.7	420	61	47
C3	1.09	23	76	5.13	0.4	16	5	1.7	1.4	50	14	1.1	0.3	180	17	62
CH3	1.03	45	64	7.68	0	12	4	7.3	15	70	62	1.1	1	590	110	50
CIB mean values								4.7	4.2	200	41	0.6	0.4	140	18	49

Table 4. PCA site scores for each of the four groups of variables analyzed. Each group represents a reduction of related variables, expressed as a single surrogate environmental variable

Sites	Channel Condition	Instream Habitat	Chemical Factors	Land-Use Factors
CH1	–0.116	0.098	0.111	–0.54
C1	0.518	–0.609	–0.747	–0.413
R1	–0.202	–0.71	–0.988	–0.341
LR1	–0.598	–0.324	–0.541	–0.542
LR2	–0.469	1	–0.06	–0.408
C2	1.195	0.612	–0.71	–0.081
R2	–0.358	–0.856	–0.766	–0.269
R3	–0.284	–0.844	–0.648	–0.158
LR3	–0.449	–0.594	–0.07	–0.173
CH2	–0.184	0.896	1.081	–0.107
C3	0.996	0.331	–0.112	1.707
CH3C	–0.048	1	3.451	1.325
Percent of total variance explained by component 1	37.7	33.7	45.7	65

Table 5. Ranges of incremental percent impervious area (PIA) thresholds as determined through sliding regression. r^2 and P values were calculated from regressions of all sites

	PIA	r^2	P
Selenium (Sediments)	3.4–3.7	0.6307	0.0020
Cadmium (Sediments)	7.5–8.1	0.5529	0.0056
Zinc (Sediments)	7.5–8.1	0.7417	0.0003
Lead (Sediments)	7.5–8.1	0.5826	0.0039
Nickel (Sediments)	No Break	0.3730	0.0349
Sodium	No Break	0.6164	0.0025
Chloride	No Break	0.7236	0.0005
Iron	No Break	0.4868	0.0117
Manganese	No Break	0.7006	0.0007
Percent of Reach >20% Embedded	3.4–3.7	0.3170	0.0566
Percent Bank Erosion	1.2–3.4	0.2017	0.1430
Stream Sinuosity	No Break	0.5016	0.0100
Hilsenhoff Family-Level Biotic Index	3.7–7.5	0.7266	0.0004
Percent Shredders	No Break	0.5599	0.0051
Total Taxa Richness (family level)	1.2–3.4	0.5998	0.0031
EPT Taxa Richness (family level)	No Break	0.6133	0.0026
Mean = 4.4–5.8			

Four sediment-chemistry variables showed a threshold response with respect to PIA (Table 5). The threshold for selenium was between 3.4 and 3.7 PIA. Thresholds for cadmium, zinc (Fig. 3B), and lead were between 7.5 and 8.1 PIA. Nickel exhibited a linear response (no breakpoint) characterized by a relatively weak straight-line association ($r^2 = 0.373$, Table 5).

PCA was used on a combination of all sediment- and water-chemistry data. Lead concentration had the highest loadings (relative importance) of all the sediment chemistry constituents on the first component. Cadmium, zinc, manganese, and arsenic also were highly loaded on the first component and accounted for the largest proportion of the variance explained by sediment chemistry in the newly created environmental variable, chemical factors. The first component accounted for about 46% of the variance (Table 4).

Physical response

Two channel condition metrics, sinuosity and percent bank erosion, exhibited significant negative correlations with PIA (Table 2). Sinuosity decreased with increasing PIA; CH2 showed the lowest value (1.01, or nearly straight) and all other downstream reaches displayed low values (range – 1.03–1.21) (Table 3). No threshold response was observed for sinuosity. Percent bank erosion values also decreased with increasing PIA [threshold response ranging from 1.2 to 3.4 PIA (Table 5)]. Percent bank erosion values were highest at upstream reaches and decreased downstream.

One instream habitat metric, percent reach >20% embedded, was significantly correlated with PIA (Table 2), with a threshold response from 3.4 to 3.7 (Table 5). This range generally related to road density values >1.8 km/km^2. Embeddedness was highest in subbasins with storm drains, except for LR1 and LR2 subbasins, which were undergoing substantial residential development during the study.

PCA showed that the new variable, instream habitat, was dominated on the first component by positive loadings of percent habitat abundance, >20% embeddedness, and by negative loadings of percent dominant large and small cobbles. The first component explained about 34% of the variance (Table 4). The other new physical response variable, channel condition, was dominated by positive loadings of run length and average bankfull width and by negative loadings of shade and riffle length on the first component. The first component explained approximately 38% of the variance. Table 4 shows the site scores for both new physical response variables.

Biotic response

Six biotic metrics were significantly correlated with PIA. Percent of EPT taxa and EPT relative abundance ($P = 0.05$ and 0.01 , respectively) were considered redundant and removed from further analyses, as both were less significant when compared with EPT taxa richness (family level) ($P = 0.01$). The three other macroinvertebrate metrics were Hilsenhoff FBI, percent shredders, and total family richness (Table 2).

Percent shredders, total family richness, and EPT taxa richness decreased with increasing PIA. Percent shredders was generally lower at all sites within the Campbell Creek Basin (C1, C2, and C3) compared to other basins, except LR2 and CH2 (Table 3), but no threshold response was apparent. Percent shredders showed the lowest correlation with PIA of the macroinvertebrate metrics (Table 5). Total taxa richness (family level) was generally highest at the upstream sites (CH1, C1, R1, LR1). A threshold response between 1.2 and 3.4 PIA separated the upstream sites from the middle and downstream sites (Table 5, Fig. 3C). EPT taxa richness was highest at LR1 and C1 and showed a linear response to PIA.

Conversely, FBI values increased with increasing PIA (Table 3, Fig. 3D). This was expected, as the metric measures the tolerances of invertebrates to perturbation, and the higher the value for a site, the greater the probability of organic pollution (Hilsenhoff, 1988). According to this index, the upstream subbasins ranged from excellent (organic pollution unlikely) for CH1 and R1 to very good (possible slight organic pollution) for LR1 and C1. Water quality in two middle subbasins, LR2 and C2 was rated as excellent, but was rated as very good at R2 and as fair at CH2. As in the upper subbasins, water quality was higher in subbasins with lower PIA. Water quality in only one of the downstream subbasins, R3, was rated as good (some organic pollution probable). Water quality at LR3 and C3 was rated as fair and, at CH3, was rated very poor (severe organic pollution likely).

Land use

PCA of land-use variables showed residential, transportation right-of-way, and institutional land uses as having the highest positive variable loadings. None of the variables were negatively loaded. The first component explained 65% of the variance. The site scores on the first component of the PCA (Table 4) were used as the new land-use environmental variable in the DCCA.

Direct gradient analysis

DCCA incorporated the four new variables created from the first component site scores derived from the PCA as environmental variables. It was necessary to minimize the number of environmental variables because the number of sampling sites was relatively small. The DCCA biplot was based on 57 macroinvertebrate taxa from the 12 sites (Fig. 2). The environmental variables are represented as vectors: the length relates to relative importance, and the direction relates to approximate correlation with the axes. The first axis accounted for 30.8% of the variance in the macroinvertebrate data and was correlated with land-use and chemical factors ($r = 0.80$ and 0.69, respectively), whereas the second axis accounted for

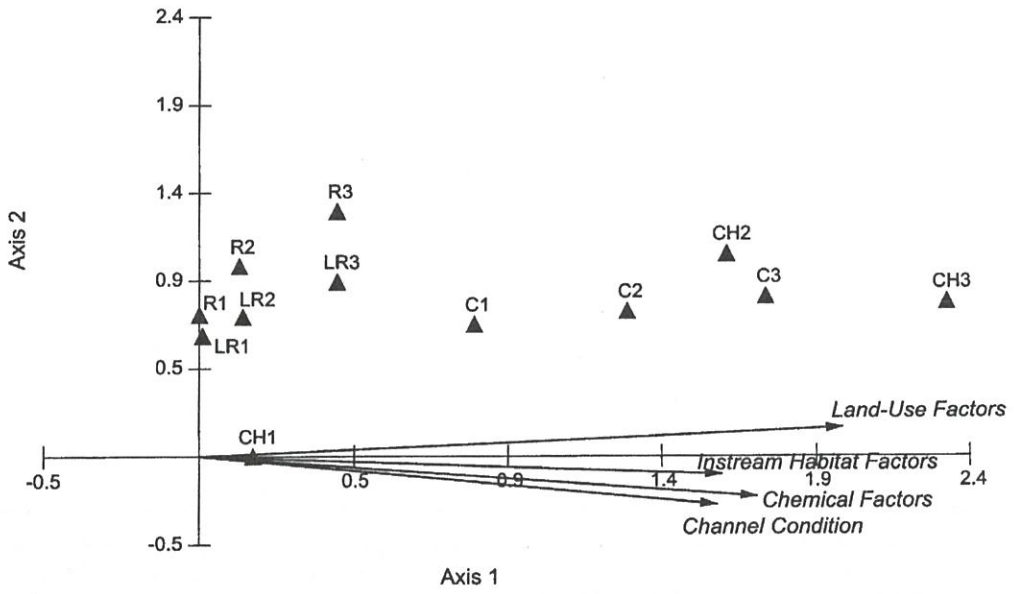

Figure 2. Detrended canonical correspondence analysis (DCCA) of the 12 study sites and relative abundance of macroinvertebrate taxa. Length of vectors indicates the relative importance of that environmental variable.

6.9% of the variance and was correlated with land use and channel condition ($r = 0.69$ and -0.08, respectively). The alignment of the sites along the first axis represents the gradient of urbanization as described by the macroinvertebrate species composition with respect to the environmental variables. According to the results of threshold responses, the split between urban affected and unaffected occurs near LR3 and R3.

The macroinvertebrate community was analyzed further by correlating the macroinvertebrate metrics with the first DCCA axis with macroinvertebrate metrics (Table 6). Positively correlated metrics (Hilsenhoff FBI and percent Oligochaeta) were related to measures of disturbance-tolerant macroinvertebrates found in areas of high PIA, whereas negatively correlated metrics (such as, percent EPT, percent shredders, and percent scrapers) were related to measures of intolerant macroinvertebrates in areas of low PIA. The second axis scores showed a marginal correlation with only the Hilsenhoff family-level biotic index ($r = 0.59$, $P = 0.04$).

Discussion

Streams in Anchorage, Alaska, showed effects from urbanization comparable to other studies (Klein, 1979; Sloane-Richey et al., 1981; Whiting & Clifford, 1983; Garie & McIntosh, 1986; Waters, 1995; May et al., 1997; Winter & Duthie, 1998; Wang et al., 2000). The gradient of urbanization, as expressed by PIA, was reflected by a shift in the macroinvertebrate community from intolerant organisms at sites with low PIA to tolerant organisms at sites with high PIA. Relatively few physiochemical variables or biotic metrics were significantly correlated with PIA, but the threshold-type responses typically occurred at PIA values lower than 10%. These values are lower than those generally observed elsewhere (Klein, 1979; Booth & Jackson, 1997; Wang et al., 2000). Some variables, such as reach >20% embedded and bank erosion, had thresholds occur at lower than 5 PIA.

The Cook Inlet Basin contains mineralized rock and soils over a wide area, especially when compared with other U.S. Geological Survey National Water-Quality Assessment Program (NAWQA) study units with respect to trace elements in streambed sediments (Brabets et al., 1999; Frenzel, 2000). Selenium concentrations for all sites in the basin exceeded the national background level (0.7 μg/g) for NAWQA study units (Gilliom et al., 1998), and concentrations were elevated even in undeveloped subbasins (Table 3). The extremely high concentration of selenium (5.8 μg/g) at CH1 may be attributable to a now-defunct

Table 6. Spearman rank order correlations between site scores from DCCA axis one and macroinvertebrate metrics. Bolded correlations are significant at $P < 0.05$

Macroinvertebrate metrics	Spearman r	P-level
Shannon-Weiner Diversity Index	0.143608	0.656129
Total Abundance	0.038529	0.905370
EPT Abundance	**–0.781087**	**0.002705**
Hilsenhoff Family-level Biotic Index	**0.591945**	**0.042590**
Percent Chironomidae	0.273205	0.390234
Percent Ephemeroptera	**–0.863158**	**0.000299**
Percent Plecoptera	–0.532400	0.074756
Percent Trichoptera	–0.568421	0.053808
Percent Oligochaeta	**0.788092**	**0.002329**
Percent Filterers	0.308232	0.329698
Percent Collectors	–0.119298	0.711915
Percent Predators	–0.101576	0.753434
Percent Scrapers	**–0.818042**	**0.001147**
Percent Shredders	**–0.746061**	**0.005329**
Total Taxa Richness (lowest practical taxonomic identification)	–0.070673	0.827231
Total Taxa Richness (family-level identification)	–0.491163	0.104899
Percent Dominant Taxa - 2	–0.230229	0.471601
Percent EPT	**–0.907182**	**0.000046**
EPT Taxa Richness (family-level)	–0.501801	0.096459
Ratio of EPT to Chironomidae	**–0.838596**	**0.000654**
Ratio of Baetidae to Ephemeroptera	0.414035	0.180880

coal-burning power generation plant nearby. The concentration at CH1 is considered a 'high hazard level' (>4 μg/g) as described by Lemly (1995), and selenium enters the food web most readily from benthic sources (Baines et al., 2002), although the biota at this site did not appear to be adversely affected during the sampling period.

Cadmium, zinc, and lead concentrations all exhibited a threshold response between 7.5 and 8.1 PIA. Cadmium concentrations were below the national median concentration (0.4 μg/g) at all sites except CH2 and CH3, two highly urbanized subbasins. None of these trace element concentrations exceeded the probable effect level (PEL) of 3.5 μg/g recommended by the Canadian Council of Ministers of the Environment (1999) and, therefore, probably had little effect on biota, even at the downstream sites. Zinc (Fig. 3B) and lead often are cited as good indicators of urbanization (Klein, 1979; Porcella & Sorensen, 1980; May et al., 1997). Zinc concentrations exceeded the PEL of 315 μg/g at CH2 and CH3, and concentrations at all sites except CH1 and C2 exceeded the national median concentration. The elevated levels of zinc (and lead) in subbasins where PIA is high are generally attributed to construction and transportation (May et al., 1997), and road sediment is a primary high-concentration source for these metals (Sutherland, 2000; Sutherland & Tolosa, 2001; Turer et al., 2001). Lead concentrations were generally below the national median concentration (24.3 μg/g) except at CH2 and CH3. Lead exceeded the PEL of 91.3 μg/g at CH3. Lead and zinc are both known to adversely affect stream organisms (Garie & McIntosh, 1986; Besser et al., 2001) and may be more of a problem during times of high flow (May et al., 1997). Storm drains and roads are probably the primary mechanisms for the transportation of zinc and lead in Anchorage, moving them toward eventual downstream deposition in the sediments. Concentrations of contaminants generally were highest in subbasins with storm drains and high PIA (Tables 1 and 4). Nickel was the only significantly correlated trace element not showing a threshold response. Although all concentrations exceeded the 25 μg/g national median, none exceeded concentrations measured elsewhere in the Cook Inlet Basin (Frenzel, 2000) and are probably naturally occurring.

Water quality related to water chemistry generally declined with increasing PIA. Sodium, chloride, iron, and manganese were significantly correlated with PIA, although no threshold responses were observed. Sodium and chloride commonly are associated with the application of deicing salts (Koryak et al., 2001) and with domestic sewage and may be considered more of a stress factor in low flow conditions because high flows often have the effect of diluting soluble forms (Klein, 1979; May et al., 1997). Because concentrations of both constituents were greater than mean concentrations for the Cook Inlet Basin (Table 3), increased PIA related to urbanization appears to be a probable factor. Conversely, manganese and iron probably are not related directly to PIA in this case, because concentrations of neither constituent exceeded the mean concentrations measured for the Cook Inlet Basin.

The three physical response variables appear to be questionable in their efficacy in accurately describing changes related to PIA. Sinuosity exhibited the best fit of the sites to the regression curve of the three variables, but only marginally ($r^2 = 0.5016$). Sinuosity generally is used at the stream segment rather than the stream reach level (Fitzpatrick et al., 1998). Reach lengths of 90–150 m, while adequate for most

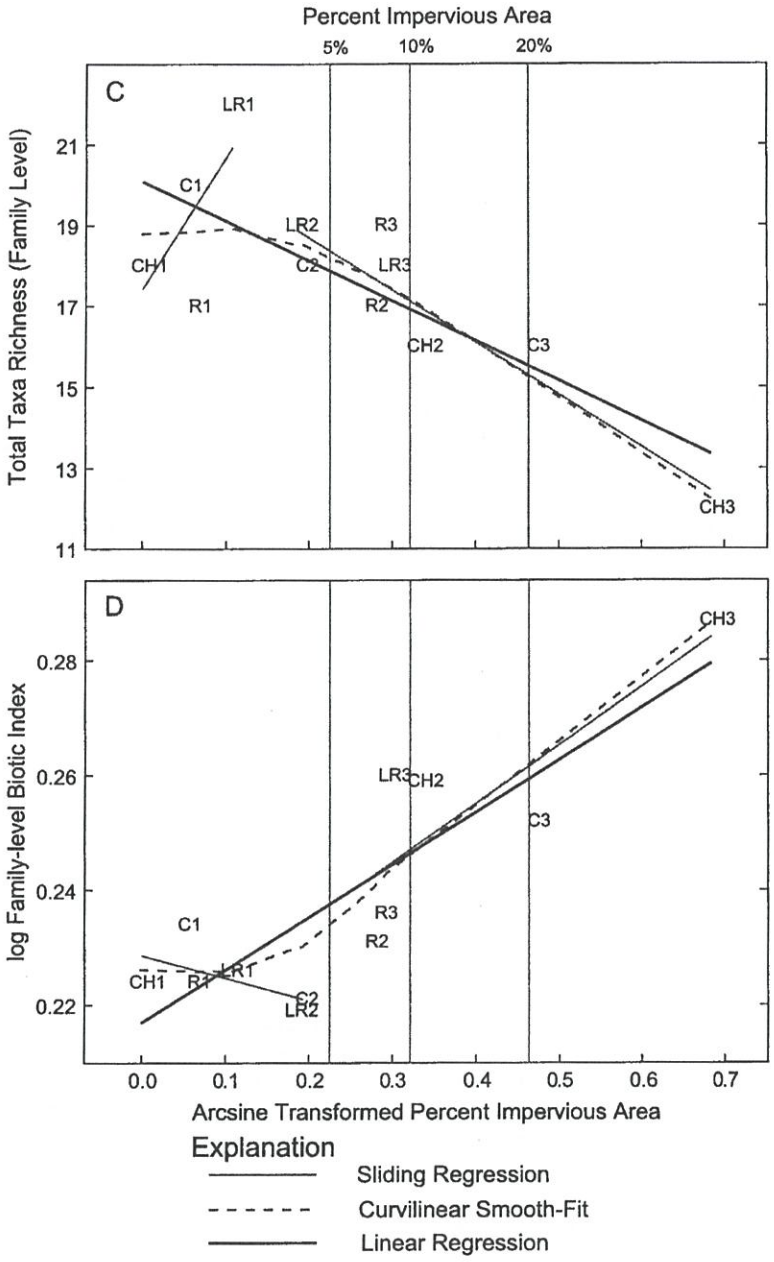

Figure 3. Selected graphs illustrating results of threshold analysis. (A) represents a linear response. (B), (C), and (D) are representative of threshold responses. The curvilinear smooth-fit line illustrates the points along the linear fit where change may be occurring, further supporting the sliding regression as a useful technique (see Ourso, 2001).

of our measures, were probably too short for an accurate accounting of sinuosity. However, sinuosity has been observed to be lower in urban streams compared to reference streams (Pizzuto et al., 2000). Increasing substrate embeddedness and bank erosion have been observed to increase in developing areas (Arnold et al., 1982; Furniss et al., 1991), but reach > 20% embedded and percent bank erosion are both subjective measures. Both variables had the lowest coefficient of determination values (r^2 = 0.3170 and 0.2017, respectively) of all significantly correlated variables. Although both showed threshold responses to PIA, the spread of points renders both highly suspect. A more quantitative measure for each, for example, digitized photos of substrate and streambanks, probably would provide more useful data. We feel that this is probably the case with many, if not most, subjective measures used in habitat monitoring and that such measures deserve further investigation.

In general, the macroinvertebrate community responded to PIA such that greater levels of PIA yielded taxonomically less diverse communities, composed of more disturbance-tolerant organisms. This is consistent with other studies of urban impacts on streams (Whiting & Clifford, 1983; Shutes, 1984; Garie & McIntosh, 1986; Kearns & Karr, 1994), especially a study by Jones & Clark (1987) that found the chironomid genera *Cricotopus* and *Orthocladius* associated with subbasins where PIA was high. Also characteristic of higher PIA sites were Tubificidae and Naididae worms, both highly tolerant to perturbation. Elevated concentrations of constituents associated with deicing salts may be related to the reduced diversity and greater abundance of tolerant organisms. Crowther & Hynes (1977) reported the possibility of degraded insect communities from road-salt-induced drift. Persistent exposure to even moderate levels of chemicals may act in a similar fashion by allowing the more tolerant organisms to dominate.

Conversely, subbasins with lower PIA were characterized by more diverse macroinvertebrate communities. Greater total taxa richness and EPT taxa richness at the family level (both characteristic of less perturbed environments, Table 3) were noted. The only significant metric related to functional feeding, percent shredder, was also negatively correlated with PIA. Shredders are those macroinvertebrates responsible for consuming coarse particulate organic matter which may create finer particles, and are most often associated with well canopied, headwater streams (Vannote et al., 1980).

Correlation (Spearman) analysis of macroinvertebrate metrics further demonstrated the validity of the gradient of urbanization illustrated by the first DCCA axis with respect to PIA. Increasing FBI and percent oligochaetes metrics were associated with increasing perturbation (Table 6). Both metrics were positively correlated with PIA as well as with the first DCCA axis (Tables 2 and 6), thereby suggesting that the site scores for urbanized areas were, in general, correctly predicted. Furthermore, metrics shown to decrease with increasing perturbation (EPT abundance; percentages of Ephemeroptera, scrapers, shredders, and EPT; and the ratio of EPT to Chironomidae) were negatively correlated with PIA and DCCA axis one (Tables 2 and 6). Therefore, subbasins with lower DCCA axis one scores tended to have lower PIA and support a greater diversity of organisms, including those considered intolerant to perturbation.

Campbell Creek was the possible exception with respect to site scores. C1 and C2 have higher DCCA axis one scores than would have been predicted by PIA alone (0.843 and 1.315, respectively). Given that PIA is higher in subbasins LR3 and R3, it could be assumed that C1 and C2 would be positioned to the left of LR3 and R3. Their shift to the right on the first DCCA axis may be attributed to natural differences associated with basin size (3rd order for C1, 4th order for C2) and related to the river continuum concept (Vannote et al., 1980). Slight changes in the macroinvertebrate community related to predictable downstream changes in feeding habits also were likely responsible for the shift to the right on the first DCCA axis.

The most urbanized sites, CH2, C3, and CH3, had PIA of at least 10% and macroinvertebrate communities characterized by more tolerant organisms than were present at sites with PIA less than 4%. Those subbasins are among the older residential areas in Anchorage and have population densities that would be categorized as urban using U.S. Census Bureau criterion of 386 persons/km^2. Rabbit and Little Rabbit Creek Basins have become developed as residential areas within the past 5–10 years and, at sites R2 and R3, population densities are approaching the urban category. Several of the threshold responses appeared to occur near sites R2 and R3, in other words, at PIA less than 10. Population densities at sites CH2 and C3 are similar, yet PIA at site C3 was twice that at CH2. Many of the measured responses at CH2 and C3 were similar, whereas CH2 appeared to be more similar to site CH3 with respect to chemical responses (Table 3).

The similarity of CH2 and CH3 in terms of chemical responses may be a function of streambed sediment chemistry integrating conditions at a larger scale than do some of the other measures.

Woody vegetation is well established along the banks at most sites, and along much of the lower parts of the Chester and Campbell Creek Basins, bike paths and parklands are adjacent to the creeks. This may explain why habitat variables related to riparian condition were not significantly correlated with PIA, as riparian buffer strips can successfully sustain many important habitat components (Schueler, 1995; Shaw & Bible, 1996). Urban development does exist in the flood plain at sites R2, R3, C2, C3, CH2, and CH3, but it is not reflected in the channel habitat variables measured. The extent of urban development in flood plains or within specified buffer distances from the channel may help explain the biological effects detected in this study.

Although the thresholds reported here appear low compared with values reported elsewhere (Schueler, 1994), the differences in this study may be related to the more advanced technology used to quantify PIA and the sliding regression technique used to determine threshold responses. Given that Landsat data used in many of the previous studies are at a 30-m resolution level, there is room for substantial misinterpretation related to a lack of precision. Had the technology used in this study been available for earlier investigations, a general reduction in detected response to PIA may have been possible. The low thresholds we observed also could relate to the local climate, as there are more extreme natural stressors on ecosystems in Alaska compared to those in more southerly latitudes. Future investigations using techniques discussed herein will aid in determining whether threshold responses to urbanization in Anchorage subbasins are actually low as a result of climatic differences or whether the greater resolution spatial data used in this study afforded better discernment of differences in PIA at lower levels.

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Appendix 1. Spearman correlations between all variables examined and subbasin impervious area. [Bold values indicate significant correlations at $P < 0.05$]

PIA vs Variable Spearman	*R*	*P*-level
Channel Condition		
Sinuousity	–0.844	**0.0006**
Reach Length	0.262	0.4100
Average Bankfull Width/Depth	0.000	1.0000
Bank Stability Index	0.274	0.3894
Percent Bank Erosion Abundance	–0.671	**0.0168**
Percent Riparian Closure	0.231	0.4705
Percent Shade	0.077	0.8122
Percent Riffle Length	–0.363	0.2461
Percent Run Length	0.292	0.3573
Percent Pool Length	–0.058	0.8573
Instream Habitat		
Percent Habitat Abundance	0.054	0.8682
Percent Woody Debris Abundance	0.527	0.0782
Percent Vegetation Abundance	–0.180	0.5751
Percent Boulder Habitat Abundance	0.367	0.2404
Percent Manmade Habitat Abundance	0.303	0.3391
Percent Undercut Bank Abundance	–0.467	0.1262
Percent Dominant Silt	0.179	0.5769
Percent Dominant Sand	0.225	0.4825
Percent Dominant Fine/Medium Gravel	0.075	0.8158
Percent Dominant Coarse Gravel	0.181	0.5730
Percent Dominant Very Coarse Gravel	0.211	0.5106
Percent Dominant Small Cobble	–0.310	0.3270
Percent Dominant Large Cobble	–0.070	0.8284
Percent Dominant Small Boulder	0.147	0.6483
Percent Reach 0 Percent Embedded	–0.487	0.1085
Percent Reach 1–20 Percent Embedded	0.451	0.1412
Percent Reach >20 Percent Embedded	0.587	**0.0448**
Percent Silt Abundance	0.401	0.1959
Macroinvertebrate Metrics		
Shannon Wiener Diversity Index	–0.294	0.3541
Total Abundance	0.056	0.8629
EPT Abundance	–0.734	**0.0065**
Hilsenhoff Family-level Biotic Index	0.748	**0.0051**
Percent Chironomidae	0.035	0.9141
Percent Ephemeroptera	–0.557	0.0600
Percent Plecoptera	–0.545	0.0666
Percent Trichoptera	–0.480	0.1144
Percent Oligochaeta	0.566	0.0548
Percent Filterer	–0.028	0.9312
Percent Collector	0.214	0.5049
Percent Predator	–0.049	0.8799
Percent Scraper	–0.564	0.0559
Percent Shredder	–0.608	**0.0358**
Total Taxa Richness (lowest practical taxonomic identification)	–0.370	0.2360
Total Family Richness	–0.651	**0.0218**
Percent Dominant Taxa - 2	0.361	0.2484
Percent EPT	–0.587	**0.0446**
EPT Taxa Richness	–0.740	**0.0059**
Percent EPT to Chironomidae	–0.539	0.0703
Percent Baetidae to Ephemeroptera	0.371	0.2347
Water Chemistry		
Discharge	0.308	0.3297
Dissolved Oxygen	–0.466	0.1269
pH	0.171	0.5941
Specific Conductance	0.503	0.0952
Calcium	0.545	0.0666
Magnesium	0.510	0.0899
Potassium	0.340	0.2803
Sodium	0.610	**0.0351**
Chloride	0.788	**0.0023**
Silica	0.182	0.5717
Sulfate	0.566	0.0548
Nitrate	–0.161	0.6175
Total Phosphorus	0.511	0.0892
Dissolved Organic Carbon	0.141	0.6624
Residue	0.524	0.0800
Iron	0.732	**0.0068**
Manganese	0.800	**0.0018**
Stream Density	–0.042	0.8970
Sediment Chemistry		
Phosphorus (sediment)	–0.372	0.2344
Sodium	0.373	0.2329
Magnesium	0.512	0.0885
Potassium	–0.243	0.4467
Iron	0.377	0.2264
Calcium	–0.245	0.4436
Aluminum	–0.111	0.7319
Organic Carbon	–0.503	0.0952
Inorganic Carbon	–0.190	0.5543
Total Carbon	–0.503	0.0952
Selenium	–0.913	**<0.0001**
Arsenic	0.133	0.6795
Cadmium	0.659	**0.0198**
Silver	0.118	0.7143
Zinc	0.866	**0.0003**
Lead	0.651	**0.0219**
Nickel	0.650	**0.0220**
Molybdenum	–0.315	0.3184
Manganese	0.267	0.4013

Is Impervious Cover Still Important? Review of Recent Research

Thomas R. Schueler[1]; Lisa Fraley-McNeal[2]; and Karen Cappiella[3]

Abstract: The impervious cover model (ICM) has attracted considerable attention in recent years, with nearly 250 research studies testing its basic hypothesis that the behavior of urban stream indicators can be predicted on the basis of the percent impervious cover in their contributing subwatershed. The writers conducted a meta-analysis of 65 new research studies that bear on the ICM to determine the degree to which they met the assumptions of the ICM and supported or did not support its primary predictions. Results show that the majority of research published since 2003 has confirmed or reinforced the basic premise of the ICM, but has also revealed important caveats and limitations to its application. A reformulated conceptual impervious cover model is presented in this paper that is strengthened to reflect the most recent science and simplify it for watershed managers and policy makers. A future challenge is to test the hypothesis that widespread application of multiple management practices at the catchment level can improve the urban stream degradation gradient that has been repeatedly observed by researchers across the country.

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CE Database subject headings: Streams; Urban areas; Urban development; Watersheds.

Introduction

Impervious cover (IC) has unique properties as a watershed metric in that it can be measured, tracked, forecasted, managed, priced, regulated, mitigated, and, in some cases, even traded. In addition, IC is a common currency that is understood and applied by watershed planners, storm-water engineers, water quality regulators, economists, and stream ecologists alike. IC can be accurately measured using either remote sensing or aerial photography (Goetz et al. 2003; Jantz et al. 2005). IC is also strongly correlated with individual land use and zoning categories (Cappiella and Brown 2001; Slonecker and Tilley 2004), which allows planners to reliably forecast how it changes over time in response to future development. Consequently, watershed planners rely on IC (and other metrics) to predict changes in stream health as a consequence of future development (CWP 1998).

Schueler (2004) has utilized IC to classify and manage urban streams, and economists routinely use IC to set rates for storm-water utilities and off-site mitigation (Parikh et al. 2005). Engineers utilize IC as a key input variable to predict future downstream hydrology and design storm-water management practices (MSSC 2005). A number of localities have modified their zoning to establish site-based or watershed-based IC caps to protect streams or drinking water supplies. In recent years, IC has been used as a surrogate measure to ensure compliance with water quality standards in impaired urban waters (Bellucci 2007).

Another noteworthy aspect of IC has been its use as an index of the rapid growth in land development or sprawl at the watershed, regional, and national scale. For example, Jantz et al. (2005) found that IC increased at a rate five times faster than population growth between 1990 and 2000 in the Chesapeake Bay watershed. At a national level, several recent estimates of IC creation underscore the dramatic changes in many of our nation's watersheds as a result of recent or future growth. Elvidge et al. (2004) estimated that about 112,665 km^2 (43,500 mi^2) of IC had been created in the lower 48 states as of 2000. Forecasts by Beach (2002) indicate that IC may nearly double by the year 2025 to about 213,837 km^2 (82,563 mi^2), given current development trends. Although care must be taken when extrapolating from national estimates, it is clear that several hundred thousand stream miles are potentially at risk. For example, a detailed GIS analysis by Exum et al. (2006) indicates that 14% of the total watershed area in eight southeastern states had exceeded 5% IC as of 2000.

Given growth in IC, watershed managers are keenly interested in the relationship between subwatershed IC and various indicators of stream quality. The impervious cover model (ICM) was first proposed by Schueler (1994) as a management tool to diagnose the severity of future stream problems in urban subwatersheds. The ICM projects that hydrological, habitat, water quality, and biotic indicators of stream health decline at around 10% total IC in small (i.e., 5 to 50 km^2) subwatersheds (CWP 2003). The ICM defines four categories of urban streams based on how much IC exists in their contributing subwatershed: *sensitive, impacted, nonsupporting,* and *urban drainage* (Schueler 1994) (Fig. 1). The ICM also outlines specific quantitative or narrative predictions for stream indicators within each stream category to define the severity of current stream impacts and the prospects for their future restoration (Schueler 2004).

The general predictions of the ICM are as follows: streams with less than 10% subwatershed IC continue to function as *sensitive streams*, and are generally able to retain their hydrologic

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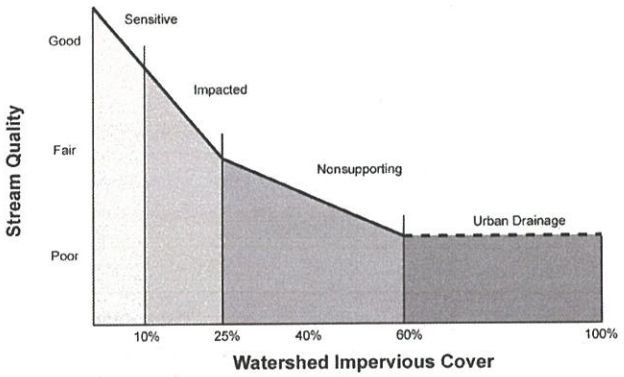

Fig. 1. Impervious cover model [adapted from CWP (1998)]

function and support good to excellent aquatic diversity. Streams with 10 to 25% subwatershed IC behave as *impacted streams* and show clear signs of declining stream health. Most stream health indicators fall in the fair range, although some reaches with extensive riparian cover may score higher. Streams that possess between 25 and 60% subwatershed IC are classified as *nonsupporting*, as they no longer support their designated uses in terms of hydrology, channel stability, habitat, water quality, or biological diversity. Nonsupporting streams become so degraded that it may be difficult or impossible to fully recover predevelopment stream function and diversity. Streams within subwatersheds exceeding 60% IC are often so extensively modified that they merely function as a conduit for flood waters. These streams are classified as *urban drainage* and consistently have poor water quality, highly unstable channels, and very poor habitat and biodiversity scores. In many cases, these urban streams are eliminated altogether by earthworks and/or storm drain enclosure.

The ICM has been extensively tested in ecoregions around the U.S. and elsewhere with more than 250 different reports reinforcing the basic model for single stream indicators or groups of stream indicators (CWP 2003; Schueler 2004). It should be noted, however, that only a third of these reports were published in peer-reviewed journals. For the purposes of this paper, we reviewed new research efforts that have further explored the ICM relationship. The methods used to conduct this review are described in the following section.

Methods

The writers conducted a meta-analysis of 65 new research studies that bear on the ICM and were not included in the papers and reports originally analyzed by CWP (2003). Each paper was reviewed to determine the number of streams, average drainage area, range in urbanization of study subwatersheds, and the receiving water indicator(s) sampled. A database was created to compile this information and four criteria were used to determine whether a paper was suitable for inclusion. First, a minimum of 10 individual subwatersheds must have been sampled. Second, riverine studies that sampled several stations in a progressive downstream direction in the same watershed were omitted. Third, only studies that directly measured impervious cover or an autocorrelated metric, such as % urban land or an urban intensity index (Meador et al. 2005), were included in the database. Fourth, the study must have been published in a peer-reviewed, reliable source, such as a scientific journal article or federal report.

Based on these criteria, 30 studies were excluded from the analysis, which yielded a total of 35 papers: 25 from peer-reviewed journals, four from the U.S. Geological Survey, five from peer-reviewed conference proceedings, and one from a state research institute. When researchers sampled multiple indicators, these were considered as separate entries only if they measured more than one major indicator group (e.g., water quality, biological diversity, geomorphology, hydrology, habitat). Multiple measures within the same indicator group were considered a single entry (i.e., sediment, nitrogen, and chloride within the water quality group). As a result, the final ICM database contained 61 individual entries. The complete database is maintained by CWP and is available upon request.

Each paper was then evaluated to determine the degree to which it met the assumptions of the ICM and supported or did not support its primary predictions, resulting in entries being sorted into four categories:

1. *Confirming papers* met the following criteria:
   a. Primarily sampled small subwatersheds (5 to 50 km^2);
   b. Directly estimated impervious cover;
   c. Tested subwatersheds over a broad range of IC;
   d. Reported a strong linear negative relationship for the indicator with increasing IC; and
   e. Showed an initial detectable shift in indicator quality in the 5 to 15% IC range.
2. *Reinforcing papers* either did not meet criteria 1a and 1c described above OR relied on percent urban land or an urban index in lieu of IC. These studies demonstrated a strong linear negative relationship between the indicator and the metric used to describe urbanization.
3. *Inconclusive papers* were defined as studies that met most of criteria 1a though 1c described for confirming papers but reported a mixed, weak, or inconsistent relationship between indicator quality and the metric used to describe urbanization.
4. *Contradicting* papers met most of criteria 1a through 1c described for confirming papers but did not show a negative or detectable relationship between urbanization and the indicator category analyzed.

General Findings from the Database

The geographic scope and intensity of recent research related to the ICM model has been impressive. Sampling has been conducted in more than 2,500 subwatersheds located in 25 states for more than 35 different indicators of environmental quality. Most studies focused on various indicators of freshwater stream quality (75%), but an increasing number explored the ICM relationship in tidal waters (25%). The majority of research has been conducted on the East Coast, with a strong emphasis on the piedmont and coastal plain regions. Much less attention has been focused along the Northern Tier, Rocky Mountains, and arid Southwest, although the Pacific Northwest was well represented.

Three additional factors complicated the comparison of individual studies. First, researchers relied on many different metrics to characterize urbanization including IC, % urban land, % developed land, and an urban intensity index, among others. Although most of these metrics are autocorrelated, some are less accurate or more variable than others (e.g., % urban land or developed land). Second, researchers applied a wide range of different statistical methods and transformations to analyze their watershed data. While it is outside the scope of this paper to critically evaluate

Table 1. Overall Summary of Recent ICM Research Included in ICM Database[a]

Confirming	Reinforcing	Inconclusive	Contradicting	Total
19	23	9	10	61

[a]For definitions, see "Methods" section.

these methods, we acknowledge that this may have caused researchers to draw different statistical inferences from the same data. Third, the geographic scale at which subwatersheds were sampled varied greatly. While most studies conformed to headwater ICM assumptions (e.g., subwatershed area ranging from 5 to 50 km^2), several regional studies had a mean subwatershed area as large as 75 to 150 km^2, which lies beyond the predictive power of the ICM (CWP 2003). An overall summary of the ICM research is provided in Table 1, and more specific results for individual indicators in freshwater and tidal ecosystems are provided in Tables 2 and 3.

The following general findings were drawn from the ICM research review, with the caveat that they may not fully apply to every ecoregion or watershed condition. Nearly 69% (this number was not tested for statistical significance due to the limited number of studies in the database) of studies confirm or reinforce the ICM, which suggests it is a robust indicator of stream quality when applied properly. On the other hand, IC does not appear to be the best metric to predict stream quality indicators below 10% subwatershed IC. Other metrics, such as subwatershed forest cover, riparian forest cover, road density, or crop cover may be more useful in explaining the variability within sensitive subwatersheds.

The average IC at which stream degradation was first detected was about 7% (range of 2–15%), depending on the indicator and ecoregion. There appears to be some evidence that lower IC thresholds are associated with extensive predevelopment forest or natural vegetative cover present in the subwatershed (Ourso and Frenzel 2003). By contrast, higher initial thresholds appear to be associated with extensive prior cultivation or range management in a subwatershed or region (Cuffney et al. 2005). Researchers who evaluated a second threshold concluded that many stream indicators consistently shifted to a poor condition at about 20 to 25% subwatershed IC. Each study was reviewed to identify the maximum subwatershed IC that was sampled. However, many of the studies focused on suburban or urbanizing subwatersheds, and did not sample the full range of possible IC within the study area.

Table 2. Distribution of Database Entries with regard to Freshwater Streams

Indicator	Total	Confirming	Reinforcing	Inconclusive	Contradicting
Hydrology[a]	4	0	0	1 (Poff et al. 2006)	3 (Coles et al. 2004; Fitzpatrick et al. 2005; Sprague et al. 2006)
Geomorphology	3	2 (Cianfrani et al. 2006; Coleman et al. 2005)	0	1 (Short et al. 2005)	0
Habitat	6	2 (Ourso et al. 2003; Schiff and Benoit 2007)	1 (Snyder et al. 2003)	0	3 (Coles et al. 2004; Fitzpatrick et al. 2005; Sprague et al. 2006)
Water quality[b]	6	3 (Ourso et al. 2003; Schiff and Benoit 2007; Schoonover and Lockaby 2006)	0	2 (Coles et al. 2004; Sprague et al. 2007)	1 (Sprague et al. 2006)
Benthic macros	10	4 (Alberti et al. 2006; Ourso et al. 2003; Schiff and Benoit 2007; Walsh 2004)	5 (Coles et al. 2004; Cuffney et al.2005; Kratzer et al. 2006; Walsh et al.2001; Moore and Palmer 2005)	0	1 (Sprague et al. 2006)
Fish	9	0	7 (Fitzpatrick et al. 2005; Meador et al.2005; Miltner et al. 2004; Moore and Plamer 2005; Roy et al.2006a,b; Snyder et al. 2003)	1 (Coles et al. 2004)	1 (Sprague et al. 2006)
Composite[c]	1	1 (Goetz et al. 2003)	0	0	0
Other[d]	5	1 (Ourso and Frenzel 2003)	1 (Riley et al. 2005)	2 (Coles et al. 2004; Potapova et al. 2005)	1 (Sprague et al. 2006)

Note: $n=44$.

[a]Primarily baseflow.

[b]Primarily water quality parameters sampled during dry weather; no studies evaluated storm-flow quality.

[c]Combined index measuring habitat, benthic macroinvertebrates, and fish.

[d]Other includes sediment quality, algae, and amphibian abundance.

Table 3. Distribution of Database Entries with regard to Small Estuaries

Indicator	Total	Confirming	Reinforcing	Inconclusive	Contradicting
Water quality[a]	4	1 (Holland et al. 2004)	2 (Deacon et al. 2005; Xian et al. 2007)	1 (King et al. 2005)	0
Sediment quality	3	1 (Holland et al. 2004)	1 (Paul et al. 2002)	1 (Comeleo et al. 1996)	0
Benthic macros	5	1 (Holland et al. 2004)	4 (Bilkovic et al. 2006; Deacon et al. 2005; Hale et al. 2004; King et al. 2005)	0	0
Fish	3	1 (Holland et al. 2004)	2 (Hale et al. 2004; King et al. 2004)	0	0
Other[b]	2	2 (Holland et al. 2004)[c]	0	0	0

Note: $n=17$.

[a]Ambient water quality usually measured in dry weather.

[b]Other includes hydrology and shrimp.

[c]Both confirming entries were for the reference Holland et al. (2004); one was for hydrology and the other for shrimp.

Further testing is required to identify the IC% at which natural stream channels disappear from the urban landscape and are replaced by pipes, channels, and other forms of storm-water infrastructure.

Three papers accounted for the majority of contradicting entries (Sprague et al. 2006; Fitzpatrick et al. 2005; Coles et al. 2004). It should be noted that each study had a mean subwatershed drainage area ranging from 75 to 100 km^2. In each case, the authors also cited a "legacy effect," including historical stream corridor disturbance and current water regulation in the front range watersheds; dams, impoundments, and wetland complexes in the New Hampshire seacoast region; and watershed and soil effects of glaciation on midwest watersheds.

Few studies examined hydrological indicators, and the results were generally contradicting or ambiguous (Table 2). In particular, the inverse relationship between subwatershed IC and stream baseflow was not found to be universal, as nontarget irrigation and leakage from existing water infrastructure appeared to increase baseflow in many urban watersheds, regardless of IC. None of the studies reviewed directly measured the relationship between IC and increased storm-water runoff, although a recent review by Shuster et al. (2005) provides numerous case studies where this relationship was very strong. Researchers that have relied on existing USGS hydrologic gages are often hindered by the generally large subwatershed areas they serve [mean 90 km^2—Poff et al. (2006)].

In general, researchers found the ICM to be an initial but not final predictor of individual stream geomorphology variables, when drainage area and stream slope were properly controlled for [Table 2 and Cianfrani et al. (2006)]. IC was frequently found to be related to aggregate measures of stream habitat, although instream and riparian habitat components may behave differently within the same stream reach. Most habitat metrics were initially sensitive to IC in the 5 to 20% range but exhibited a nonlinear habitat response thereafter (which suggests that habitat metrics may not be well calibrated for highly urban streams).

Researchers also reported inconsistent relationships between IC and dry weather water quality. While differences between urban and nonurban sites were frequently noted, there was seldom a linear trend with increasing subwatershed IC. The relationship between IC and storm-water quality would be expected to be strong, but no researchers in this review had simultaneously sampled a large population of storms and subwatersheds. A national review of nearly 8,000 urban storm events compiled by Pitt et al. (2004) indicates event mean concentrations of 20 storm-water pollutants statistically were more closely related to urban land use and regional and first flush effects than impervious cover per se. One study of various pollutants in the Tampa Bay watershed found that the load of storm-water pollutants delivered, however, is still strongly dominated by subwatershed IC (Xian et al. 2007).

Benthic macroinvertebrates appeared to conform to the ICM more than any other stream indicator (Table 2). More than 90% of the studies directly supported or generally reinforced the ICM. Researchers generally found a strong negative relationship between fish IBI scores and subwatershed IC, but there were also confounding effects due to differences in stream slope, type, or subwatershed size (Walters et al. 2003; Wang et al. 2003) or the degree of prior headwater stream alteration (Morgan and Cushman 2005).

Several researchers have recently examined whether the ICM applies to tidal coves and small estuaries (see Table 3). Holland et al. (2004) indicate that adverse changes in physical, sediment, and water quality variables can be detected at 10 to 20% subwatershed IC, with stronger biological responses observed between 20 and 30% IC. The primary physical changes involve greater salinity fluctuations, sedimentation, and sediment contamination. The biological response includes declines in benthic macroinvertebrates, shrimp, and finfish diversity. Although none of the studies in the database examined algal blooms as an indicator in tidal coves and small estuaries, a study by Mallin et al. (2004) found that algal blooms and anoxia resulting from nutrient enrichment by storm-water runoff also are routinely noted at about 10 to 20% subwatershed IC.

Approximately 25% of the papers reviewed explored the effect of riparian conditions on the ICM. The studies that evaluated this relationship showed a consistent riparian effect, generally manifested as (1) a decline in the quality and extent of cover in the riparian network as subwatershed IC increases; (2) little or no statistical difference in the proportion of forest cover found in the

riparian zone and the subwatershed as a whole; and (3) generally higher habitat and biological scores for streams with extensive riparian cover or palustrine wetland complexes. Riparian forest cover appears to be an important factor in maintaining stream geomorphology and various indexes of biotic integrity. As a group, the studies suggest that stream indicator values increase when riparian forest cover is retained over at least 50 to 75% of the length of the upstream network (Moore and Palmer 2005; Goetz et al. 2003; Wang et al. 2003).

The beneficial impact of riparian forest cover appears to diminish as subwatershed IC increases (Roy et al. 2005, 2006a; Walsh et al. 2007; Goetz et al. 2003). At a certain point [15% urban land as identified by Roy et al. (2006a) or 10% IC as identified by Goetz et al. (2003)], the degradation caused by upland storm-water runoff shortcutting the buffer overwhelms the more localized benefits of riparian canopy cover. A study by McBride and Booth (2005) was not included in the database, but found that downstream improvements in some stream quality indicators may still be observed when an unforested stream segment flows into a long segment of extensive riparian forest or wetland cover.

The issue as to whether watershed treatment (i.e., storm-water treatment practices, buffers, land conservation) can prevent the stream impacts forecasted by the ICM is largely unresolved. The recent literature is largely silent on this topic, with the exception of the riparian buffer research noted earlier. It is worth noting that most regions where the ICM has been tested have had some degree of storm water, buffer, or land development regulations in place for several decades (e.g., MD, VA, NC, WA, GA), although the extent or effectiveness of watershed treatment has seldom been measured and is often incomplete.

Discussion: Reformulated ICM

While this review has found that 69% of peer-reviewed papers generally support or reinforce the original ICM, it has also revealed ways the ICM can be strengthened to reflect the most recent science and simplify it for watershed managers and policy makers. A reformulated version of the ICM is presented in Fig. 2. Fig. 2 is a conceptual model that illustrates the relationship between watershed impervious cover and the stream hydrologic, physical, chemical, and biological responses to this disturbance. The model is intended to predict the average behavior of this group of indicator responses over a range of IC, rather than predicting the precise score of an individual indicator. Based on the response, streams fall into the sensitive, impacted, nonsupporting, or urban drainage management categories, whose boundaries represent a compilation of different approaches to interpret stream condition (e.g., research studies that evaluate the same stream quality indicator may have similar quantitative outcomes that represent different qualitative conditions depending on the approach used).

The reformulated ICM includes three important changes to the original conceptual model proposed by Schueler (1994). First, the IC/stream quality relationship is no longer expressed as a straight line, but rather as a "cone" that is widest at lower levels of IC and progressively narrows at higher IC. The cone represents the observed variability in the response of stream indicators to urban disturbance and also the typical range in expected improvement that could be attributed to subwatershed treatment. In addition, the use of a cone rather than a line is consistent with the findings that exact, sharply defined IC thresholds are rare, and that most

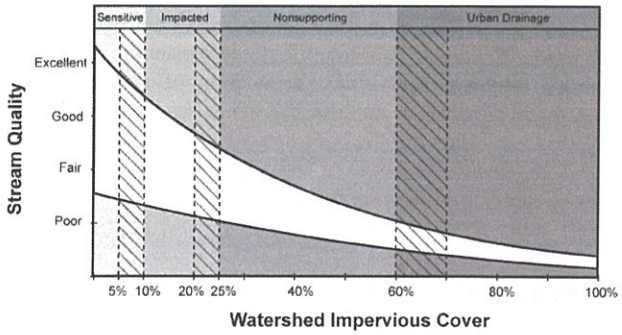

Fig. 2. Reformulated impervious cover model

regions show a generally continuous but variable gradient of stream degradation as IC increases.

Second, the cone width is greatest for IC values less than 10%, which reflects the wide variability in stream indicator scores observed for this range of streams. This modification prevents the misperception that streams with low subwatershed IC will automatically possess good or excellent quality. As noted earlier, the expected quality of streams in this range of IC is generally influenced more by other watershed metrics such as forest cover, road density, riparian continuity, and cropping practices. This modification suggests that IC should not be the sole metric used to predict stream quality when subwatershed IC is very low.

Third, the reformulated ICM now expresses the transition between stream quality classifications as a band rather than a fixed line (e.g., 5 to 10% IC for the transition from sensitive to impacted, 20 to 25% IC for the transition from impacted to nonsupporting, and 60 to 70% IC for the transition from nonsupporting to urban drainage). The band reflects the variability in the relationship between stream hydrologic, physical, chemical, and biological responses and the qualitative endpoints that determine stream quality classifications. It also suggests a watershed manager's choice for a specific threshold value to discriminate among stream categories should be based on actual monitoring data for their ecoregion, the stream indicators of greatest concern and the predominant predevelopment regional land cover (e.g., crops or forest).

The ICM is similar to other models that describe ecological response to stressors from urbanization in that the stream quality classifications are value judgments relative to some endpoint defined by society (e.g., water quality criteria). The ICM differs from most other models in that it provides a broader focus on a group of stream responses, yet focuses on only one stressor, impervious cover. The focus on IC allows watershed managers to use the ICM both to predict stream response and to manage future impacts by measuring and managing IC.

This review also has identified several important caveats to keep in mind to properly apply and interpret the ICM in a watershed context. The first caveat is that watershed scale matters, and that use of the ICM should generally be restricted to first to third order alluvial streams. The second caveat is that the ICM may not work well in subwatersheds with major point sources of pollutant discharge, or extensive impoundments or dams located within the stream network. The third caveat is that the ICM is best applied to subwatersheds located within the same physiographic region. In particular, stream slope, as measured from the top to the bottom of the subwatershed, should be in the same general range for all subwatersheds (Morgan and Cushman 2005; Snyder et al. 2003; Fitzpatrick et al. 2005). The last caveat is that the ICM is unreli-

able when subwatershed management practices are poor, particularly when IC levels are low (e.g., deforestation, acid mine drainage, intensive row crops, denudation of riparian cover). When these caveats are applied, the available science generally reinforces the validity of the ICM as a watershed planning tool to forecast the general response of freshwater and tidal streams as a result of future land development.

Conclusions

The reformulated ICM organizes and simplifies a great deal of complex stream science into a model that can be readily understood by watershed planners, storm-water engineers, water quality regulators, economists, and policy makers. More information is needed to extend the ICM as a method to classify and manage small urban watersheds and organize the optimum combination of best management practices to protect or restore streams within each subwatershed classification.

The challenge for scientists and watershed managers is no longer proving the hypothesis that increasing levels of land development will degrade stream quality along a reasonably predictable gradient—the majority of studies now support the ICM. Rather, researchers may shift to testing a hypothesis that widespread application of multiple management practices at the catchment level can improve the urban stream degradation gradient that has been repeatedly observed. The urgency for testing the catchment effect of implementing best management practices is underscored by the rapid and inexorable growth in IC across the country.

Appendix

The following references, Alberti et al. (2006), Bilkovic et al. (2006), Cianfrani et al. (2006), Coleman et al. (2005), Coles et al. (2004), Comelo et al. (1996), Cuffney et al. (2005), Deacon et al. (2005), Fitzpatrick et al. (2005), Goetz et al. (2003), Hale et al. (2004), Holland et al. (2004), King et al. (2004, 2005), Kratzer et al. (2006), Meador et al. (2005), Miltner et al. (2004), Moore and Palmer (2005), Morgan and Cushman (2005), Ourso and Frenzel (2003), Paul et al. (2002), Poff et al. (2006), Potapova et al. (2005), Riley et al. (2005), Roy et al. (2006a,b), Schiff and Benoit (2007), Schoonover et al. (2006), Short et al. (2005), Snyder et al. (2003), Sprague et al. (2006, 2007), Walsh (2004), Walsh et al. (2001), and Xian et al. (2007), denote research papers that were included in the ICM database. A list of additional papers that were reviewed, but did not meet the criteria for inclusion in the ICM database, is available upon request from the Center for Watershed Protection.

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Article 1

Feature article from Watershed Protection Techniques. 1(3): 100-111

The Importance of Imperviousness

The emerging field of urban watershed protection often lacks a unifying theme to guide the efforts of its many participants—planners, engineers, landscape architects, scientists, and local officials. The lack of a common theme has often made it difficult to achieve a consistent result at either the individual development site or cumulatively, at the watershed scale.

In this article a unifying theme is proposed based on a physically defined unit: imperviousness. Imperviousness here is defined as the sum of roads, parking lots, sidewalks, rooftops, and other impermeable surfaces of the urban landscape. This variable can be easily measured at all scales of development, as the percentage of area that is not "green."

Imperviousness is a very useful indicator with which to measure the impacts of land development on aquatic systems. Reviewed here is the scientific evidence that relates imperviousness to specific changes in the hydrology, habitat structure, water quality and biodiversity of aquatic systems. This research, conducted in many geographic areas, concentrating on many different variables, and employing widely different methods, has yielded a surprisingly similar conclusion: stream degradation occurs at relatively low levels of imperviousness (~10%). Most importantly, imperviousness is one of the few variables that can be explicitly quantified, managed and controlled at each stage of land development. The remainder of this article details the relationship between imperviousness and stream quality.

The Components of Imperviousness

Imperviousness represents the imprint of land development on the landscape. It is composed of two primary components: the *rooftops* under which we live, work and shop, and the *transport* system (roads, driveways, and parking lots) that we use to get from one roof to another. As it happens, the transport component now often exceeds the rooftop component in terms of total impervious area created. For example, transport-related imperviousness comprised 63 to 70% of total impervious cover at the site in 11 residential, multifamily and commercial areas where it had actually been measured (City of Olympia, 1994b). This phenomenon is observed most often in suburban areas and reflects the recent ascendancy of the automobile in both our culture and landscape. The sharp increases in per capita vehicle ownership, trips taken, and miles travelled have forced local planners to increase the relative size of the transport component of imperviousness over the last two decades.

Traditional zoning has strongly emphasized and regulated the first component (rooftops) and largely neglected the transport component. While the rooftop component is largely fixed in zoning, the transport component is not. As an example, nearly all zoning codes set the maximum density for an area, based on dwelling units or rooftops. Thus, in a given area, no more than one single family home can be located on each acre of land, and so forth.

Thus, a wide range in impervious cover is often seen for the same zoning category. For example, impervious area associated with medium density single family homes can range from 20% to nearly 50%, depending on the layout of streets and parking. This suggests that significant opportunities exist to reduce the share of imperviousness from the transport component.

Imperviousness and Runoff

The relationship between imperviousness and runoff may be widely understood, but it is not always fully appreciated. Figure 1 illustrates the increase in the site runoff coefficient as a result of site impervious cover, developed from over 40 runoff monitoring sites across the nation. The runoff coefficient ranges from zero to one and expresses the fraction of rainfall volume that is actually converted into storm runoff volume. As can be seen, the runoff coefficient closely tracks percent impervious cover, except at low levels where soils and slope factors become more important. In practical terms, this means that the total runoff volume for a one-acre parking lot (Rv = 0.95) is about 16 times that produced by an undeveloped meadow (Rv = 0.06).

To put this in more understandable terms, consider the runoff from a one-inch rainstorm (see Table 1). The total runoff from a one-acre meadow would fill a standard size office to a depth of about two feet (218 cubic feet). By way of comparison, if that same acre was completely paved, a one-inch rainstorm would completely fill your office, as well as the *two* next to it. The peak discharge, velocity and time of concentration of stormwater runoff also exhibit a striking increase after a meadow is replaced by a parking lot (Table 1).

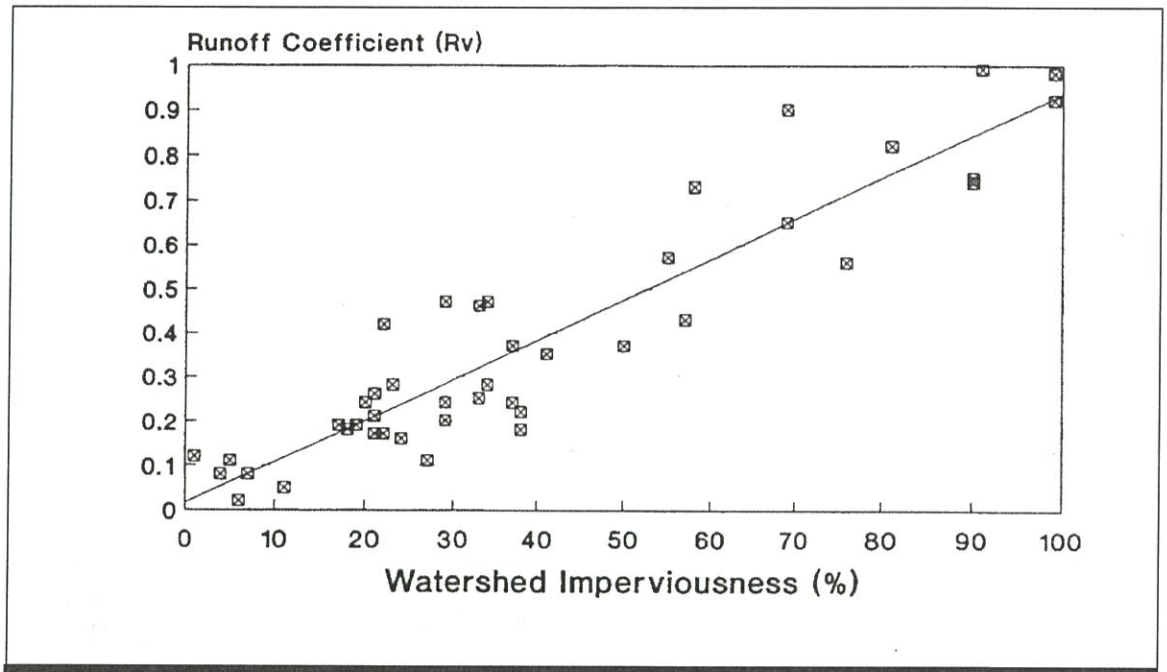


Figure 1: Watershed Imperviousness and the Storm Runoff Coefficient

Because infiltration is reduced in impervious areas, one would expect groundwater recharge to be proportionately reduced. This, in turn, should translate into lower dry weather stream flows. Actual data, however, that demonstrate this effect is rare. Indeed, Evett *et al.* (1994) could not find any statistical difference in low stream flow between urban and rural watersheds after analyzing 16 North Carolina watersheds. Simmons and Reynolds (1982) did note that dry weather flows dropped 20 to 85% after development in several urban watersheds in Long Island, New York.

It should be noted that transport-related imperviousness often exerts a greater hydrological impact than the rooftop-related imperviousness. In residential areas, runoff from rooftops can be spread out over pervious areas, such as backyards, and rooftops are not always directly connected to the storm drain system. This may allow for additional infiltration of runoff. Roads and parking lots, on the other hand, are usually directly connected to the storm drain system.

Table 1: Comparison of One Acre of Parking Lot Versus One Acre of Meadow in Good Condition

Runoff or Water Quality Parameter	Parking Lot	Meadow
Curve number (CN)	98	58
Runoff coefficient	0.95	0.06
Time of concentration (minutes)	4.8	14.4
Peak discharge rate (cfs), 2 yr., 24 hr. storm	4.3	0.4
Peak discharge rate (cfs), 100 yr. storm	12.6	3.1
Runoff volume from one-inch storm (cubic feet)	3450	218
Runoff velocity @ 2 yr. storm (feet/second)	8	1.8
Annual phosphorus load (lbs/ac./yr.).	2	0.50
Annual nitrogen load (lbs/ac./yr.).	15.4	2.0
Annual zinc load (lbs/ac./yr.)	0.30	ND

Key Assumptions:
Parking lot is 100% impervious with 3% slope, 200 feet flow length, Type 2 Storm, 2 yr. 24 hr. storm = 3.1 inches, 100 yr. storm = 8.9 inches, hydraulic radius = 0.3, concrete channel, and suburban Washington 'C' values.
Meadow is 1% impervious with 3% slope, 200 foot flow length, good vegetative condition, B soils, and earthen channel.

Imperviousness and the Shape of Streams

Confronted by more severe and more frequent floods, stream channels must respond. They typically do so by increasing their cross-sectional area to accommodate the higher flows. This is done either through widening of the stream banks, downcutting of the stream bed, or frequently, both. This phase of channel instability, in turn, triggers a cycle of streambank erosion and habitat degradation.

The critical question is at what level of development does this cycle begin? Recent research models developed in the Pacific Northwest suggest that a threshold for urban stream stability exists at about 10% imperviousness (Booth, 1991; Booth and Reinelt, 1993) (Figure 2). Watershed development beyond this threshold consistently resulted in unstable and eroding channels. The rate and severity of channel instability appears to be a function of sub-bankfull floods, whose frequency can increase by a factor of 10 even at relatively low levels of imperviousness (Hollis, 1975; Macrae and Marsalek, 1992; Schueler, 1987).

A major expression of channel instability is the loss of instream habitat structures, such as the loss of pool and riffle sequences and overhead cover, a reduction in the wetted perimeter of the stream and the like. A number of methods have been developed to measure the structure and quality of instream habitat in recent years (Galli, 1993; Gibson *et al.*, 1993; Plafkin *et al.*, 1989). Where these tools have been applied to urban streams, they have consistently demonstrated that a sharp threshold in habitat quality exists at approximately 10 to 15% imperviousness (Booth and Reinelt, 1993; Galli, 1994; Shaver *et al.*, 1995). Beyond this threshold, urban stream habitat quality is consistently classified as poor.

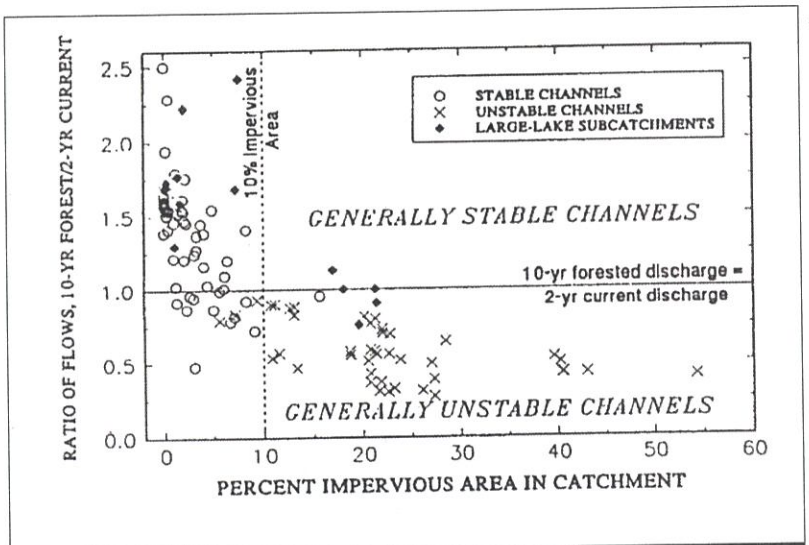


Figure 2: Channel Stability as a Function of Imperviousness (Booth and Reinelt, 1993)

Imperviousness and Water Quality

Impervious surfaces collect and accumulate pollutants deposited from the atmosphere, leaked from vehicles or derived from other sources. During storms, accumulated pollutants are quickly washed off and rapidly delivered to aquatic systems.

Monitoring and modeling studies have consistently indicated that urban pollutant loads are directly related to watershed imperviousness. Indeed, imperviousness is the key predictive variable in most simulation and empirical models used to estimate pollutant loads. For example, the Simple Method assumes that pollutant loads are a direct function of watershed imperviousness (Schueler, 1987), as imperviousness is the key independent variable in the equation.

Threshold Limits for Maintaining Background Pollutant Loads

Suppose that watershed runoff drains into a lake that is phosphorus-limited. Also assume that the present background load of phosphorus from a rural land use amounts to 0.5 lbs/ac/yr. The Simple Method predicts that the post-development phosphorus load will exceed background loads once watershed imperviousness exceeds 20 to 25% (Figure 3), thereby increasing the risk of nutrient over-enrichment in the lake.

Urban phosphorus loads can be reduced when urban stormwater treatment practices are installed, such as stormwater ponds, wetlands, filters or infiltration practices. Performance monitoring data indicates that stormwater practices can reduce phosphorus loads by as much as 40 to 60%, depending on the practice selected. The impact of this pollutant reduction on the post-development phosphorus loading rate from the site is shown in Figure 3. The net effect is to raise the phosphorus threshold to about 35 to 60% imperviousness, depending on the performance of the stormwater practice installed. Therefore, even when effective practices are widely applied, a threshold of imperviousness is eventually crossed, beyond which predevelopment water quality cannot be maintained.

Imperviousness and Stream Warming

Impervious surfaces both absorb and reflect heat. During the summer months, impervious areas can have local air and ground temperatures that are 10 to 12 degrees warmer than the fields and forests that they replace. In addition, the trees that could have provided shade to offset the effects of solar radiation are absent.

Water temperature in headwater streams is strongly influenced by local air temperatures. Galli (1991) reported that stream temperatures throughout the summer are increased in urban watersheds, and the degree of warming appears to be directly related to the impervious cover of the contributing watershed. He monitored five headwater streams in the Maryland Piedmont over a six-month period, each of which had different levels of impervious cover (Figure 4). Each of the urban streams had mean temperatures that were consistently warmer than a forested reference stream, and the size of the increase (referred to as the delta-T) was a direct function of watershed imperviousness. Other factors, such as lack of riparian cover and ponds, were also demonstrated to amplify stream warming, but the primary contributing factor appeared to be watershed impervious cover (Galli, 1991).

Imperviousness and Stream Biodiversity

The health of the aquatic ecosystem is a strong environmental indicator of watershed quality. A number of research studies have recently examined the links between imperviousness and the biological diversity in streams. Some of the key findings are summarized in Table 2.

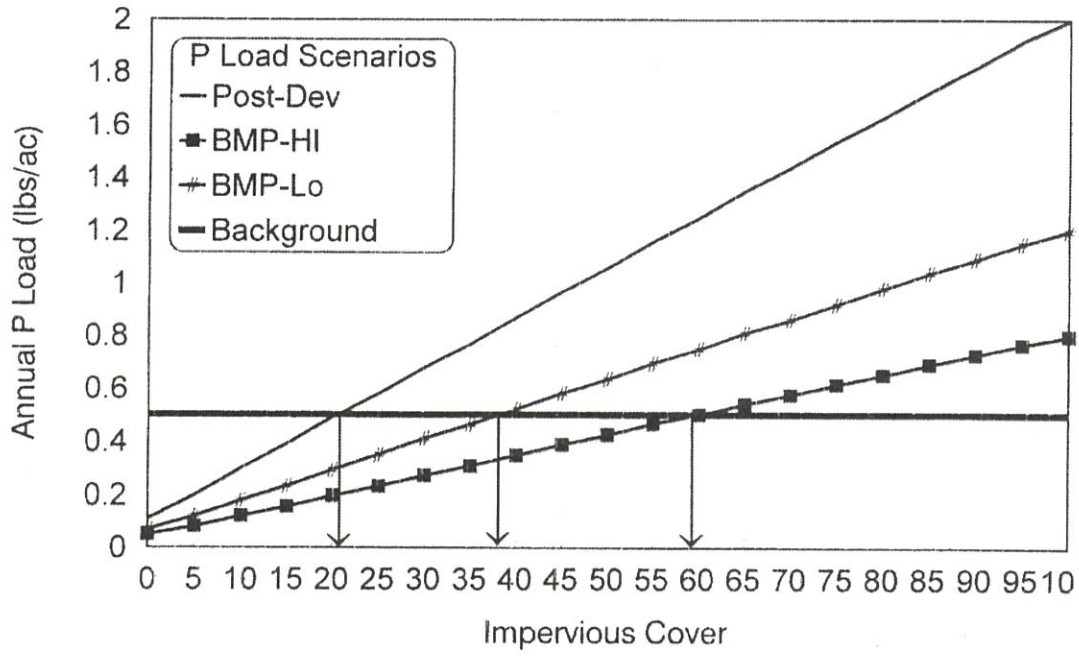
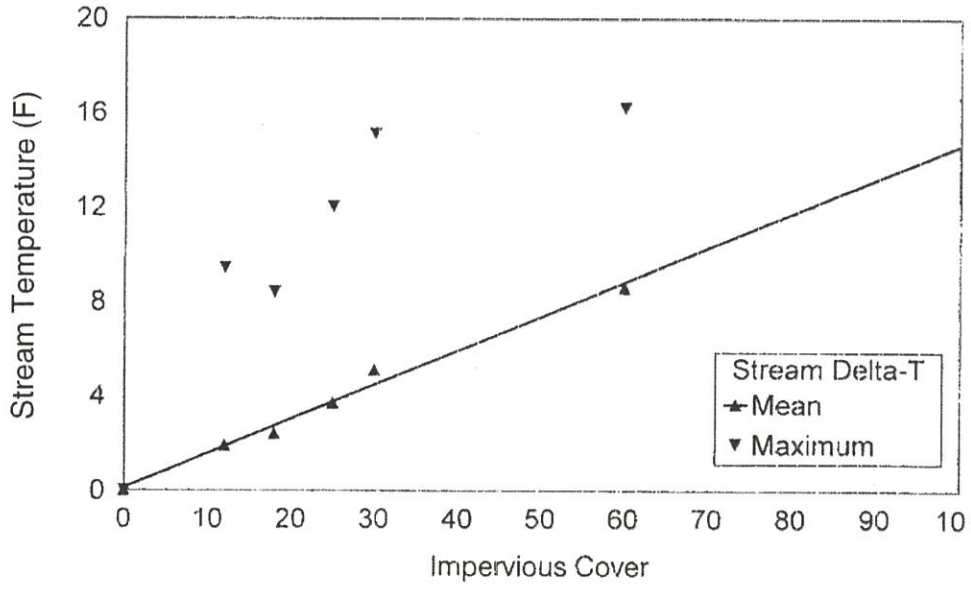
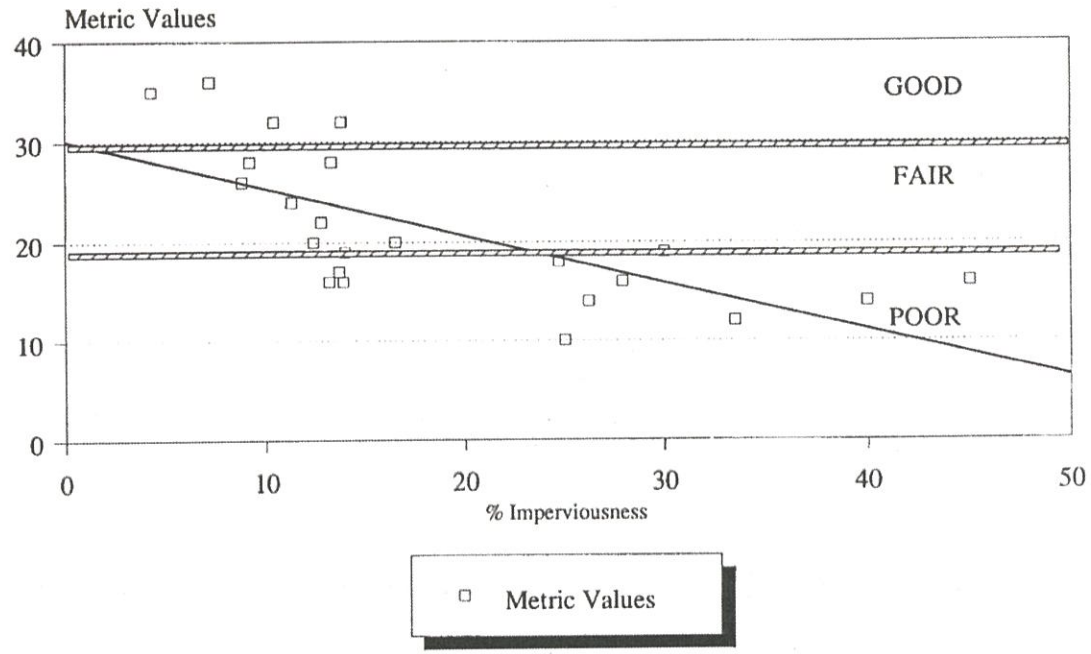


Figure 3: The Effect of Impervious Cover on Urban Phosphorus Load Under Several Scenarios, as Computed by the Simple Method



Delta-t is the difference in mean or max stream temperature from a developed stream, compared to an undisturbed stream.

Figure 4: The Effect of Impervious Cover on Stream Temperature (Galli, 1991)



Metric Values are based upon the sum of scores assigned for the following categories: EPTC balance, EPT Index, Average Generic Diversity, Chironomid Abundance, Taxonomic Richness (Family and Generic)

Figure 5: Impacts of Imperviousness on Macroinvertebrate Communities in the Headwater Streams of the Anacostia River (Schueler and Galli, 1992)

Aquatic Insects

The diversity, richness and composition of the aquatic insect community has frequently been used to evaluate the quality of urban streams. Not only are aquatic insects a useful environmental indicator, but they also form the base of the stream food chain in most regions of the country.

Klein (1979) was one of the first to note that macroinvertebrate diversity drops sharply in urban streams in Maryland. Diversity consistently became poor when watershed imperviousness exceeded 10 to 15%. The same basic threshold has been reported by all other research studies that have looked at macroinvertebrate diversity in urban streams (Table 2).

In each study, sensitive macroinvertebrates were replaced by ones that were more tolerant of pollution and hydrologic stress. Species such as stoneflies, mayflies, and caddisflies largely disappeared and were replaced by chironomids, tubificid worms, amphipods, and snails. Species that employ specialized feeding strategies—shredding leaf litter, grazing rock surfaces, filtering organic matter that flows by, or preying on other insects—were lost.

A typical example of the relationship between imperviousness and macroinvertebrate diversity is shown in Figure 5. The graph summarizes diversity trends for 23 sampling stations in headwater streams of the Anacostia watershed (Schueler and Galli, 1992). While good to fair diversity was noted in all headwater streams with less than 10% impervious cover, nearly all stations with 12% or more impervious cover recorded poor diversity. The same sharp drop in macroinvertebrate diversity at around 12 to 15% impervious cover was also observed in streams in the coastal plain and piedmont of Delaware (Shaver *et al.*, 1995).

Other studies have utilized other indicators to measure the impacts of urbanization on stream insect communities. For example, Jones and Clark (1987) monitored 22 stations in Northern Virginia and concluded that aquatic insect diversity composition changed markedly after watershed population density exceeded four or more individuals per acre. This population density roughly translates to half-acre or one acre lot residential use, or perhaps 10 to 15% imperviousness.

Steedman (1988) evaluated 208 Ontario stream sites, and concluded that aquatic insect diversity shifted from fair to poor at about 35% urban land use. Since "urban land" includes both pervious and impervious cover, the actual threshold in the Ontario study may well be closer to seven to 10% imperviousness (Booth and Reinelt, 1993). Steedman also reported that urban streams with intact riparian forests had higher diversity than those that did not, for the same level of urbanization.

While the exact point at which stream insect diversity shifts from fair to poor is not known with absolute precision, it is clear that few, if any, urban streams can

Table 2: Review of Key Findings of Urban Stream Studies Examining the Relationship of Urbanization to Stream Quality

Ref.	Year	Location	Biological Parameter	Key Finding
Booth	1991	Seattle	Fish habitat/ channel stability	Channel stability and fish habitat quality declined rapidly after 10% imperv.
Galli	1994	Maryland	Brown trout	Abundance and recruitment of brown trout declines sharply at 10-15% imperv.
Benke *et al.*	1981	Atlanta	Aquatic insects	Negative relationship between number of insect species and urbanization in 21 streams
Jones and Clark	1987	Northern Virginia	Aquatic insects	Urban streams had sharply lower diversity of aquatic insects when human population density exceeded 4 persons/acre. (estimated 15-25% imperv. cover)
Limburg and Schimdt	1990	New York	Fish spawning	Resident and anadromous fish eggs and larvae declined sharply in 16 tributary streams greater than 10% imperv.
Shaver *et al.*	1994	Delaware	Aquatic insects	Insect diversity at 19 stream sites dropped sharply at 8 to 15% imperv.
Shaver *et al.*	1994	Delaware	Habitat quality	Strong relationship between insect diversity and habitat quality; majority of 53 urban streams had poor habitat
Schueler and Galli	1992	Maryland	Fish	Fish diversity declined sharply with increasing imperv., loss in diversity began at 10-12% imperv.
Schueler and Galli	1992	Maryland	Aquatic insects	Insect diversity metrics in 24 subwatersheds shifted from good to poor over 15% imperv.
Black and Veatch	1994	Maryland	Fish/insects	Fish, insect and habitat scores were all ranked as poor in 5 subwatersheds that were greater than 30% imperv.
Klein	1979	Maryland	Aquatic insects/fish	Macroinvertebrate and fish diversity declines rapidly after 10% imperv.
Luchetti and Fuersteburg	1993	Seattle	Fish	Marked shift from less tolerant coho salmon to more tolerant cutthroat trout populations noted at 10-15% imperv. at 9 sites
Steedman	1988	Ontario	Aquatic insects	Strong negative relationship between biotic integrity and increasing urban land use/ riparian condition at 209 stream sites. Degradation begins at about 10% imperv.
Pedersen and Perkins	1986	Seattle	Aquatic insects	Macroinvertebrate community shifted to chironomid, oligochaetes and amphipod species tolerant of unstable conditions.
Steward	1983	Seattle	Salmon	Marked reduction in coho salmon populations noted at 10-15% imperv. at 9 sites
Taylor	1993	Seattle	Wetland plants/ amphibians	Mean annual water fluctuation was inversely correlated to plant and amphibian density in urban wetlands. Sharp declines noted over 10% imperv.
Garie and McIntosh	1986	NewJersey	Aquatic insects	Drop in insect taxa from 13 to 4 noted in urban streams
Yoder	1991	Ohio	Aquatic insects/ fish	100% of 40 urban sites sampled had fair to very poor index of biotic integrity scores

support diverse aquatic insect communities at moderate to high levels of impervious cover (25% or more). Four different studies (Benke *et al.*, 1981; Black and Veatch, 1994; Booth, 1991; Garie and McIntosh, 1986) all failed to find aquatic insect communities with good or excellent diversity in these highly urban streams.

Fish Surveys

The abundance and diversity of the fish community can also serve as an excellent environmental indicator. Surprisingly, relatively few studies have examined the influence of imperviousness on fish communities in headwater streams. The results of one study are illustrated in Figure 6. Four similar subwatersheds in the Maryland Piedmont were sampled for the number of fish species present. As the level of watershed imperviousness increased, the number of fish species collected dropped. Two sensitive species (trout and sculpin) were lost as imperviousness increased from 10 to 12%, and four more were lost when impervious cover increased to 25%. Significantly, only two species remained in the fish community at 55% imperviousness. Sensitive species, defined as those with a strong dependence on the substrate for feeding and/or spawning, showed a more precipitous decline. Klein (1979) found a similar relationship between fish diversity and watershed impervious cover in several dozen headwater streams in the Maryland Piedmont.

Salmonid fish species (trout and salmon) and anadromous fish species appear to be most negatively impacted by impervious cover. Trout have stringent temperature and habitat requirements, and seldom are present in mid-Atlantic watersheds where imperviousness exceeds 15% (Galli, 1994). Declines in trout spawning success are evident above 10% imperviousness (Galli, 1994). In the Pacific Northwest, Luchetti and Feurstenburg (1993) seldom found sensitive coho salmon in watersheds beyond 10 or 15% imperviousness. Booth and Reinelt (1993) noted that most urban stream reaches had poor quality fish habitat when imperviousness exceeded eight to 12%.

Fish species that migrate from the ocean to spawn in freshwater creeks are also very susceptible to impacts of urbanization such as fish barriers, pollution, flow changes, and other factors. For example, Limburg and Schmidt (1990) discovered that the density of anadromous fish eggs and larvae declined sharply after a 10% imperviousness threshold was surpassed in 16 subwatersheds draining into the Hudson River.

The Influence of Imperviousness on Other Urban Water Resources

Several other studies point to the strong influence of imperviousness on other important aquatic systems such as shellfish beds and wetlands.

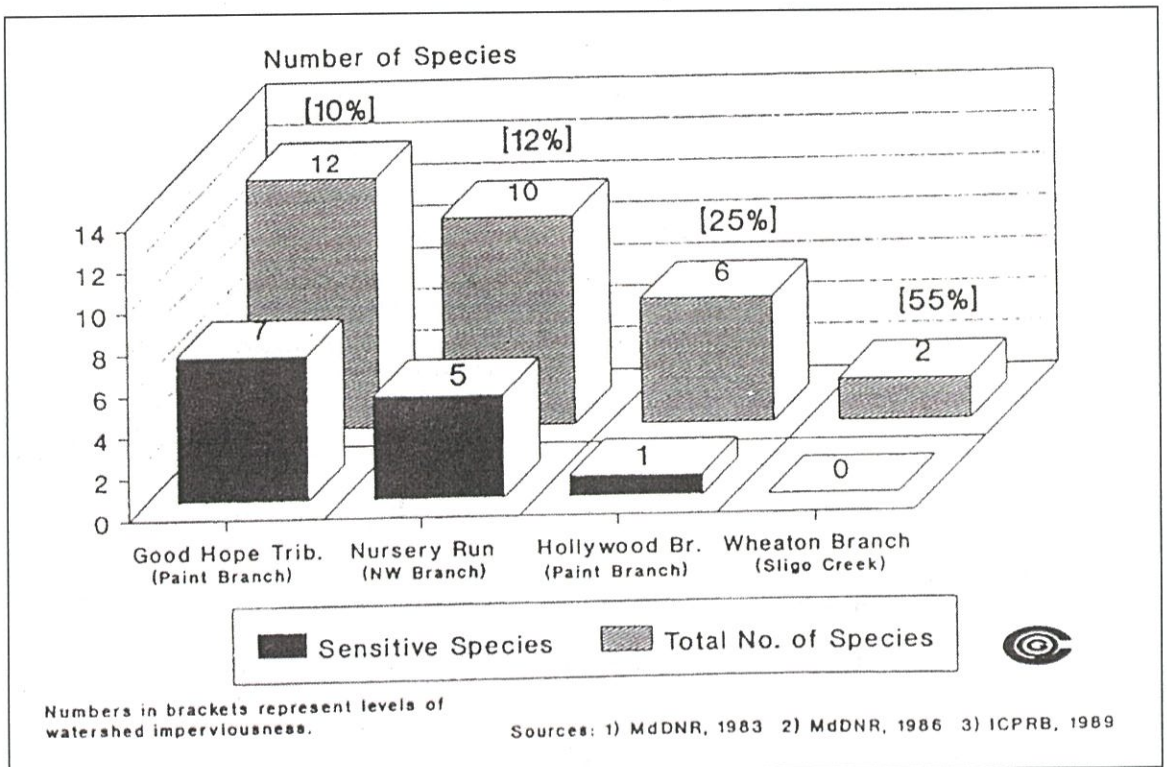


Figure 6: Fish Diversity as a Function of Watershed Imperviousness in Four Subwatersheds in the Maryland Piedmont (Schueler and Galli, 1992)

Even relatively low levels of urban development yield high levels of bacteria, derived from urban runoff or failing septic systems. These consistently high bacterial counts often result in the closure of shellfish beds in coastal waters, and it is not surprising that most closed shellfish beds are in close proximity to urban areas. Indeed, it may be difficult to prevent shellfish closure when more than one septic drain field is present per seven acres—a very low urban density (Duda and Cromartie, 1982). Although it is widely believed that urban runoff accounts for many shellfish bed closures (now that most point sources have been controlled), no systematic attempt has yet been made to relate watershed imperviousness to the extent of shellfish bed closures.

Taylor (1993) examined the effect of watershed development on 19 freshwater wetlands in King County, Washington, and concluded that the additional stormwater contributed to greater annual water level fluctuations (WLF). When the annual WLF exceeded about eight inches, the richness of both the wetland plant and amphibian community dropped sharply. This increase in WLF began to occur consistently when upstream watersheds exceeded 10 to 15% imperviousness.

Implications at the Watershed Level

The many independent lines of research reviewed here converge toward a common conclusion: that it is extremely difficult to maintain predevelopment stream quality when watershed development exceeds 10 to 15% impervious cover. What implications might this apparent threshold have for watershed planning?

Should Low Density or High Density Development be Encouraged?

At first glance, it would seem appropriate to limit watershed development to no more than 10% total impervious cover. While this approach may be wise for an individual "sensitive" watershed, it is probably not practical as a uniform standard. Only low density development would be feasible under a 10% zoning scenario, perhaps one-acre lot residential zoning, with a few widely scattered commercial clusters. At the regional scale, development would thus be spread over a much wider geographic area than it would otherwise have been. At the same time, additional impervious area (in the form of roads) would be needed to link the community together.

Paradoxically, the best way to minimize the creation of additional impervious area at the regional scale is to concentrate it in high density clusters or centers. The corresponding impervious cover in these clusters is expected to be very high (25% to 100%), making it virtually impossible to maintain predevelopment stream quality. A watershed manager must then confront the fact that to save one stream's quality it may be necessary to degrade another.

A second troubling implication of the impervious cover/stream quality relationship involves the large expanses of urban areas that have already been densely developed. Will it be possible to fully restore stream quality in watersheds with high impervious cover? Some early watershed restoration work does suggests that biological diversity in urban streams can be partially restored, but only after extensive stormwater retrofit and habitat structures are installed. For example, fish and macroinvertebrate diversity has been partially restored in one tributary of Sligo Creek, Maryland (Galli, 1994). In other urban watersheds, however, comprehensive watershed restoration may not be feasible, due to a lack of space, feasible sites, or funding.

A Proposed Scheme for Classifying Urban Stream Quality Potential

The thresholds provide a reasonable foundation for classifying the potential stream quality in a watershed based on the ultimate amount of impervious cover. One such scheme is outlined in Table 3. It divides urban streams into three management categories based on the general relationship between impervious cover and stream quality:

1. Sensitive streams (one to 10% impervious cover)
2. Impacted streams (11 to 25% impervious cover)
3. Non-supporting streams (26 to 100% impervious cover)

The resource objective and management strategies in each stream category differ to reflect the potential stream quality that can be achieved. The most protective category are "sensitive streams" in which strict zoning, site impervious restrictions, stream buffers and stormwater practices are applied to maintain predevelopment stream quality. "Impacted streams" are above the threshold and can be expected to experience some degradation after development (i.e., less stable channels and some loss of diversity). The key resource objective for these streams is to mitigate these impacts to the greatest extent possible, using effective stormwater management practices.

The last category, "non-supporting streams," recognizes that predevelopment channel stability and biodiversity cannot be fully maintained, even when stormwater practices or retrofits are fully applied. The primary resource objective shifts to protect downstream water quality by removing urban pollutants. Efforts to protect or restore biological diversity in degraded streams are not abandoned; in some priority subwatersheds, intensive stream restoration techniques

Table 3: A Possible Scheme for Classifying and Managing for Headwater Urban Streams Based on Ultimate Imperviousness

Urban Stream Classification	Sensitive (0-10% Imperv.)	Impacted (11-25% Imperv.)	Non-supporting (26-100% Imperv.)
Channel stability	Stable	Unstable	Highly Unstable
Water quality	Good	Fair	Fair-Poor
Stream biodiversity	Good-Excellent	Fair-Good	Poor
Resource objective	Protect biodiversity and channel stability	Maintain critical elements of stream quality	Minimize downstream pollutant loads
Water quality objectives	Sediment and temperature	Nutrient and metal loads	Control bacteria
Stormwater Practice Selection Factors	Secondary environmental impacts	Removal efficiency	Removal efficiency
Land Use Controls	Watershed-wide imp. cover limits (ICLs), site ICLs	Site imp. cover limits (ICLs)	Additional infill and redevelopment encouraged
Monitoring and enforcement	GIS monitoring of imp. cover, biomonitoring	Same as "Stressed"	Pollutant load modeling
Development rights	Transferred out	None	Transferred in
Riparian buffers	Widest buffer network	Average bufferwidth	Greenways

are employed to attempt to partially restore some aspects of stream quality. In other subwatersheds, however, new development (and impervious cover) is encouraged to protect other sensitive or impacted streams.

Watershed-Based Zoning

Watershed-based zoning is based on the premise that impervious cover is a superior measure for gauging the impacts of growth, compared to population density, dwelling units or other factors. The key steps in watershed-based zoning are as follows: *First*, a community undertakes a comprehensive physical, chemical and biological monitoring program to asses the current quality of its entire inventory of streams. The data are used to identify the most sensitive stream systems and to refine impervious/stream quality relationships. *Next*, existing impervious cover is measured and mapped at the subwatershed level. Projections of future impervious cover due to forecasted growth are also made at this time.

The *third* step involves designating the future stream quality for each subwatershed based on some adaptation of the urban stream classification scheme presented earlier. The existing land use master plan is then modified to ensure that future growth (and impervious cover) is consistent with the designated stream classification for each subwatershed.

The *final* step in the watershed-based zoning process involves the adoption of specific resource objectives for each stream and subwatershed. Specific policies and practices on impervious cover limits, stormwater practices, and buffers are then instituted to meet the stream resource objective, and these practices directly applied to future development projects.

Watershed-based zoning should provide managers with greater confidence that resource protection objectives can be met in future development. It also forces local governments to make hard choices about which streams will be fully protected and which will become at least partially degraded. Some environmentalists and regulators will be justifiably concerned about the streams whose quality is explicitly sacrificed under this scheme. However, the explicit stream quality decisions which are at the heart of watershed-based zoning are preferable to the uninformed and random "non-decisions" that are made every day under the present zoning system.

A Cautionary Note

While the research on impervious cover and stream quality is compelling, it is doubtful whether it can serve as the sole foundation for legally defensible zoning and regulatory actions at the current time. One key reason is that the research has not been standardized. Different investigators, for example, have used different methods to define and measure imperviousness. Second, researchers have employed a wide number of techniques to measure stream quality characteristics that are not always comparable with each other. Third, most of the studies have been confined to few ecoregions in the

country. Little research has been conducted in the Northeast, Southeast, Midwest, and semi-arid Western regions. Lastly, none of the studies has yet examined the effect of widespread application of stormwater practices on impervious cover/stream quality relationships. Until studies determine how much stormwater practices can "cheat" the impervious cover/stream quality relationship, it can be argued that structural practices alone can compensate for imperviousness effects.

On the positive side, it may be possible for a community to define the impervious cover/stream quality relationship in a short time and at relatively low cost. A suggested protocol for conducting a watershed monitoring study is presented in Table 4. The protocol emphasizes comparative sampling of a large population of urban subwatersheds of different increments of imperviousness (perhaps 20 to 50).

A rapid sampling program collects consistent data on hydrologic, morphologic, water quality, habitat and biodiversity variables within each subwatershed. For comparison purposes, series of undeveloped and undisturbed reference streams are also monitored. The sampling data are then statistically and graphically analyzed to determine the presence of imperviousness/stream quality relationships.

The protocol can be readily adapted to examine how stormwater practices can shift the stream quality/imperviousness relationship. This is done by adjusting the sampling protocol to select two groups of study subwatersheds: those that are effectively served by stormwater practices and those that are not.

Table 4: Proposed Protocol for Defining Functional Relationships Between Watershed Imperviousness and Stream Quality

- General study design
  A systematic evaluation of stream quality for a population of 20 to 50 small subwatersheds that have different levels of watershed imperviousness. Selected field measurements are collected to represent key hydrological, morphological, water quality, habitat and biodiversity variables within each defined subwatershed. The population of subwatershed data is then statistically analyzed to define functional relationships between stream quality and imperviousness.
- Defining reference streams
  Up to 5 non-urban streams in same geo-hydrological region, preferably fully forested, or at least full riparian forest coverage along same length. Free of confounding NPS sources, imperviousness less than 5%, natural channel and good habitat structure.
- Basic Subwatershed Variables
  Watershed area, standard definition and method to calculate imperviousness, presence/absence of stormwater practices.
- Selecting subwatersheds
  Drainage areas from 100 to 500 acres, known level of imperviousness and age, free of confounding sources (active construction, mining, agriculture, or point sources). Select three random non-overlapping reaches (100 feet) for summer and winter sampling of selected variables in each of five key variables groups:

  1. Hydrology variables: summer dry weather flow, wetted perimeter, cross-sectional area of stream, peak annual storm flow (if gaged).
  2. Channel morphology variables: channel alteration, height, angle and extent of bank erosion, substrate embeddedness, sediment deposition, substrate quality.
  3. Water quality variables: summer water temperature, turbidity, total dissolved solids, substrate fouling index, EP toxicity test, wet weather bacteria, wet weather hydrocarbon.
  4. Habitat Variables: pool- riffle ratio, pool frequency, depth and substrate, habitat complexity, instream cover, riffle substrate quality, riparian vegetative cover, riffle embeddeness
  5. Ecological Variables: fish diversity, macroinvertebrate diversity, index of biological integrity, EPA Rapid Bioasessment Protocol, fish barriers, leaf pack processing rate.

Conclusion

Research has revealed that imperviousness is a powerful and important indicator of future stream quality and that significant degradation occurs at relatively low levels of development. The strong relationship between imperviousness and stream quality presents a serious challenge for urban watershed managers. It underscores the difficulty in maintaining urban stream quality in the face of development.

At the same time, imperviousness represents a common currency that can be measured and managed by planners, engineers and landscape architects alike. It links activities of the individual development site with its cumulative impact at the watershed scale. With further research, impervious cover can serve as an important foundation for more effective land use planning decisions.

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MEMORANDUM PL 14-03

TO: Homer Advisory Planning Commission

THROUGH: Julie Engebretsen, Deputy City Planner

FROM: Travis Brown, Planning Clerk

DATE: October 30, 2014

SUBJECT: Continued public hearing for an ordinance amending HCC 21.040.070, requirements, regarding standards for impervious coverage in the Bridge Creek Watershed Protection District

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A public hearing for a proposal to amend the Bridge Creek Watershed Protection District was held on October 15, 2014. Following public testimony and discussion, the Planning Commission moved to continue the public hearing at their next meeting on November 5, 2014.

This memo provides all of the materials of the public hearing including all public comments received to-date.

Attachments:
Staff Report 14-90 with attachments, including the proposed ordinance
Minutes excerpt of October 15, 2014 public hearing
Bob Shavelson email and attachment dated October 16, 2014
Laydown comments at October 15, 2014 meeting:

- Nancy Hillstrand letter and informational item dated October 14, 2014
- Julie Woodworth letter dated October 15, 2014
- Phil Clay letter dated October 15, 2014
- Bob Shavelson letter on behalf of Cook Inlet Keeper dated October 15, 2014

Nancy Hillstrand
P.O. Box 674
Homer, Alaska 99603
907-235-9772

Lay Down at October 15, 2014 HAPC Meeting

I am a land owner in the Bridge Creek Watershed district. I am doing my part to protect this drinking water source on 350 acres up there by leaving it unfragmented. This is a huge cost to me and I feel that the city planners as well as all land owners have a responsibility to do the same to safeguard the future from cumulative impacts of development in our precious water source.

Strengthen these regulations. Do not cave in to pressure from the few to weaken these safeguards. Stand Strong !!! Once you open this door it will be hard to close. You cannot discriminate. Keep the regulations in tact!

Our Past wise Planning Commissions and Departments had the forethought and wherewithal to create The Bridge Creek Reservoir Watershed District. This District had full public meetings and participation designed for cost effective **prevention** of damage from human expansion in this watershed that provides our precious drinking water. It needs to remain intact.

Today our City Planning Department and Commission are asking for input to consider changes to our health and safety by weakening these drinking water safeguards. Bridge Creek Property owners have been barely notified in time to reply but the Homer Area Citizens who will pay the consequences of these negotiations...in their health and safety... are unaware of these weakened rules affecting their water quality.

Compromising our *drinking water* quality regulations is a serious gamble. If anything, regulations on this priority city service owned by all citizens requires strengthening never weakening to provide long term low cost water quality protection. **Prevention of cumulative damage** is the most cost effective means of providing clean water.

Our drinking water quality is not negotiable to a very few developers, realtors, or landowners pocketbooks. To weaken our well thought out water quality safeguards to placate a handful of people, steals the health and safety rights to clean clear chemical free healthy water from the thousands of tax paying Homer and outlying area citizens.

A subdivision like Kelly Ranch Estates was of prime concern when the District was created because it is located directly adjacent to the Bridge Creek that flows into our drinking water source. Subdivisions like this one without a city sewer system create the dilemma of raw sewage and siltation flowing into our drinking water source.

Relaxing water quality protections on so many developable lots is dangerous and will only increase the environmental and public health problems proven to be associated with sewage and siltation overflows.

The soils are extremely silty and nicks and damage caused silt and sewage to flow long distances. There is a history of these problems that must be understood by the planning commission.

This is serious to the health and welfare of all Homer Area citizens present and into the future. Sewage carries disease-causing microorganisms and pathogens that cause diarrhea, vomiting, respiratory and other infections, hepatitis, dysentery, and other chronic diseases such as cancer, arthritis and heart disease. they can be deadly for children, the elderly, and others with weakened immune systems, such as cancer patients.

Compromising our drinking water from lax rules is not cost effective. Prevention is our only proven tool to safeguard our water. We have these preventative regulations and they need to remain intact so our watershed is not damaged by a thousand cumulative cuts.

Just think! As we impair our watershed cut by cut...bigger impervious driveway here... larger garden with chemical fertilizers there...extra septic tank over here...ditching to drain a wetland there. Pharmaceuticals from sickness...oil from our driveways... each event removes the integrity from our water quality safeguards.

After a decade or two we will wonder... <u>What Happened???</u> Why is the operating expense to the water treatment plant going up. Why are more and more chemicals needed to settle silt and kill pathogens. Who is responsible for this?

Then... taxpayers not only get to pay with their health, healthcare costs, but with more tax dollars needed to rehabilitate the damage a handful of residents who

got the ear of the present planning commission that caused cumulative damage to our critical watershed by weakening and compromising rules planned and designed by a long planned public process to protect us all through **prevention.**

The Planning Commission can help avoid cumulative deterioration in water quality by tabling these shortsighted ideas that serve only a few.

Water quality is not negotiable. This is a health and safety issue. To own land in this watershed is a big responsibility. It is an honour , and a privilege to contribute to the public good, not a means of lining someone's pocket.

Once you give special treatment for a small group you will be obliged to open this up to all Bridge Creek Property owners. Don't open this door!

It will be interesting to see who signs on to cutting these health and safety precautions of our most precious resource...our water. It will be important to keep track of names of those who compromised our rights to health and safety for a monetary gain by a select special interest few. The countless examples of watersheds compromised and the resulting **oops** can be easily googled for reference. Please do so to educate yourselves on this critically important issue.

Please don't gamble our precious water to feather a few nests at the expense of all our thousands of tax paying residents who rely on the city to perform this priority service.

Thank-you for your continued vigilance to protect the pure water quality of our Homer Area tax paying citizens.

With Kind Regards,

Nancy Hillstrand

Public Health Effects of Inadequately Managed Stormwater Runoff

Stephen J. Gaffield, PhD, Robert L. Goo, Lynn A. Richards, MSES, MPA, and Richard J. Jackson, MD, MPH

Objectives. This study investigated the scale of the public health risk from stormwater runoff caused by urbanization.

Methods. We compiled turbidity data for municipal treated drinking water as an indication of potential risk in selected US cities and compared estimated costs of waterborne disease and preventive measures.

Results. Turbidity levels in other US cities were similar to those linked to illnesses in Milwaukee, Wis, and Philadelphia, Pa. The estimated annual cost of waterborne illness is comparable to the long-term capital investment needed for improved drinking water treatment and stormwater management.

Conclusions. Although additional data on cost and effectiveness are needed, stormwater management to minimize runoff and associated pollution appears to make sense for protecting public health at the least cost. (*Am J Public Health.* 2003;93:1527–1533)

Residents in the United States generally can depend on safe water for drinking, food production, and recreation, thanks to effective water treatment and protective environmental policies. Despite these safeguards, waterborne illnesses are prevalent and may increase because of the strain of climate change, population growth, and changing land use.[1] Expansion of urban areas is creating more impervious surfaces, such as roofs, roads, and parking lots, that collect pathogens, metals, sediment, and chemical pollutants and quickly transmit them to receiving waters during rain and snowmelt events. This nonpoint source pollution is one of the major threats to water quality in the United States[2] and is linked to chronic and acute illnesses from exposure through drinking water, seafood, and contact recreation. Impervious surfaces also lead to pooling of stormwater, increasing potential breeding areas for mosquitoes, the disease vectors for dengue hemorrhagic fever, West Nile virus, and other infectious diseases.

Traditional strategies to manage stormwater and treat drinking water require large infrastructure investments and face difficult technical challenges. Reducing stormwater runoff and associated nonpoint source pollution is a potentially valuable component of an integrated strategy to protect public health at the least cost.

WATERBORNE DISEASE

Acute illnesses can result from consuming water contaminated with protozoan oocysts, viruses, and bacteria. Between 1991 and 2000, 123 documented outbreaks of waterborne illness in 30 states were linked to pathogens or involved acute gastrointestinal illnesses of unknown etiology (Figure 1).[3–7] Pathogens currently impair 5529 US water bodies (Figure 2) and are the second leading cause of impairment, following sediment.[8]

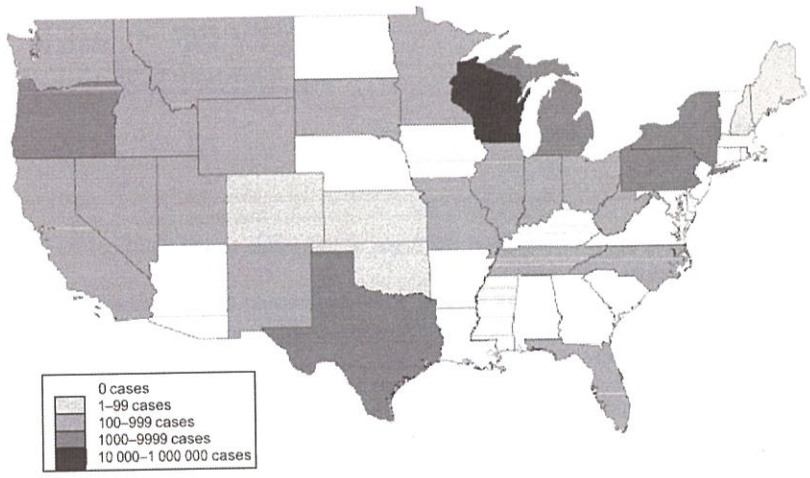
Children, the elderly, pregnant women, and the immunocompromised—20% of the US population—are at the greatest risk for serious illness and mortality from waterborne pathogens.[9] Outbreaks of cryptosporidiosis in Milwaukee, Wis, in 1993 and Las Vegas, Nev, in 1994 caused at least 70 fatalities among the immunocompromised.[4,10–12]

It is widely recognized that the vast majority of waterborne disease cases go unreported because of difficulties in diagnosing the cause of illness. Approximately 99 million people in the United States have acute gastrointestinal illnesses each year, at a cost of billions of dollars,[13] and 6% to 40% of these illnesses may be caused by contaminated drinking water.[1,14,15] Exposure to *Cryptosporidium* is common; 17% to 32% of people tested have evidence of infection by young adulthood.[16]

Drinking water outbreaks have been linked to runoff; more than half of the documented waterborne disease outbreaks since 1948 have followed extreme rainfalls.[17] Spring rains and snowmelt preceded the Milwaukee *Cryptosporidium* outbreak and may have played a role in transport of the oocysts.[6] Urban and suburban streets, parking lots, and lawns generate large loads of bacteria in stormwa- ter,[18–20] and urban runoff is responsible for an estimated 47% of the pathogen contamination of Long Island Sound.[21] Stormwater drainage pipelines and channels accumulate sediment and block sunlight, inhibiting natural bacteria die-off and creating a bacterial reservoir,[22,23] and combined storm and sanitary sewer systems discharge untreated sewage into receiving waters when runoff volumes overwhelm their treatment capacity.

Inflows of runoff to surface water bodies, indicated by increased turbidity from suspended soil particles eroded from the landscape, are associated with elevated concentrations of bacteria, *Giardia*, *Cryptosporidium*, and other microorganisms.[24,25] Small increases in the turbidity of treated drinking water have been linked to increased occurrence of acute gastrointestinal illnesses among children and the elderly in Milwaukee and Philadelphia, Pa, even though the water is in compliance with Environmental Protection Agency standards.[26–28]

Fecal coliform bacteria in surface waters commonly exceed standards for recreation,[29] and exposure to bacteria and parasites from swimming and other forms of recreation in water contaminated with urban runoff has caused numerous cases of illness, including ear and eye discharges, skin rashes, and gastrointestinal problems.[30–32] Consumption of seafood from contaminated waters is linked to diarrheal and paralytic illnesses caused by the hepatitis A and Norwalk viruses, *Vibrio* species, and marine biotoxins formed by algal blooms.[31,33–36] Excess nitrogen from urban



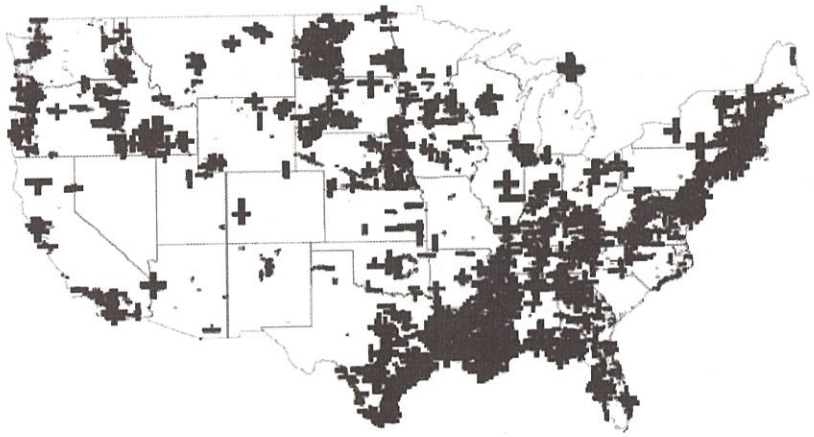
Note. Wisconsin reported the maximum number of cases, with 403 000 caused by the cryptosporidiosis outbreak of 1993.
Source. Compiled from Centers for Disease Control and Prevention data.[3-7]

FIGURE 1—Reported waterborne illnesses linked to pathogens or involving gastrointestinal illnesses of unknown etiology, 1991–2000.

and agricultural sources exacerbates harmful algal blooms.[37] Major sources of nitrogen from urban and suburban areas may include fertilizers carried by stormwater, vehicle exhaust, and septic systems.[38,39]

Nitrogen also poses direct health threats. Exposure to nitrate in drinking water increases the risk of methemoglobinemia, causing shortness of breath and blueness of the skin, especially for infants.[40,41] Consumption of water with elevated nitrate is also suspected to increase miscarriage risk.[42]

Various pollutants are commonly found in urban and suburban stormwater. Runoff from roofs, roads, and parking lots can contain significant concentrations of copper, zinc, and lead,[19,38] which can have toxic effects in humans. Insecticides occur widely in sediment and fish in urban streams at levels considered harmful to wildlife,[43] raising concerns about carcinogenic effects and disruption of hormonal systems in humans.[44] Increased traffic volume in recent decades has resulted in higher concentrations of polyaromatic hydrocarbons—known human carcinogens—in urban lake sediments, with concentrations commonly exceeding levels set to protect aquatic ecosystems.[45]



Source. Compiled from US Environmental Protection Agency data.[8]

FIGURE 2—Pathogen-impaired water bodies, 1998–2000.

DRINKING WATER TREATMENT

Community drinking water supplies are commonly disinfected with chlorine and, if the source is surface water, filtered to remove sediment and associated pollutants. Several common microorganisms, including *Cryptosporidium*, are resistant to treatment with chlorine and filtration,[46] although the effectiveness of filters varies with their pore size. Suspended sediment in source waters further reduces the effectiveness of chlorine. A 1995 study found that 13% of the samples of drinking water filtered and treated with chlorine still contained *Cryptosporidium* oocysts.[47] Ozone is increasingly being used for disinfection instead of or in addition to chlorine. High ozone doses can inactivate *Giardia* and *Cryptosporidium*; however, neutralizing the ozone after treatment presents technical difficulties, and addition of ozone to water containing bromide can form bromate, a potential human carcinogen.[48]

The need for disinfection must be weighed against growing evidence of carcinogenic and other health effects related to disinfection byproducts. Trihalomethanes and other disinfection byproducts form when chlorine reacts with organic carbon associated with sediment or produced by algal and bacterial growth, which can be enhanced by nitrogen and phosphorous in runoff.[49] The Environmental Protection Agency estimates that ingestion of disinfection byproducts in drinking water leads to 1100 to 9300 cases of bladder cancer each year,[50] and trihalomethanes are linked to neural tube defects, small size for gestational age, and spontaneous abortions.[51]

Approximately 42 million people in rural and suburban areas use their own private water supplies, typically shallow groundwater wells that are not covered by the Safe Drink-

ing Water Act and are rarely treated or monitored.[52] Concerns include cross-contamination from runoff and surface water and contamination by nitrates and pathogens from septic systems.

EFFECTS OF COMMUNITY DESIGN

Community design has a major effect on stormwater volumes and quality, as well as treatment methods and costs. The total area of impervious surfaces in a community is 1 of the most common measures used to assess the effects of community design on stormwater runoff.[53] Also important is the degree of connection between impervious surfaces and the storm drainage system; surfaces that drain directly to vegetated areas produce less runoff and are considered to have a lower effective impervious area.

Urbanization of the landscape adds to strain on water resources by expanding the area covered by impervious surfaces that shed virtually all rainfall and snowmelt. Hydrologic models predict large increases in runoff for urbanizing areas,[54,55] with runoff volume increasing linearly with impervious surface area.[56] Long-term stream-flow monitoring has shown that development leads to higher flood peaks[57] and to increases in annual runoff volumes of 2 to 4 times previous levels for suburban areas and 15 times previous levels for highly urban areas.[58,59]

Increased runoff volume generates greater pollutant loads.[60] In response to an 18% increase in urban area in a watershed near Indianapolis, Ind, between 1973 and 1991, annual average runoff volume increased by 80%, and average annual loads for lead, copper, and zinc increased by more than 50%.[61] High proportions of urban land cover and steep slopes—predictors of high runoff volumes—correspond with high fecal coliform levels in South Carolina watersheds.[62] Elevated fecal coliform levels also have been detected in suburban streams.[63]

Although low-density development with large lawns leads to a low proportion of impervious cover within individual lots, the total impervious surface area of low-density residential and commercial developments, on the regional scale, is typically much larger than that of higher-density developments.[64,65] This high proportion of impervious surface area is largely a result of roads and parking lots, which can account for more than 60% of a low-density development's impervious area.[66] Although large lawns might seem capable of absorbing runoff from adjacent surfaces, they are typically compacted by construction equipment and can generate up to 90% as much runoff as pavement.[67,68] Runoff measured from suburban developments has been shown to be 1.5 to 4 times greater than that from rural areas,[69,70] although low-density development may produce less runoff than do some intensive agricultural land uses.[71]

Moreover, construction of low-density developments disturbs the soil over larger land areas, accelerating transport of sediment and associated pollutants into water bodies. Stripping the protective vegetation cover from construction sites accelerates soil erosion to a rate up to 40 000 times higher than before the soil was disturbed.[72] During brief periods of active construction, sediment yield from watersheds can increase 5-fold, with additional deposition in stream channels providing a continual sediment source during subsequent storms.[73] This accumulated sediment can harbor large populations of bacteria and other pathogens.[74]

There is widespread concern that increased runoff from impervious surfaces contributes to the depletion of groundwater aquifers. Unfortunately, few detailed studies of urban groundwater recharge have been performed to evaluate this concern. Leaks from aging water distribution networks and infiltration in stormwater ponds and channels may add appreciably to aquifer recharge.[75] However, infiltration ponds have a high failure rate because of fine sediment that settles to the bottom and forms a hydraulic barrier,[76] and improvements in construction materials for water pipelines probably lead to reduced leakage in new developments.[77] Nearly half of the US population drinks groundwater from wells,[52] and widespread drops in groundwater levels have contributed to water quality problems, including increased arsenic concentrations.[78]

METHODS

Because turbidity is an indicator of runoff and was associated with increased illness in Milwaukee and Philadelphia,[26–28] we compiled turbidity data for treated drinking water of selected cities in 2001 for comparison. We obtained this information from annual consumer confidence reports published by each water utility. Many of these systems reported turbidity values for water mixed from multiple sources and treatment facilities.

An important consideration in deciding how to address waterborne illness is the cost associated with different options. Unfortunately, available data are inadequate to fully assess these costs. In this article, we present estimates of some of the costs associated with (1) managing current levels of waterborne illness, (2) improving drinking water treatment, and (3) improving stormwater management. Although incomplete, such estimates illustrate the magnitude of these costs and underscore important unanswered questions.

We estimated the annual cost of gastrointestinal illnesses related to drinking water by multiplying the estimated cost of all infectious gastrointestinal illnesses for 1985[13] by the fraction of these illnesses (6%–40%) attributed to drinking water in the literature.[1] Cost estimates for drinking water treatment and stormwater management were taken from Environmental Protection Agency surveys of 20-year capital investment needs.[79,80] We did not extrapolate the annual cost of illness over the same 20-year period, because this estimate was based on data from only 1 year. All costs were converted to 2002 dollars.

RESULTS

Table 1 lists annual minimum, mean, and maximum turbidity values based on daily samples of treated drinking water for selected cities. All of these systems were in compliance with the Environmental Protection Agency requirements in effect at that time that no sample exceed a turbidity of 5 nephelometric turbidity units and that no more than 5% of daily samples show turbidity greater than 0.5 nephelometric turbidity unit. In 2002, these standards were reduced to 1 nephelometric turbidity unit and 0.3 nephelometric turbidity unit, respectively.

The low and high estimates of the annual cost of gastrointestinal illnesses related to drinking water (Table 2) differ by nearly a

TABLE 1—Turbidity Values for Treated Drinking Water Reported by Selected Cities for 2001

City/Treatment System	Drinking Water Turbidity (NTU) Minimum	Maximum	Mean
Ann Arbor, Mich	NR	0.2	NR
Atlanta, Ga	NR	>0.5	NR
Austin, Tex	0.01	0.34	0.08
Baltimore, Md			
Ashburton filtration plant	NR	0.39	NR
Montebello filtration plants	NR	0.41	NR
Chicago, Ill	NR	NR	0.34
Corvallis, Ore	0.02	0.08	0.04
Dallas, Tex	0.04	0.2	0.08
Denver, Colo			
Marston filtration plant	<0.05	0.07	0.04
Foothills filtration plant	0.04	0.05	0.04
Moffat filtration plant	0.04	0.07	0.05
Detroit, Mich	NR	0.48	NR
Houston, Tex, main	<0.01	0.5	0.07
Los Angeles, Calif			
Los Angeles Aqueduct filtration plant	0.1	0.37	0.12
Diemer filtration plant	0.05	0.07	0.06
Weymouth filtration plant	0.06	0.08	0.07
Milwaukee, Wis	0.06	0.23	0.08
New York, NY			
Catskill–Delaware system	0.8	1.7	1.1
Croton system	1.3	1.6	1.4
Philadelphia, Pa	NR	0.08	0.06
Seattle, Wash			
Cedar system	0.3	3.9	0.8
Tolt system	0.04	0.3	0.07
Washington, DC	NR	0.19	NR

Note. NTU = nephelometric turbidity unit; NR = not reported.

TABLE 2—Comparison of Costs of Options for Addressing Waterborne Illness

Option	Estimate	Cost, in Billions of 2002 Dollars	Source
Continue to manage waterborne illnesses	Annual cost of waterborne gastrointestinal illnesses	2.1–13.8[a]	Estimate of total cost of endemic gastrointestinal illness in 1985[13] and range of these illnesses attributed to drinking water[1]
Improve drinking water treatment	20-year capital needs to meet current and proposed drinking water standards	33.0[b]	1999 Drinking Water Infrastructure Needs Survey[79]; "regulatory needs" for compliance with current and future regulations
Improve stormwater management	20-year capital needs for runoff control	9.3[c]	1996 Clean Water Needs Survey[80]; categories VI (stormwater) and VIID (urban runoff)

[a]Adjusted for inflation by multiplying by factor of 1.50.
[b]Adjusted for inflation by multiplying by factor of 1.06.
[c]Adjusted for inflation by multiplying by factor of 1.11.

factor of 10 because of uncertainty in identifying the cause of illness. These estimates do not include other acute effects, chronic illnesses, or illnesses related to recreation or consumption of contaminated seafood or produce. The higher estimate is comparable to the 20-year capital costs for enhanced drinking water treatment and stormwater management. Operation and maintenance over the 20-year period are not included in these estimates; however, a reasonable assumption is

investment.[81,82]

DISCUSSION

Although it is highly likely that Figure 1 greatly underestimates the burden of disease caused by waterborne pathogens, it does indicate widespread occurrence of such disease. Because of underreporting issues and the poor geographic resolution of the state-level illness data, it is difficult to directly compare Figures 1 and 2.

The turbidity of drinking water in many US cities (Table 1) is similar to the level of turbidity linked to illnesses in Milwaukee and Philadelphia (where the mean turbidity was <0.2 nephelometric turbidity unit).[26–28] Although these data alone are insufficient to define the level of risk, they underscore the need for additional research into the complex relations between turbidity, pathogen loads, drinking water treatment, and illness. Assessment of risk and early warning of contamination would be greatly aided by more rapid and accurate testing methods for microbiological contaminants.[83]

Given the limited information in Table 2, the costs of drinking water treatment and stormwater management appear reasonable compared with the burden of waterborne illness. The economic benefits of drinking water treatment have been established previously.[84]

ness of stormwater management options as well as on the true cost of waterborne illness are needed to make fully informed decisions.

Conventional urban stormwater management requires a large investment in infrastructure. For example, the Milwaukee Metropolitan Sewage District has reduced, but not eliminated, combined sewer overflows since 1994 by spending $716 million to construct a tunnel to store excess stormwater during runoff events, allowing it to be treated later.[85] Consequently, it makes sense to use alternative strategies that reduce the volume and improve the quality of stormwater. Planning on the regional scale that integrates community design and watershed function can reduce stormwater volumes and effects. On the local scale, further reduction can be achieved through compact site design and best management practices that remove pollutants, detain stormwater, and reduce runoff volume by enhancing infiltration into the soil.

Watershed planning strategies that effectively protect water quality include maintaining vegetated buffer strips and setback distances of at least 150 m for impervious areas

along water bodies[63,86] and preserving forests and other highly pervious land covers.[87] New York City has chosen to spend $1.4 billion over 10 years as part of a strategy to protect its Catskill–Delaware water supply by purchasing land as a buffer against development, thus avoiding the need for a filtration plant that would cost $6 billion to construct and would have an annual operating cost of $300 million.[88,89]

Compact site designs include narrow streets, reduced parking requirements, mixed land uses, increased residential densities, and open space. The city of Olympia, Wash, determined that a 20% reduction in impervious area would not require exceptional changes.[66] A stormwater ordinance passed by the city of Columbus, Ohio, includes reducing street widths and commercial parking to minimize impervious surfaces and enhance open space.[90] Runoff simulations of proposed community designs suggest that a compact development with significant open space may generate only half the increased stormwater volume generated by a conventional, large-lot development.[91]

Best management practices can reduce but not eliminate pollutant loadings of common stormwater pollutants. Designs that collect runoff and allow it to infiltrate the soil have the highest documented pollutant-removal efficiency, eliminating nearly all lead, zinc, and solids and more than 50% of total nitrogen and phosphorus. Ponds and wetlands, which allow contaminants to settle out of the water column or be broken down by sunlight and biological activity, can remove more than 70% of bacteria but are less effective for other pollutants. Drainage ditches and swales appear to have very limited pollutant-removal capabilities.[92] Pollutant modeling indicates that street sweeping once a week on highways and every 3 days in residential areas removes 10% to 60% of solids and nutrients.[93] Modern street sweepers that use vacuum systems may result in higher and more consistent pollutant-removal effectiveness, although potential negative side effects, such as air and noise pollution, also must be considered. Managing urban pet and wildlife waste may reduce pathogen loads, although more research on parasite and bacteria infection rates in animals is needed.[83]

Low-impact development techniques are gaining popularity for supplementing traditional best management practices and reducing infrastructure needs. Low-impact development measures route runoff from impervious surfaces to natural or constructed features where it can infiltrate the soil. Connecting roof drains to a yard, garden, or infiltration trench can double the amount of precipitation that infiltrates the soil.[94] Diverting roof downspouts from sanitary sewers to yards in a Michigan community reduced storm flows in sewers by 25% to 62%, resulting in cost savings that matched the cost of the conversion in only 2 months.[95] Buildings with green roofs (roofs covered with soil and live vegetation to absorb precipitation) have been used for years in Europe and have been successfully constructed in the United States.

Protecting public health by reducing urban stormwater runoff and associated nonpoint source pollution makes sense as a complement to water treatment infrastructure and health care interventions. In fact, stormwater management needs to be integrated into a comprehensive water management scheme that addresses water supply and sewage treatment. We believe that such integrated programs are necessary to adequately protect public health at the lowest cost. ■

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Contributors

S.J. Gaffield led the design and implementation of the study and the writing of the article. R.L. Goo helped to conceptualize ideas, plan the analysis, and write the article. L.A. Richards assisted with the literature review, study design, and writing of the article. R.J. Jackson conceived of this article and assisted with planning and writing.

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Human Participant Protection

No human participants were involved in this study.

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Lay Down at October 15, 2014 HAPC Meeting

Planning Commission
City of Homer
491 East Pioneer Avenue
Homer, AK 99603

October 15, 2014

RE: Bridge Creek Watershed

Dear Honorable Commissioners:

First, I want to thank you for your commonsense approach to the Bridge Creek Watershed issue and the development limitations. I think the provisions outlined in the letter I received dated October 3, 2014, are logically, thoughtful, and balanced between preservation and development.

I am sorry I am not able to attend the meeting tonight, but I have a previous obligation with Hospice of Homer (we are having an open house tonight and would love for you all to stop by!). But I did want to provide an example on how these changes would affect my property, only as a real-life illustration of the impact. I have 1.45 acres, with a foot print of 912 sf plus a 2 stall garage. According to the borough site, my total developed square footage is 6,065, over the new allowable 5500sf. We built prior to the watershed designation and prior to annexation. We have a flat lot with no sloping.

My example is not a plea for a larger allocation for development, simply an example of the impact to existing property owners. I do appreciate the outbuilding provision as well as the decking.

I am not sure you will find this letter useful, but did want to extend my appreciation for your common sense approach.

Sincerely,

Julie Woodworth
1200 Queets Circle
PO Box 1012
Homer, AK 99603

Lay Down at October 15, 2014 HAPC Meeting

To: Planning Commission (City of Homer)
From: Phil Clay
Lot owner BCWPD

Thank you for addressing the development limitations for the Bridge Creek Water Shed District. I believe the existing rules for development in the area are too restrictive regarding the amount of property that may be developed, especially for the smaller lots.

I purchased 2 lots in the East Highland Sub. before the rules were put in place, with the intent of building a large house for a bed and breakfast. After just a short time the rules went into effect which made it impossible to follow through with our plan. (The lots are not contiguous)

The new proposed rules would be a step in the right direction, but I believe still does not go far enough in allowing property development. If the proposed change includes driveways, this 5500 square foot limitation may still be too restrictive if a long driveway is needed to reach the building site. I would like to see more like a 7500 square foot allowance for development of lots under 3 acres.

Thank you for your time and attention.

Phil Clay

(This is a transcription of the original letter by Travis Brown. Original letter is on reverse.)

10-15-14

TO: Planning Commission (City of Homer)
From: Phil Clay
lot owner BCWSD

Thank you for addressing the development limitations for the Bridge Creek Water Shed District.

I believe the existing rules for development in the area are too restrictive regarding the amount of property that may be developed, especially for the smaller lots.

I purchased a lot in ~~East~~ Highland Sub. before the rules were put in place, with the intent of building a large home for a Bed & Breakfast. After just a short time, the rules went into effect which made it impossible to follow through with our plans. (The lots are not contiguous).

The new proposed rules would be a step in the right direction, but I believe still does not go far enough in allowing property development. If the proposed change includes driveways, this 5500 square foot limitation may still be too restrictive if a long driveway is needed to reach the building site. I would like to see more like a 7500 square foot allowance for development of lots under 3 acres.

Thank you for your time & attention.

Phil Clay

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PLANNING/ZONING

Lay Down at October 15, 2014 HAPC Meeting

Cook Inletkeeper
3734 Ben Walters Lane
Homer, Alaska 99603

p. 907.235.4068
f. 907.235.4069
www.inletkeeper.org

October 15, 2014

Don Stead, Chair
Homer Advisory Planning Commission
491 East Pioneer Avenue
Homer, Alaska 99603

Dear Chairman Stead:

Please accept these comments on behalf of Cook Inletkeeper (Inletkeeper) and its more than 500 members and supporters in the Homer area.

I. Background:

As a threshold matter, Inletkeeper recognizes the Bridge Creek Watershed as a vital community asset. Across the nation and the world, there's no more important community resource than clean, accessible and plentiful drinking and domestic water. We need look no further than the current drought conditions in California to understand how important and valuable municipal water supplies are to local families and businesses.

That's why Inletkeeper played an active role in supporting the City of Homer's efforts to obtain jurisdiction over the Bridge Creek Watershed from the Kenai Peninsula Borough, and why we also worked hard with a broad coalition of people and groups to secure the common-sense safeguards found in the current Bridge Creek ordinance.

II. Concerns

a. **Precedent:** The current ordinance is not perfect, but it's been effective to control nonpoint source pollution into the City's drinking water supply. The proposed changes, however, drive a substantial hole in the ordinance, and allow impervious cover up to 12% or more on parcels under 3 acres – more than double what's currently allowed, with no mitigation plan requirement. While the proposed ordinance includes some mitigation requirements, the mitigation plans currently required for impervious cover above 6.4% is missing. These shortcomings create a dangerous precedent that can pave the way for additional rollbacks in years to come. For example, what's to stop the owner of a larger parcel – after seeing changes made for owners of smaller parcels - to request increased impervious cover in the future, or to request a waiver of the mitigation plan requirement? This is an important precedent involving the City's sole drinking water source, and the City needs a strong rationale to open the door to rollbacks.

b. **Need:** Furthermore, these changes have apparently been prompted by concerns from some who feel the current ordinance is having a chilling effect on property sales, development and/or values. Yet the background materials for the proposed ordinance do not include any concrete basis on which to justify the considerable changes envisioned. As a result, the Planning Commission should rest its decision on specific concerns, and if they're valid, craft narrowly-tailored changes – including the opportunity for site-specific variances - to address those concerns.

c. **Other Pollutants:** Next, the prospect of increased development in the Bridge Creek Watershed District also highlights a shortcoming in the current ordinance. Specifically, there are no best management practices or mitigation measures required to address polluted runoff from nutrients/fertilizers and herbicides. If the Planning Commission opts to move ahead with increased development on smaller parcels, it should recognize the likely increase in fertilizers and herbicides which will accompany such increases, and address them.

d. **Overall Mitigation:** Additionally, the proposed ordinance attempts to address nonpoint source pollution through parcel-by-parcel mitigation practices. Yet based on the close proximity of the lots in Kelly Ranch Estates and the natural contour/topography of the subdivision sloping toward the Bridge Creek drainage, roads and driveways will act as conduits for runoff. Therefore, it makes more sense to address mitigation on a subdivision scale. This could be through retention basins, swales and other best management practices that would capture and control all or most of the water from the subdivision.

e. **Impervious Extent:** The proposed ordinance includes an extra 700 sq. ft. for decks and out buildings, yet there's no basis in the record or elsewhere to segregate these structures from the overall impervious coverage calculation. Impervious cover is impervious cover and should be included in the final overall parcel calculation, regardless the source.

III. Conclusion & Recommendations

In closing, I'd like to reiterate the point I made at the Planning Commission's last meeting: the Bridge Creek Reservoir is Homer's only drinking water supply, and it is always – always – cheaper and easier to prevent pollution in a municipal drinking water source then to treat the problem after it occurs. Living within the Bridge Creek Watershed District carries a substantial public obligation, and individuals wishing to develop more extensively on their parcels have a wide range of options outside of the City's sole drinking water source.

As a result, Inletkeeper feels the current proposal goes too far with too little information, and recommends the Planning Commission:

- Quantify the concerns from realtors and/or property owners to understand any diminution in value caused by the current ordinance to parcels under 3 acres in the Bridge Creek Watershed District;

- Develop a subdivision-scale mitigation plan to address the cumulative effects of run-off from Kelly Ranch Estates;

- Re-work the ordinance to include provisions to mitigate the use of fertilizers and herbicides;

- Include decks and outbuildings in the impervious surface coverage calculation for an entire parcel so there's a more accurate assessment of impacts;

- Conduct a study to understand the range of treatment costs City ratepayers would bear in the event turbidity, suspended solids, nutrient or herbicide levels exceed the standards of the Safe Drinking Water Act.

Thank you for your attention to this important matter and feel free to contact me with any questions.

Very truly yours,

Bob Shavelson
Inletkeeper

B. A Memo from the City Clerk and a resolution of the City Council of Homer, Alaska, establishing the 2015 regular meeting schedule for the city council, economic development advisory commission, library advisory board, parks and recreation advisory commission, advisory planning commission, port and harbor advisory commission, permanent fund committee, and public arts committee.

Chair Stead called for a motion to adopt the consent agenda.

HIGHLAND/VENUTI SO MOVED.

There was no discussion

VOTE: NON OBJECTION: UNANIMOUS CONSENT.

Motion carried.

Presentations

Reports

A. Staff Report PL 14-84, City Planner's Report

City Planner Abboud reviewed the staff report.

There was brief discussion about the safe routes to school grant and the erosion around Woodard Creek.

Commissioner Highland requested a break to read the laydown materials that were provided to the Commission. Chair Stead called for a recess at 6:50 and the meeting reconvened at 6:57.

Public Hearings

Testimony limited to 3 minutes per speaker. The Commission conducts Public Hearings by hearing a staff report, presentation by the applicant, hearing public testimony and then acting on the Public Hearing items. The Commission may question the public. Once the public hearing is closed the Commission cannot hear additional comments on the topic. The applicant is not held to the 3 minute time limit.

A. Staff Report PL 14-90, An ordinance of the Homer City Council amending Homer City Code 21.40.070, requirements, regarding standards for impervious coverage in the bridge creek watershed protection district.

City Planner Abboud reviewed the staff report.

Chair Stead opened the public hearing.

Chris Story, city resident and local realtor, thanked the group for their work on the draft ordinance. He said he presented this information to the Kachemak Board of Realtors membership and those

present at the meeting were in agreement that this is a positive and proactive step toward making these properties more useable, desirable, and marketable. He added that if it goes beyond this public hearing that they not only think in terms of impervious coverage versus not impervious, but also in terms of characteristics of people's homes. It's much more than a scientific calculation. He, and those has talked to, appreciate the concern that this is our one source of drinking water, but there have been no major impacts since this ordinance was written, or even before.

Bob Shavelson, Executive Director of Cook Inletkeeper, acknowledged individual property owners rights, but he is he here to talk about the rights of the public and encouraged erring on the side of caution. Treatment is always a lot more expensive than prevention, and prevention is a lot easier. In response to comment there is no evidence this is working, he submitted that there have been no violations of the Safe Drinking Water Act since this ordinance has been in place. We don't have a lot of information in place right now and are making decisions based on some speculation that there has been diminishing property values and restriction. We don't understand what the hydrology is and the impacts of the concentration of these parcels in Kelly Ranch Estates if they are developed to the levels outlined in code. There are additional factors that haven't been touched on like yard fertilizers and so forth. He encouraged them to look at this more carefully; they are making decisions without enough information and once the decisions are made, we can't go back on them.

Commissioner Venuti asked if Mr. Shavelson if he could provide data of tracking drainages into the reservoir that he mentioned at a previous meeting. Mr. Shavelson said he would.

Commissioner Stroozas questioned if the proposal relaxing regulations on four out of 2100 acres seems like a minimal figure. Mr. Shavelson reiterated that it isn't the overall number they are looking at; it's the concentration of the lots in one area.

Chair Stead queried whether or not they should close the public hearing.

There was discussion of the lack of property owners providing comment. It was suggested it may indicate they feel this is going in the right direction. It was also noted that in the laydowns, two supported the amendment, one strongly opposing it with good points why it shouldn't change.

Commissioner Highland is interested in how to get a better idea of the impact of concentrated development in the area being considered tonight. She agrees they need hydrological information and would like to know who they could contact.

HIGHLAND/VENUTI MOVED TO CONTINUE THE PUBLIC HEARING TO THE NEXT MEETING.

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

The Commissioners discussed laydown information titled "Public Health Effects of Inadequately Managed Stormwater Runoff". Comments included:

- The report repeatedly mentions urban areas, and it isn't an urban area up there.

- It addresses waterborne illnesses linked to pathogens and it's zero in low density population areas, and the Bridge Creek watershed area is a low density populated area.
- The statement in the report that the construction of low density developments disturbs soil over larger land area, accelerating transport of sediment and associated pollutants into water bodies, may apply in this area.
- There may be a discrepancy regarding turbidity values. When turbidity goes up there are issues with bacteria coming in, but the report data shows low turbidity and problems with bacteria. It wasn't clear how they got from one place to the other.
- In best management practices, there are problems with designs for collecting runoff.
- It suggests increasing density of the people living in the area to create larger buffers to lower turbidity.

The concern of dealing with fertilizers in the area was raised, along with invasive grasses in the area. City Planner Abboud talked about challenges of being able to reasonably enforce a regulation on fertilizers and such. It was countered that adding prohibiting fertilizers and herbicides in the ordinance will at least educate people and there will be those who will comply and curb some of the uses. Regarding invasive grasses, in the section regarding reseeding, it was suggested to include wording that it be seeded with natural or native grass.

Relating back to the study, Chair Stead expressed he doesn't think there isn't much there. The biggest things they can do are limit runoff and provide natural buffers. Kelly Ranch Estates flows down to Bridge Creek.

B. Staff Report PL 14-88, An ordinance of the Homer City Council amending Homer City Code 21.70.010, Zoning permit required, and 21.90.030, Invalid land use permits, regarding the requirement for a zoning permit and the relationship of zoning violations to permit issuance

City Planner Abboud reviewed the staff report.

Chair Stead opened the public hearing. There were no public comments and the hearing was closed.

VENUTI/STROOZAS MOVED TO APPROVE THE DRAFT ORDINANCE AMENDING HCC 21.7.010 ZONING PERMITS REQUIRED AND 21.90.030 INVALID LAND USE PERMITS, REGARDING THE REQUIREMENT FOR A ZONING PERMIT AND THE RELATIONSHIP OF ZONING VIOLATIONS TO PERMIT ISSUANCE, AND FORWARD IT TO THE CITY COUNCIL FOR PUBLIC HEARING AND ADOPTION.

There was discussion that this seems to be pretty straight forward and that staff doesn't know if there will be any retroactive issues. There may be some discussion about it at the joint worksession with Council.

VOTE: NON OBJECTION: UNANIMOUS CONSENT.

Motion carried.

Plat Consideration

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Staff Report PL 14-90

TO:	Homer Advisory Planning Commission
THROUGH:	Rick Abboud, City Planner
FROM:	Julie Engebretsen, Deputy City Planner
DATE:	October 15, 2014
SUBJECT:	Draft Ordinance 14-xx Amendments to the Bridge Creek Watershed Protection District

Introduction

In April, Chris Story, President of the Kachemak Board of Realtors, made a presentation on to the HAPC on some potential changes to the Bridge Creek Watershed Protection District regulations. The Planning Commission subsequently had several work sessions and heard from guest speakers Bob Shavelson of Cook InletKeeper and Todd Cook, City of Homer Water/Wastewater Superintendent.

Analysis

Staff review of the zoning code amendment per 21.95.040 is an attached memorandum.

The ordinance will make three main changes to 21.40.070. All changes apply only to lots under three acres in size.

1. Parcels less than three acres will be allowed to have up to 5,500 square feet of impervious surface.
2. Disturbed areas will be reseeded by August 31st, 40 gallons of storm water retention are required on every lot, and when determined by the City Planner, infiltration ditches next to driveways may be required. Mitigation plans will no longer be required.
3. Up to 500 square feet of uncovered deck, and one accessory structure under 200 square feet, may be constructed and not count toward the impervious surface maximum.

Total Impact of these changes to the watershed

The watershed are consists of approximately 2,100 acres, subdivided into 255 lots. Staff estimates there are 93 developable lots affected by these changes. There are more lots less than three acres, but they are not readily developable due to limiting factors such as conservation easements, lack of infrastructure, or proximity to the reservoir.

The calculations below assume all 93 property owners develop to the maximum allowed.

- Total impervious coverage allowed under the existing rules: **9.24 acres**
- Total impervious coverage under the proposed changes = **13.24 acres**

This is an increase of 4 acres from the existing rules. Private parcels can currently create 88.2 acres of imperious coverage at 4.2% of the watershed area. The proposed changes raise that potential to 92.2 acres of impervious coverage, or 4.39% of the watershed area.

Public Notice
A cover letter and public notice was mailed to all property owners within the Bridge Creek Watershed Protection District. Public notice was advertised in the local newspaper as required by code. As of the writing of this staff report, no comments had been received.

Staff Recommendation: Conduct a public hearing and forward a recommendation to the City Council

Attachments
Memorandum – staff review of the code amendment per 21.95.040
Draft Ordinance
Map dated 8/28/14
Letter to watershed land owners
Board of Realtors materials from 4/16/14 HAPC work session

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Memorandum

TO: Homer Advisory Planning Commission
THROUGH: Rick Abboud, City Planner
FROM: Julie Engebretsen, Deputy City Planner
MEETING: October 15, 2014
SUBJECT: AN ORDINANCE OF THE HOMER CITY COUNCIL AMENDING HOMER CITY CODE 21.40.070, REQUIREMENTS, REGARDING STANDARDS FOR IMPERVIOUS COVERAGE IN THE BRIDGE CREEK WATERSHED PROTECTION DISTRICT.

This memo contains the planning staff review of the zoning code amendment as required by HCC 21.95.040.

Planning Staff review of the **code amendment** per 21.95.040
The Planning Department shall evaluate each amendment to this title that is initiated in accordance with HCC 21.95.010 and qualified under HCC 21.95.030, and may recommend approval of the amendment only if it finds that the amendment:

a. Is consistent with the comprehensive plan and will further specific goals and objectives of the plan.

Staff response: The 2008 Comprehensive Plan Chapter 4 Land Use Goal 2 Objective B states: "Establish development standards and require development practices that protect environmental functions." The amendment is consistent with the plan be creating new, consistent development standards.

b. Will be reasonable to implement and enforce.

Staff response: Under current code, property owners with parcels smaller than 2.5 acres may apply to the Planning Commission for approval of a mitigation plan. This is time consuming for the applicant, staff and the Planning Commission. The mitigation plans over the past ten years have been inconsistent. It's unclear to staff if the mitigation plan process has resulted in anything other than a disincentive to develop in the watershed due to the administrative process. The amendments will simplify city code, and will be easier to implement and enforce than the current code.

c. Will promote the present and future public health, safety and welfare.

Staff response: The amendment promotes present and future public health, safety and welfare by creating clear, consistent regulation for small parcel development in the watershed.

d. Is consistent with the intent and wording of the other provisions of this title.

Staff response: This amendment is consistent with the intent, wording and purpose of HCC Title 21. The city attorney has reviewed and amended the ordinance for consistency.

CITY OF HOMER
ORDINANCE 14-xx

City Manager

AN ORDINANCE OF THE HOMER CITY COUNCIL AMENDING HOMER CITY CODE 21.40.070, REQUIREMENTS, REGARDING STANDARDS FOR IMPERVIOUS COVERAGE IN THE BRIDGE CREEK WATERSHED PROTECTION DISTRICT.

THE CITY OF HOMER ORDAINS:

Section 1. Homer City Code 21.40.070, Requirements, is amended to read as follows:

21.40.070 Requirements. The requirements of this section shall apply to all structures and uses in the BCWP district unless more stringent requirements are required pursuant to Chapter 21.71 HCC. The City of Homer water utility is exempt from this section.

a. Impervious Coverage.

1. Lots **three** ~~two-and-one-half~~ acres and larger shall have a maximum total impervious coverage of 4.2 percent.

2. Lots smaller than **three** ~~two-and-one-half~~ acres shall have a maximum total impervious coverage of **5,500 square feet** ~~4.2 percent, except as provided in subsection (a)(3) of this section~~.

3. Lots smaller than **three** ~~two-and-one-half~~ acres **shall comply with the following performance standards:** ~~may be allowed impervious coverage up to 6.4 percent if (a) the owner submits a lot-specific mitigation plan for Planning Commission's approval, and (b) if approved, thereafter implements and continuously complies with the approved plan. The mitigation plan must be designed to mitigate the effect of impervious coverage on water flow and the effect of loss of vegetation created by the impervious coverage~~

a. Disturbed areas shall be reseeded by August 31st

b. Storm water retention of 40 gallons must be provided on site, in the form of one or a combination of dry wells, rain barrels, rain gardens, foot drain retention or other method approved by the City Planner. The storm water retention is intended to mitigate the effect of impervious coverage and the resulting loss of vegetation on water flow.

c. When the City Planner finds that special site considerations such as topography or drainage warrant such treatment, a ditch lined with filter fabric and rock shall be constructed to slow water runoff from the driveway and encourage infiltration of water into the ground.

b. Impervious Coverage Calculations.

1. For the purpose of calculating impervious coverage on lots smaller than **three** ~~two-and-one-half~~ acres, **up to 500 square feet of uncovered deck attached to a**

[**Bold and underlined added**. ~~Deleted language stricken through~~.]

residence, and one accessory structure with a footprint area up to 200 square feet are excluded from the calculation ~~driveways and walkways may be partially or fully excluded from the calculation, if constructed and maintained in accordance with a mitigation plan, submitted and approved in accordance with subsection (a)(3) of this section~~.

2. Except as otherwise provided in this section, parcels of land subdivided after February 25, 2003, shall be allowed a total impervious coverage of 4.2 percent including right-of-way (ROW) dedication. ROW coverage area shall be calculated as 50 percent of the total area of the dedicated ROW. The impervious coverage allowed for the subdivided parcels shall be calculated after deducting the ROW coverage from the total parcel allowance according to the following formula:

Formula:

(Area of parcel being subdivided) x 0.042 = Total allowed impervious coverage (TAC)

(Area of ROW dedication) x 0.5 = ROW coverage (ROW C)

(TAC) – (ROW C) = Allowed impervious coverage for remainder of parcel being subdivided

(Area of parcel being subdivided) – (Area of ROW dedication) = New parcel area

(Allowed impervious coverage for remainder) ÷ (New parcel area) x 100 = Percent impervious coverage allowed on subdivided lots.

c. Additional Requirements for Subdivisions and Lots.

1. Lots created by subdivision after February 25, 2003, shall be a minimum of four and one-half acres.

2. Applications for subdivisions, dedications, and vacations of easements and rights-of-way in the BCWP district must be approved by the Planning Commission prior to submission to the Kenai Peninsula Borough.

d. Building Setbacks. Buildings must be set back from the Bridge Creek Reservoir and from streams as provided in HCC 21.40.110 and 21.40.120.

e. Sewer Systems. Appropriate to the use of the lot, each lot shall be served by a septic or sewer system approved by the Alaska State Department of Environmental Conservation (ADEC). Stream setbacks equal to 100 feet for drain fields and subsurface discharge and 250 feet for raised septic systems are required.

f. Ongoing Construction and Timber Harvesting. All activities including, but not limited to, timber harvesting, road building, subdivision and building activities involving loss of vegetation ground cover or soil disturbance and that are in process on February 25, 2003, shall be required to obtain permits under this chapter and shall fully conform to the terms of this chapter. Activities leaving disturbed or lost vegetative ground cover, disturbed soils without revegetation or leaving slash piles will be considered in process for the purposes of this subsection, regardless of when the activity occurred.

g. Pending Subdivisions. Subdivisions that have not received final plat approval by February 25, 2003, shall obtain approval from the Planning Commission and shall be required to conform to the requirements of this chapter.

[**Bold and underlined added**. ~~Deleted language stricken through~~.]

Section 2. This Ordinance is of a permanent and general character and shall be included in the City Code.

ENACTED BY THE CITY COUNCIL OF HOMER, ALASKA, this ____ day of _____ 2014.

CITY OF HOMER

_____
MARY E. WYTHE, MAYOR

ATTEST:

_____
JO JOHNSON, MMC, CITY CLERK

AYES:
NOES:
ABSTAIN:
ABSENT:

First Reading:
Public Hearing:
Second Reading:
Effective Date:

Reviewed and approved as to form:

_____
Walt Wrede, City Manager

Date: _____

_____
Thomas F. Klinkner, City Attorney

Date: _____

[**Bold and underlined added**. ~~Deleted language stricken through~~.]

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October 3, 2014

Dear Bridge Creek Watershed Property Owner;

The City of Homer Planning Commission is considering some changes to the watershed zoning rules. The Commission would like to hear from you! The proposed changes will only affect lots smaller than three acres. The rules for larger lots will remain unchanged. The goal of the changes is to make the rules easier to administer, enforce, and to ease the regulations for the smallest lots in the watershed, which are the most affected. Overall the changes would allow a small increase in impervious coverage in relation to the watershed as a whole.

The Commission will hold a public hearing on Wednesday, October 15th, at 6:30 PM, in the City Hall Cowles Council Chambers. You can testify at the meeting, or provide comments in writing by 4 pm the day of the meeting. (See reverse for more public notice information.)

For lots under three acres, there are three main changes:

- First, up to 5,500 square feet may be developed. Under the current rules, only 4.2% of the lot area may be developed, or 6.4% with a mitigation plan. This will change to a flat 5,500 square feet for all lots less than three acres.
- Second, all lots less than three acres will be required to meet some minimum requirements. This is in place of the current mitigation plan requirement.
    - a. Disturbed areas shall be reseeded by August 31st
    - b. Storm water retention of 40 gallons must be provided on site, in the form of one or a combination of dry wells, rain barrels, rain gardens, foot drain retention or other method approved by the City Planner. The storm water retention is intended to mitigate the effect of impervious coverage and the resulting loss of vegetation on water flow.
    - c. When the City Planner finds that special site considerations such as topography or drainage warrant such treatment, a ditch lined with filter fabric and rock shall be constructed to slow water runoff from the driveway and encourage infiltration of water into the ground.
- Third, for lots less than three acres, up to 500 square feet of uncovered deck attached to a residence, and one accessory structure (like a tool shed or greenhouse) with a footprint area up to 200 square feet are excluded from the calculation.

If you would like more information, please visit the Planning Department website at **http://www.cityofhomer-ak.gov/planning,** email: planning @ci.homer.ak.us, or call 235-3106.

Sincerely,

Rick Abboud
City Planner

PUBLIC HEARING NOTICE

Public notice is hereby given that the City of Homer will hold a public hearing by the Homer Advisory Planning Commission on Wednesday, October 15, 2014 at 6:30 p.m. at Homer City Hall, 491 East Pioneer Avenue, Homer, Alaska, on the following matter:

AN ORDINANCE OF THE HOMER CITY COUNCIL AMENDING HOMER CITY CODE 21.40.070, REQUIREMENTS, REGARDING STANDARDS FOR IMPERVIOUS COVERAGE IN THE BRIDGE CREEK WATERSHED PROTECTION DISTRICT.

Anyone wishing to present testimony concerning this matter may do so at the meeting or by submitting a written statement to the Homer Advisory Planning Commission, 491 East Pioneer Avenue, Homer, Alaska 99603, by 4:00 p.m. on the day of the meeting.

The complete proposal is available for review at the City of Homer Planning and Zoning Office located at Homer City Hall. For additional information, please contact Rick Abboud at the Planning and Zoning Office, 235-3106.

Session 14-17, a Regular Meeting of the Homer Advisory Planning Commission was called to order by Chair Stead at 6:30 p.m. on September 17, 2014 at the City Hall Cowles Council Chambers located at 491 E. Pioneer Avenue, Homer, Alaska.

PRESENT: COMMISSIONERS BOS, BRADLEY, ERICKSON, HIGHLAND, STEAD, STROOZAS, VENUTI

STAFF: CITY PLANNER ABBOUD
DEPUTY CITY CLERK JACOBSEN

Approval of Agenda

Chair Stead called for a motion to approve the agenda.

HIGHLAND/BOS SO MOVED

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

Public Comment
The public may speak to the Planning Commission regarding matters on the agenda that are not scheduled for public hearing or plat consideration. (3 minute time limit).

Bob Shavelson noted he had commented at the worksession and wanted to reiterate how valuable and important the public asset of our drinking water supply is in the Bridge Creek Watershed protection district. He wants to emphasize that if we are going to open up provisions to this, that we take a precautionary approach. We know from countless examples it is always more cost effective to protect water quality than to try to treat it after it's been harmed. As we look at increased population it puts increased pressure on our drinking water, it behooves us to move carefully. He reiterated that they step away from a blanket cap on square footage and try to look more carefully at a percentage base and possibly a sliding scale, based on the size of the property. He thinks it would be smart to bring in someone more knowledgeable to look at these issues on a watershed scale and understand what concentrated development in this subdivision versus larger development outside of it means for the health of the area moving forward. He thanked the group and urged them to take a slow and cautious path because it's the only drinking water supply we have.

Kevin Dee echoed Mr. Shavelson's comments. He added that even with cutting the acreage down to one acre it could mean that it could be doable if there was adequate planning and mitigation put in place for all the run off. He also encourages taking a slow and cautions approach. He values the commission's work here and agrees they need to get a level of expertise that deals with this on a variety of levels. It needs to be a holistic view point. He reviewed the approach they use for their 80 acres and their whole systems view of development. There are realty signs going up around the area so there is pressure for people who will be building or buying. The question is what you want the area to look like. The area is doing well with the protection that's in place, he hopes a thoughtful process

takes place in the long term with the right outcome that serves the quality for Homer and for the people who live in the area.

Reconsideration

Adoption of Consent Agenda

All items on the consent agenda are considered routine and non-controversial by the Planning Commission and are approved in one motion. There will be no separate discussion of these items unless requested by a Planning Commissioner or someone from the public, in which case the item will be moved to the regular agenda and considered in normal sequence.

A. Approval of Minutes of September 3, 2014 meeting

Chair Stead called for a motion to adopt the consent agenda.

HIGHLAND/VENUTI SO MOVED.

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT.

Motion carried.

Presentations

Reports

A. Staff Report PL 14-84, City Planner's Report

City Planner Abboud reviewed the staff report.

B. KPB Planning Commission Report – Franco Venuti

Commissioner Venuti gave his report at the worksession.

Public Hearings

Testimony limited to 3 minutes per speaker. The Commission conducts Public Hearings by hearing a staff report, presentation by the applicant, hearing public testimony and then acting on the Public Hearing items. The Commission may question the public. Once the public hearing is closed the Commission cannot hear additional comments on the topic. The applicant is not held to the 3 minute time limit.

A. Staff Report PL 14-85, Proposed zoning code amendments to change where heliports and helipads are allowed within the City, creates definitions for helipads and changed the definition of hospital.

City Planner Abboud reviewed the staff report.

Chair Stead opened the public hearing.

Pending Business

A. Staff Report PL 14-87, Proposal to amend to the Bridge Creek Watershed Protection District.

City Planner Abboud noted they heard some new information tonight at the worksession and he reviewed the staff report and draft ordinance.

There was discussion about current lot sizes, proposed development area, and regulations currently in place relating to subdividing. They acknowledged the proposed ordinance is a starting draft based on information the Commission addressed so far. It is something the property owners can consider and give feedback about. The protection district seems to be working now, so they have time to get input.

Other comments included concerns about driveways and parking. Many of the homes have minimal driveways and parking, which becomes a safety concern in the winter. Also, Mr. Shavelson's suggestion to work with a hydrologist would be fitting for the Commission's work on this. Adding it to the CIP could be an option for getting help with funding to pay for the work. It would also be helpful to look at the information the Inletkeeper has accumulated over the years.

There was consensus of the Commission to hold a public hearing at the October 16 meeting.

New Business

A. Staff Report PL 14-88, An ordinance of the Homer City Council amending Homer City Code 21.70.010, Zoning permit required, and 21.90.030, Invalid land use permits regarding the requirement for a zoning permit and the relationship of zoning violations to permit issuance.

City Planner Abboud reviewed the staff report.

There was discussion about follow-up after permits are issued. It was explained that presently things may or may not be verified, and many permits get issued because what the applicant is asking for is legally permissible, although they may have an issue on their property.

Further discussion centered on the notion of building permits or zoning permits being documentation of work completed on homes, for example, throughout the years. That is how it is done in other communities, and despite the resistance to rules, some of that should be regulated in Homer. The "buyer beware" mentality of properties in the city is shameful.

Point was raised that this ordinance addresses zoning code, which is about land use. City Planner Abboud noted that site visits are done as much as possible to follow up on the work after the permit is issued.

HIGHLAND/BOS MOVED TO HOLD A PUBLIC HEARING ON STAFF REPORT PL 14-88.

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT.

Motion carried.

Informational Materials

A. City Manager's Report, September 8, 2014

B. Joanne Thordarson Letter – view obstruction with new development in Forest Glenn Subdivsion

Comments of the Audience

Members of the audience may address the Commission on any subject. (3 minute time limit)

Scott Adams, city resident, commented about the Bridge Creek/ Kelly Ranch area. He is surprised the Borough allowed that subdivision to go in and some of those back lots should never have been sold. Some of the property on Skyline that is away from the water areas could use some tweaking because most of the acreage is over three acres and they have been on the market for a good ten years. He thinks it should be based on individual lots and not the general area because of the difference in lot size and location within the watershed district. He hopes they do step back and look at the watershed district. In the discussion about regulating development in Homer, their work on steep slope put restrictions on property there. He lives in that area and will be abiding by those rules. He noted that he lives in the area that was annexed and was told the area would get water, only to find out ten years later it isn't feasible. That kind of puts a sting on things. He likes where they are going, he thinks a building inspector might be a direction we are headed. He explained a situation with a neighbor who bought a house that was owner built and the issues she has had to face.

Comments of Staff

City Planner Abboud said they have been working on strategic planning with the Mayor and Council, including some review of the Comp Plan. He will bring the Commission the information to review. The Commission will be looking at some Comp Plan updates in the near future.

Deputy City Clerk Jacobsen reminded the group about the upcoming Volunteer Appreciation Event and also early voting for the municipal elections.

Comments of the Commission

Commissioner Highland said it was a good meeting. She asked about comments she heard about NAPA complaining about having to repaint their building and sign issues. City Planner Abboud reviewed information about corporate branding and the colors those corporate businesses use to advertise. The NAPA building sign and legacy are beyond our code. If someday there are changes, they will need to conform to code. Ms. Highland asked if an acknowledgement could be sent to Joann Thordarson regarding her letter in the informational items.

Commissioner Bradley said she will be absent on October 1st.

Laydown at Sept 17, 2014 meeting

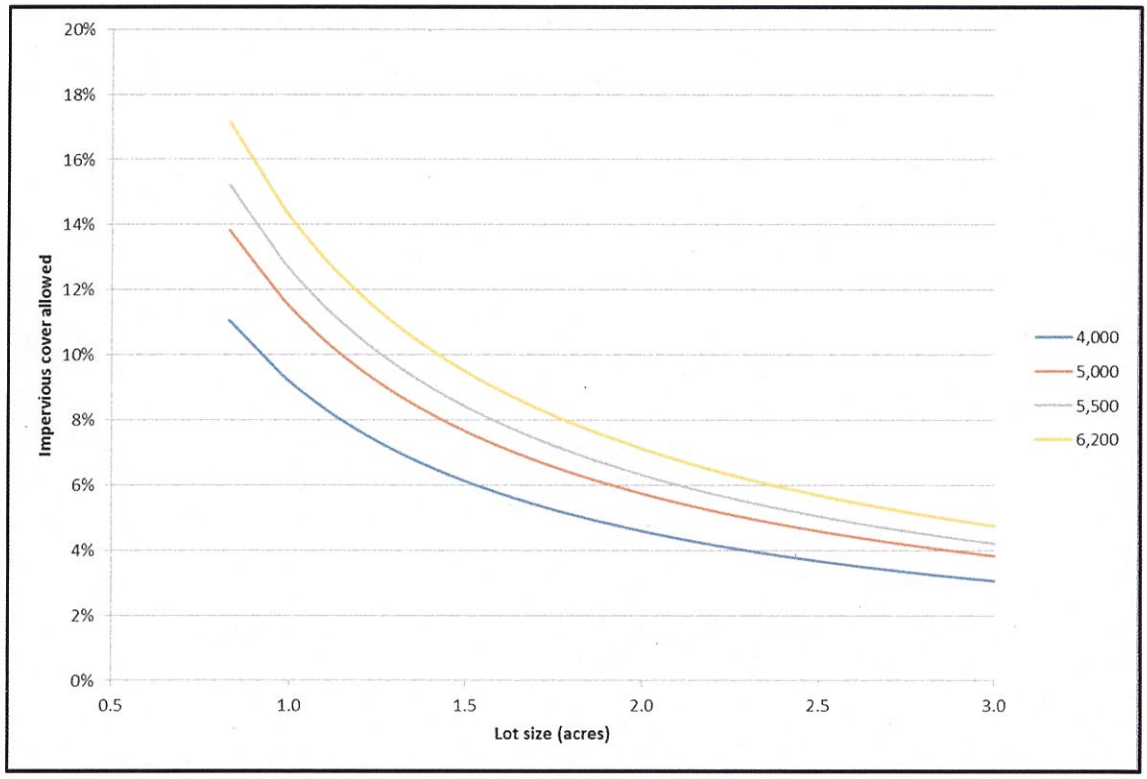
Map #	Parcel Number	Acres	Square Feet	Do Improvements Exist? (Source KPB)	Is the Parcel within the Riparian Corridor?	Do Impervious Road Surfaces Exist?	Parcel Straddles BCWPD Boundary	Square Footage (Source: Kenai Peninsula Borough)	Percent Impervious Cover	Square Footage for 4.20% Impervious	Square Footage over 4.20%	Square Footage for 6.40% Impervious	Square Footage over 6.40%	Developed Area Propsed by Panning Staff (ft^2)	Percent Impervious Cover	Developed Area Propsed by Panning Staff (ft^2)	Percent Impervious Cover	Revised Developed Area Propsed by Panning Staff (ft^2)	Percent Impervious Cover	Developed Area Proposed By Realtors (ft^2)	Percent Impervious Cover
26	17402501	0.83	36154.8	Yes				2162	5.98%	1519	643	2314	-152	4000	11.06%	5000	13.83%	5500	15.21%	6200	17.15%
28	17402505	0.98	42688.8	No					0.00%	1793	-1793	2732	-2732	4000	9.37%	5000	11.71%	5500	12.88%	6200	14.52%
137	17359201	0.98	42688.8	No	no	no			0.00%	1793	-1793	2732	-2732	4000	9.37%	5000	11.71%	5500	12.88%	6200	14.52%
44	17305415	1.01	43995.6	No					0.00%	1848	-1848	2816	-2816	4000	9.09%	5000	11.36%	5500	12.50%	6200	14.09%
43	17305416	1.03	44866.8	Yes				1659	3.70%	1884	-225	2871	-1212	4000	8.92%	5000	11.14%	5500	12.26%	6200	13.82%
23	17305432	1.10	47916	Yes				1986	4.14%	2012	-26	3067	-1081	4000	8.35%	5000	10.43%	5500	11.48%	6200	12.94%
110	17407008	1.13	49222.8	Yes	yes	yes		1	0.00%	2067	-2066	3150	-3149	4000	8.13%	5000	10.16%	5500	11.17%	6200	12.60%
100	17408014	1.15	50094	Yes	no	yes		2989	5.97%	2104	885	3206	-217	4000	7.98%	5000	9.98%	5500	10.98%	6200	12.38%
10	17305447	1.20	52272	Yes				849	1.62%	2195	-1346	3345	-2496	4000	7.65%	5000	9.57%	5500	10.52%	6200	[illegible]
30	17305430	1.20	52272	No					0.00%	2195	-2195	3345	-3345	4000	7.65%	5000	9.57%	5500	10.52%	6200	[illegible]
11	17305446	1.21	52707.6	No					0.00%	2214	-2214	3373	-3373	4000	7.59%	5000	9.49%	5500	10.43%	6200	11.76%
34	17305425	1.21	52707.6	No					0.00%	2214	-2214	3373	-3373	4000	7.59%	5000	9.49%	5500	10.43%	6200	11.76%
64	17405203	1.21	52707.6	Yes	no	yes		3530	6.70%	2214	1316	3373	157	4000	7.59%	5000	9.49%	5500	10.43%	6200	11.76%
46	17305413	1.22	53143.2	Yes				1	0.00%	2232	-2231	3401	-3400	4000	7.53%	5000	9.41%	5500	10.35%	6200	11.67%
77	17405101	1.23	53578.8	Yes	no	yes		3026	5.65%	2250	776	3429	-403	4000	7.47%	5000	9.33%	5500	10.27%	6200	11.57%
13	17305443	1.24	54014.4	No					0.00%	2269	-2269	3457	-3457	4000	7.41%	5000	9.26%	5500	10.18%	6200	11.48%
18	17305438	1.24	54014.4	No					0.00%	2269	-2269	3457	-3457	4000	7.41%	5000	9.26%	5500	10.18%	6200	11.48%
27	17305431	1.24	54014.4	No					0.00%	2269	-2269	3457	-3457	4000	7.41%	5000	9.26%	5500	10.18%	6200	11.48%
76	17405215	1.24	54014.4	No	no	no			0.00%	2269	-2269	3457	-3457	4000	7.41%	5000	9.26%	5500	10.18%	6200	11.48%
2	17305406	1.25	54450	No					0.00%	2287	-2287	3485	-3485	4000	7.35%	5000	9.18%	5500	10.10%	6200	11.39%
37	17305419	1.26	54885.6	No					0.00%	2305	-2305	3513	-3513	4000	7.29%	5000	9.11%	5500	10.02%	6200	11.30%
82	17405107	1.27	55321.2	Yes	no	yes		1612	2.91%	2323	-711	3541	-1929	4000	7.23%	5000	9.04%	5500	9.94%	6200	11.21%
33	17305426	1.29	56192.4	Yes				2266	4.03%	2360	-94	3596	-1330	4000	7.12%	5000	8.90%	5500	9.79%	6200	11.03%
94	17404001	1.29	56192.4	Yes	no	yes		4800	8.54%	2360	2440	3596	1204	4000	7.12%	5000	8.90%	5500	9.79%	6200	11.03%
47	17305412	1.30	56628	No					0.00%	2378	-2378	3624	-3624	4000	7.06%	5000	8.83%	5500	9.71%	6200	10.95%
50	17366009	1.30	56628	No	yes				0.00%	2378	-2378	3624	-3624	4000	7.06%	5000	8.83%	5500	9.71%	6200	10.95%
24	17305433	1.32	57499.2	No					0.00%	2415	-2415	3680	-3680	4000	6.96%	5000	8.70%	5500	9.57%	6200	10.78%
35	17305424	1.36	59241.6	No					0.00%	2488	-2488	3791	-3791	4000	6.75%	5000	8.44%	5500	9.28%	6200	10.47%
63	17405204	1.37	59677.2	Yes	no	yes		4619	7.74%	2506	2113	3819	800	4000	6.70%	5000	8.38%	5500	9.22%	6200	10.39%
104	17408016	1.37	59677.2	Yes	?	yes		2565	4.30%	2506	59	3819	-1254	4000	6.70%	5000	8.38%	5500	9.22%	6200	[illegible]
41	17305421	1.38	60112.8	No					0.00%	2525	-2525	3847	-3847	4000	6.65%	5000	8.32%	5500	9.15%	6200	10.31%
45	17305414	1.38	60112.8	No					0.00%	2525	-2525	3847	-3847	4000	6.65%	5000	8.32%	5500	9.15%	6200	10.31%
83	17404021	1.38	60112.8	No	no	no			0.00%	2525	-2525	3847	-3847	4000	6.65%	5000	8.32%	5500	9.15%	6200	10.31%
65	17405202	1.41	61419.6	No	no	yes			0.00%	2580	-2580	3931	-3931	4000	6.51%	5000	8.14%	5500	8.95%	6200	10.09%
72	17405226	1.43	62290.8	No	no	no			0.00%	2616	-2616	3987	-3987	4000	6.42%	5000	8.03%	5500	8.83%	6200	9.95%
73	17405227	1.43	62290.8	Yes	no	yes		1	0.00%	2616	-2615	3987	-3986	4000	6.42%	5000	8.03%	5500	8.83%	6200	9.95%
74	17405228	1.43	62290.8	Yes	no	yes		1574	2.53%	2616	-1042	3987	-2413	4000	6.42%	5000	8.03%	5500	8.83%	6200	9.95%
75	17405229	1.43	62290.8	Yes	no	yes		2989	4.80%	2616	373	3987	-998	4000	6.42%	5000	8.03%	5500	8.83%	6200	9.95%
3	17305405	1.44	62726.4	No					0.00%	2635	-2635	4014	-4014	4000	6.38%	5000	7.97%	5500	8.77%	6200	9.88%
31	17305428	1.45	63162	Yes				2874	4.55%	2653	221	4042	-1168	4000	6.33%	5000	7.92%	5500	8.71%	6200	9.82%
66	17405201	1.45	63162	No	no	no			0.00%	2653	-2653	4042	-4042	4000	6.33%	5000	7.92%	5500	8.71%	6200	9.82%
95	17404029	1.46	63597.6	No	no	no			0.00%	2671	-2671	4070	-4070	4000	6.29%	5000	7.86%	5500	8.65%	6200	9.75%
42	17305422	1.47	64033.2	Yes				1	0.00%	2689	-2688	4098	-4097	4000	6.25%	5000	7.81%	5500	8.59%	6200	9.68%
84	17404022	1.48	64468.8	No	no	no			0.00%	2708	-2708	4126	-4126	4000	6.20%	5000	7.76%	5500	8.53%	6200	9.62%
14	17305442	1.49	64904.4	Yes				2501	3.85%	2726	-225	4154	-1653	4000	6.16%	5000	7.70%	5500	8.47%	6200	9.55%

Laydown at Sept. 17, 2014 meeting

15	17305441	1.50	65340	Yes				2706	4.14%	2744	-38	4182	-1476	4000	6.12%	5000	7.65%	5500	8.42%	6200	9.49%
22	17305434	1.50	65340	Yes				3033	4.64%	2744	289	4182	-1149	4000	6.12%	5000	7.65%	5500	8.42%	6200	9.49%
32	17305427	1.51	65775.6	Yes				3098	4.71%	2763	335	4210	-1112	4000	6.08%	5000	7.60%	5500	8.36%	6200	9.43%
81	17405106	1.51	65775.6	Yes	no	yes		5981	9.09%	2763	3218	4210	1771	4000	6.08%	5000	7.60%	5500	8.36%	6200	9.43%
114	17407012	1.52	66211.2	Yes	no	yes		473	0.71%	2781	-2308	4238	-3765	4000	6.04%	5000	7.55%	5500	8.31%	6200	9.36%
8	17305402	1.53	66646.8	Yes				1088	1.63%	2799	-1711	4265	-3177	4000	6.00%	5000	7.50%	5500	8.25%	6200	9.30%
20	17305437	1.54	67082.4	Yes				2468	3.68%	2817	-349	4293	-1825	4000	5.96%	5000	7.45%	5500	8.20%	6200	9.24%
85	17404023	1.54	67082.4	No	no	no			0.00%	2817	-2817	4293	-4293	4000	5.96%	5000	7.45%	5500	8.20%	6200	9.24%
101	17408015	1.54	67082.4	Yes	no	yes		3790	5.65%	2817	973	4293	-503	4000	5.96%	5000	7.45%	5500	8.20%	6200	9.24%
16	17305440	1.56	67953.6	Yes				4362	6.42%	2854	1508	4349	13	4000	5.89%	5000	7.36%	5500	8.09%	6200	9.12%
39	17305417	1.56	67953.6	No					0.00%	2854	-2854	4349	-4349	4000	5.89%	5000	7.36%	5500	8.09%	6200	9.12%
36	17305423	1.60	69696	Yes				2987	4.29%	2927	60	4461	-1474	4000	5.74%	5000	7.17%	5500	7.89%	6200	8.90%
51	17366010	1.60	69696	No	yes				0.00%	2927	-2927	4461	-4461	4000	5.74%	5000	7.17%	5500	7.89%	6200	8.90%
48	17305411	1.61	70131.6	No					0.00%	2946	-2946	4488	-4488	4000	5.70%	5000	7.13%	5500	7.84%	6200	8.84%
103	17408011	1.63	71002.8	No	Yes	no			0.00%	2982	-2982	4544	-4544	4000	5.63%	5000	7.04%	5500	7.75%	6200	8.73%
138	17307063	1.68	73180.8	No	yes	no			0.00%	3074	-3074	4684	-4684	4000	5.47%	5000	6.83%	5500	7.52%	6200	[illegible]
[illegible]8	17305418	1.70	74052	Yes				2073	2.80%	3110	-1037	4739	-2666	4000	5.40%	5000	6.75%	5500	7.43%	6200	[illegible]
[illegible]6	17404028	1.73	75358.8	No	no	no			0.00%	3165	-3165	4823	-4823	4000	5.31%	5000	6.63%	5500	7.30%	6200	8.23%
[illegible]5	17407011	1.73	75358.8	Yes	no	yes		775	1.03%	3165	-2390	4823	-4048	4000	5.31%	5000	6.63%	5500	7.30%	6200	8.23%
49	17305410	1.75	76230	Yes				3022	3.96%	3202	-180	4879	-1857	4000	5.25%	5000	6.56%	5500	7.22%	6200	8.13%
7	17305401	1.76	76665.6	Yes				2693	3.51%	3220	-527	4907	-2214	4000	5.22%	5000	6.52%	5500	7.17%	6200	8.09%
17	17305439	1.76	76665.6	No					0.00%	3220	-3220	4907	-4907	4000	5.22%	5000	6.52%	5500	7.17%	6200	8.09%
40	17305420	1.77	77101.2	No					0.00%	3238	-3238	4934	-4934	4000	5.19%	5000	6.48%	5500	7.13%	6200	8.04%
52	17366011	1.80	78408	No	yes				0.00%	3293	-3293	5018	-5018	4000	5.10%	5000	6.38%	5500	7.01%	6200	7.91%
87	17404025	1.80	78408	No	no	no			0.00%	3293	-3293	5018	-5018	4000	5.10%	5000	6.38%	5500	7.01%	6200	7.91%
109	17407009	1.80	78408	No	yes	no			0.00%	3293	-3293	5018	-5018	4000	5.10%	5000	6.38%	5500	7.01%	6200	7.91%
86	17404024	1.82	79279.2	No	no	no			0.00%	3330	-3330	5074	-5074	4000	5.05%	5000	6.31%	5500	6.94%	6200	7.82%
29	17305429	1.85	80586	Yes				4367	5.42%	3385	982	5158	-791	4000	4.96%	5000	6.20%	5500	6.83%	6200	7.69%
58	17405220	1.86	81021.6	Yes	no	yes		1	0.00%	3403	-3402	5185	-5184	4000	4.94%	5000	6.17%	5500	6.79%	6200	7.65%
59	17405219	1.86	81021.6	Yes	no	yes		1514	1.87%	3403	-1889	5185	-3671	4000	4.94%	5000	6.17%	5500	6.79%	6200	7.65%
60	17405218	1.86	81021.6	Yes	no	yes		1290	1.59%	3403	-2113	5185	-3895	4000	4.94%	5000	6.17%	5500	6.79%	6200	7.65%
61	17405216	1.86	81021.6	Yes	no	yes		3	0.00%	3403	-3400	5185	-5182	4000	4.94%	5000	6.17%	5500	6.79%	6200	7.65%
62	17405217	1.86	81021.6	Yes	no	yes		1912	2.36%	3403	-1491	5185	-3273	4000	4.94%	5000	6.17%	5500	6.79%	6200	7.65%
67	17405223	1.86	81021.6	Yes	no	no		1890	2.33%	3403	-1513	5185	-3295	4000	4.94%	5000	6.17%	5500	6.79%	6200	7.65%
68	17405224	1.86	81021.6	No	no	yes			0.00%	3403	-3403	5185	-5185	4000	4.94%	5000	6.17%	5500	6.79%	6200	7.65%
71	17405225	1.86	81021.6	Yes	no	yes		981	1.21%	3403	-2422	5185	-4204	4000	4.94%	5000	6.17%	5500	6.79%	6200	7.65%
1	17305407	1.88	81892.8	No	Yes				0.00%	3439	-3439	5241	-5241	4000	4.88%	5000	6.11%	5500	6.72%	6200	[illegible]
106	17406006	2.00	87120	Yes	?	yes		1509	1.73%	3659	-2150	5576	-4067	4000	4.59%	5000	5.74%	5500	6.31%	6200	[illegible]
19	17305436	2.03	88426.8	No					0.00%	3714	-3714	5659	-5659	4000	4.52%	5000	5.65%	5500	6.22%	6200	7.01%
78	17405102	2.04	88862.4	Yes	no	yes		3419	3.85%	3732	-313	5687	-2268	4000	4.50%	5000	5.63%	5500	6.19%	6200	6.98%
79	17405103	2.12	92347.2	NO	no	no			0.00%	3879	-3879	5910	-5910	4000	4.33%	5000	5.41%	5500	5.96%	6200	6.71%
21	17305435	2.16	94089.6	No					0.00%	3952	-3952	6022	-6022	4000	4.25%	5000	5.31%	5500	5.85%	6200	6.59%
69	17405222	2.16	94089.6	Yes	no	yes		1153	1.23%	3952	-2799	6022	-4869	4000	4.25%	5000	5.31%	5500	5.85%	6200	6.59%
70	17405221	2.16	94089.6	Yes	no	yes		1290	1.37%	3952	-2662	6022	-4732	4000	4.25%	5000	5.31%	5500	5.85%	6200	6.59%
97	17404027	2.21	96267.6	No	no	no			0.00%	4043	-4043	6161	-6161	4000	4.16%	5000	5.19%	5500	5.71%	6200	6.44%
9	17305403	2.31	100623.6	No					0.00%	4226	-4226	6440	-6440	4000	3.98%	5000	4.97%	5500	5.47%	6200	6.16%
12	17305448	2.39	104108.4	Yes				2331	2.24%	4373	-2042	6663	-4332	4000	3.84%	5000	4.80%	5500	5.28%	6200	5.96%
54	17366013	2.50	108900	No	yes				0.00%	4574	-4574	6970	-6970	4000	3.67%	5000	4.59%	5500	5.05%	6200	5.69%
105	17408017	2.54	110642.4	Yes	yes	yes		3962	3.58%	4647	-685	7081	-3119	4000	3.62%	5000	4.52%	5500	4.97%	6200	5.60%
113	17407014	2.68	116740.8	Yes	no	yes		5340	4.57%	4903	437	7471	-2131	4000	3.43%	5000	4.28%	5500	4.71%	6200	5.31%
5	17305408	2.86	124581.6	No					0.00%	5232	-5232	7973	-7973	4000	3.21%	5000	4.01%	5500	4.41%	6200	4.98%

Lodown at Sept. 17 2014 meeting

Bridge Creek Watershed Protection District
Proposed Revisions HCC 21.40.070 – Sept. 17, 2014



70% (68 out of 96) would result in an impervious cover greater than 6.4% with a 5,000 foot cap.
85% (82 out of 96) would result in an impervious cover greater than 6.4% with a 5,500 foot cap.
94% (90 out of 96) would result in an impervious cover greater than 6.4% with a 6,200 foot cap

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Staff Report PL 14-87

TO:	Homer Advisory Planning Commission
THROUGH:	Rick Abboud, City Planner
FROM:	Julie Engebretsen, Deputy City Planner
DATE:	September 17, 2014
SUBJECT:	Amendments to the Bridge Creek Watershed Protection District

Introduction

This staff report is a continuation of the discussion on amendments to the Bridge Creek Watershed Protection District. At the work session, Bob Shavelson form Cook InletKeeper will make a presentation. At the last regular meeting, the Commission voted on six different proposals. Staff has created a draft ordinance for discussion. In writing the draft ordinance, a few more questions came up for the Commission to consider.

Analysis

Mitigation Plans and storm water

One of the proposals the Commission agreed with was staff approval of mitigation plans. It was suggested in a previous staff report that the storm water volume calculations that are already in code could be used in the watershed. Current code cites the 10 year, 3 hour storm event, which creates 0.5 inches of rainfall per hour (so 1.5 inches total). Using this calculation, staff figured that an 'average' small house would be required to retain 17 gallons of water. If we use the current code language, then this water calculation would have to be done for every development. That seems like a lot of work when we are talking about pretty small water volumes. Staff has this proposal: Every lot under 3 acres in the watershed would be required to retain water based the maximum impervious coverage. In other words, retain water based on the assumption that everyone will build out to the 5,500 square feet of impervious surface, plus 500 square foot deck plus 200 square foot shed (6,200 square feet). This raises the amount of water to be retained to 40 gallons. This could be accomplished with two rain barrels, for under $300.00. Using a firm number of gallons saves staff and the land owner the time of making a calculation every time there is development. The small water volume generated doesn't really warrant a computation for every development, and 40 gallons of retention is very easy to accomplish. Options include rain barrels, rain gardens, foot drain retention areas, dry wells, etc. Additionally, when a new home is built, this retention would be included. The mitigation plan would not need to be changed if there was more construction in the future since it was included at the time of constructions. Existing homes can easily add a rain barrels to meet this requirement.

Table 1. Storm water created by impervious surface area

Impervious area (Sq Ft)	Rainfall cu. inch	storm water created cu. inch	Total gallons
2750	1.5	4125	17.9
5500	1.5	8250	37.5
6200	1.5	9300	40.3

Mitigation plans or simple code requirement?

Another issue came to light as the ordinance was drafted. The 4.2% calculation on lots under about 2 acres results in a small impervious area. Staff thinks many of these land owners will apply for a mitigation plan. Rather than have a 4.2% rule for lots less than 3 acres, staff recommends that all lots less than 3 acres have to follow a mitigation plan and can develop up to 5500 square feet. The mitigation simply becomes part of the requirements for building in this district, (ie a performance standard). In fact we could just get rid of the term mitigation; construction simply has specific requirements in this district, just like other districts might require paved parking lots or require landscaping. And since all mitigation would be for the maximum amount, it could be a onetime effort by the land owner. For example, if the land owner built a new home with footer drain retention, they wouldn't need to update their mitigation plan if they created more impervious surface in the future. Staff recommends eliminating the 4.2% language for lots less than 3 acres. Lots less than 3 acres would be allowed a certain amount of coverage and would be required to construct storm water detention. See attached ordinance.

Total Impact of these changes to the watershed

At the last meeting the Commission questioned the total impact to the watershed, if 5,500 square feet of impervious surface was allowed, and in addition, 500 square feet of deck and 200 square feet of accessory structure were allowed. This would total 6,200 square feet, and apply to all lots under 3 acres, developed or vacant.

- Total impervious coverage under the existing rules: **9.24 acres** (See SR 14-83)
- Total impervious coverage with only 5,500 square feet impervious = **11.74 acres. This is an increase of 2.5 acres.**
- Total impervious coverage of 5,500 sq ft + 500 deck + 200 shed = **13.24 acres**

This is an increase of 4 acres from the existing rules. Creates up to 8.95% impervious coverage for the 93 developable lots containing 148 acres that are affected.

If the Commission feels that 13.24 acres is too much, the ordinance can be amended by deleting lines 28-31.

Staff Recommendation

1. Discuss the draft ordinance and make any amendments. When ready, move to public hearing.

Staff will forward the ordinance to the attorney for review, schedule a public hear for October 15th (estimate) and mail notice to all property owners within the watershed.

Attachments

1. Draft Ordinance 9 17 2014
2. List of developable lots impacted by these rules
3. Minutes of Septembers 3, 2014 HAPC meeting

Draft Ordinance 9 17 2014 HAPC meeting

The requirements of this section shall apply to all structures and uses in the BCWPD district unless more stringent requirements are required pursuant to Chapter 21.71 HCC. The City of Homer water utility is exempt from this section.

a. Impervious Coverage.

1. Lots ~~two and one-half~~ **three** acres and larger shall have a maximum total impervious coverage of 4.2 percent.

2. Lots smaller than ~~two and one-half~~ **three** acres shall have a maximum total impervious coverage of ~~4.2 percent~~**, 5,500 square feet.**~~, except as provided in subsection (a)(3) of this section.~~

3. Lots smaller than ~~two and one-half~~ **three** acres **shall comply with the following performance standards:**

1. Construction sites shall be reseeded by August 31st

2. Storm water retention of 40 gallons must be provided on site. Any combination of dry wells, rain barrels, rain gardens, foot drain retention or other approved method may be used. The storm water retention is intended to mitigate the effect of impervious coverage on water flow and the effect of loss of vegetation created by the impervious coverage.

(NOTE: Attorney to provide defensible language here:) **3. When required by the City Planner due to special site considerations such as topography and drainage, ditch the driveway and line with filter fabric and rock to slow water runoff from the driveway and encourage infiltration of water into the ground.**

~~may be allowed impervious coverage up to 6.4 percent if (a) the owner submits a lot-specific mitigation plan for Planning Commission's approval, and (b) if approved, thereafter implements and continuously complies with the approved plan. The mitigation plan must be designed to mitigate the effect of impervious coverage on water flow and the effect of loss of vegetation created by the impervious coverage.~~

b. Impervious Coverage Calculations.

1. For the purpose of calculating impervious coverage on lots smaller than ~~two and one-half~~ **three** acres, **uncovered decks up to 500 square feet when attached to a**

residence, and one accessory structure up to 200 square feet are excluded from calculation.

~~driveways and walkways may be partially or fully excluded from the calculation, if constructed and maintained in accordance with a mitigation plan, submitted and approved in accordance with subsection (a)(3) of this section.~~

List of affected lots by lot size

USEAGE	ACREAGE
110 Residential Dwelling - single	0.83
100 Residential Vacant	0.98
100 Residential Vacant	0.98
100 Residential Vacant	1.01
110 Residential Dwelling - single	1.03
110 Residential Dwelling - single	1.10
105 Residential Improved Land	1.13
110 Residential Dwelling - single	1.15
100 Residential Vacant	1.20
190 Residential Accessory Bldg	1.20
100 Residential Vacant	1.21
100 Residential Vacant	1.21
110 Residential Dwelling - single	1.21
105 Residential Improved Land	1.22
110 Residential Dwelling - single	1.23
100 Residential Vacant	1.24
100 Residential Vacant	1.24
100 Residential Vacant	1.24
100 Residential Vacant	1.24
100 Residential Vacant	1.25
100 Residential Vacant	1.26
110 Residential Dwelling - single	1.27
110 Residential Dwelling - single	1.29
112 Residential Dwellings 2-4	1.29
100 Residential Vacant	1.30
100 Residential Vacant	1.30
100 Residential Vacant	1.32
100 Residential Vacant	1.36
110 Residential Dwelling - single	1.37
100 Residential Vacant	1.38
100 Residential Vacant	1.38
100 Residential Vacant	1.38
100 Residential Vacant	1.41
100 Residential Vacant	1.43
110 Residential Dwelling - single	1.43
110 Residential Dwelling - single	1.43
105 Residential Improved Land	1.43
100 Residential Vacant	1.44
110 Residential Dwelling - single	1.45
100 Residential Vacant	1.45
100 Residential Vacant	1.46
105 Residential Improved Land	1.47
100 Residential Vacant	1.48
110 Residential Dwelling - single	1.49
110 Residential Dwelling - single	1.50
110 Residential Dwelling - single	1.50
110 Residential Dwelling - single	1.51
190 Residential Accessory Bldg	1.52
110 Residential Dwelling - single	1.53
110 Residential Dwelling - single	1.54
100 Residential Vacant	1.54
110 Residential Dwelling - single	1.54
100 Residential Vacant	1.56
110 Residential Dwelling - single	1.56
110 Residential Dwelling - single	1.60
100 Residential Vacant	1.60
100 Residential Vacant	1.61
100 Residential Vacant	1.63
110 Residential Dwelling - single	1.70
100 Residential Vacant	1.73
110 Residential Dwelling - single	1.73
110 Residential Dwelling - single	1.75
110 Residential Dwelling - single	1.76
100 Residential Vacant	1.76
100 Residential Vacant	1.77
100 Residential Vacant	1.80
100 Residential Vacant	1.80
100 Residential Vacant	1.80
100 Residential Vacant	1.82
110 Residential Dwelling - single	1.85
110 Residential Dwelling - single	1.86
105 Residential Improved Land	1.86
110 Residential Dwelling - single	1.86
130 Residential Mobile Home	1.86
105 Residential Improved Land	1.86
110 Residential Dwelling - single	1.86
100 Residential Vacant	1.86
110 Residential Dwelling - single	1.86
100 Residential Vacant	1.88
110 Residential Dwelling - single	2.00
100 Residential Vacant	2.03
110 Residential Dwelling - single	2.04
100 Residential Vacant	2.12
100 Residential Vacant	2.16
110 Residential Dwelling - single	2.16
130 Residential Mobile Home	2.16
100 Residential Vacant	2.21

100 Residential Vacant	2.31
110 Residential Dwelling - single	2.39
600 Leased Vacant Land	2.50
110 Residential Dwelling - single	2.54
112 Residential Dwellings 2-4	2.68
100 Residential Vacant	2.86

(next lot is 3 acres in size)

93 lots, totaling 148 acres

A. Staff Report PL 14-83, Proposal to amend to the Bridge Creek Watershed Protection District.

City Planner Abboud commented that Cookinlet Keeper will be providing feedback at a future meeting and briefly reviewed the staff report and the proposals included in the report.

ERICKSON/HIGHLAND MOVED TO ACCEPT PROPOSAL 2, 4, AND 5 AS IS.

Proposal 2: Staff, rather than the Commission, will approve mitigation plans. Code requirements for mitigation plans will be drafted based on prior staff reports and meeting minutes.
Proposal 4: Uncovered decks connected to a primary structure are exempt from impervious calculations (up to 500 square feet.)
Proposal 5: One accessory structure up to 200 square feet is allowed without a zoning permit and is not counted toward impervious coverage on the lot.

Comments included:

- Proposals 2, 4, and 5 gives the property owners a little more flexibility and simpler for the planning department. It's a good compromise to get started without a lot of extra work.
- There haven't been a lot of property owners clamoring for this change. The realtors have an interest.
- Water quality is the most important aspect to all of us and unless we get a lot of people clamoring for change, then there isn't a pressing reason to change.
- Decisions should be made based on feedback from the people who live there.
- Uncovered decks being exempt seem reasonable.
- The numbers in 4 and 5 would be in addition to the total square foot allowable coverage.

There was discussion about the impact of proposals 4 and 5, on current residents and impervious coverage.

ERICKSON/HIGHLAND MOVED TO AMEND PROPOSAL 4 THAT THE 500 SQUARE FEET INCLUDES THE EXISTING DECKS.

There was discussion that this will help clarify the intent that existing residents can have the exemption for up to 500 sf of deck. City Planner Abboud suggested after the amendment proposal 4 would read uncovered decks, including existing decks, connected to a primary structure are exempt from impervious calculations (up to 500 sf).

VOTE: (Amendment) YES: BOS, HIGHLAND, ERICKSON, BRADLEY
NO: VENUTI

Motion carried.

There was no further discussion on the main motion as amended.

VOTE: (Main motion as amended): YES: HIGHLAND, ERICKSON, VENUTI, BRADLEY, BOS

Motion carried.

HIGHLAND/ERICKSON MOVED TO ACCEPT PROPOSAL THREE.

Proposal 3: Set a maximum amount of developable area for smaller lots. Staff recommends for lots under 3 acres:

1. *An impervious surface maximum of 5,500 square feet.*
2. *A property may have 4.2% impervious surface without a mitigation plan.*
3. *Eliminate the provision of an increase to 6.4%, instead, the cap is a flat 5,500 square feet.*
4. *If a property wants to go over 4.2%, a mitigation plan is required*

Comments included:

- The realtor's suggestion of a 6200 sf coverage allowance to encompass a 2000 to 2200 sf house seems reasonable for growing families. Reducing it to 5500 reduces the size of those family houses.
- Access is a key point in how much coverage is needed. Some of the lots need long driveways.
- With the demographics of an aging population, is 5500 sf adequate for a ranch still home and attached garage.
- It's hard to say whether or not the 2.5 acre lots will need enough driveway construction to use up a significant amount of impervious coverage.
- 5500 sf allowance with the 500 sf deck and 200 sf out building is still a 6200 sf allowance overall. Less than 5500 sf allowed would not be adequate for development.

There was discussion for clarification that the 4 recommendations in proposals three would all be options for development on lots less than three acres.

In response to the suggestion of an incentive for property owners to purchase the empty lot next to them and leave it vacant to help protect the watershed, City Planner Abboud explained it could work in a place where there is a lot of pressure for development and a lot of opportunity for protection. In this case it could eventually raise issue with non-conformity. It is also questionable if the demand is there.

There was further discussion reviewing and clarifying the calculations addressed in the effects of proposal three.

VOTE: YES: ERICKSON, BRADLEY, BOS, HIGHLAND, VENUTI

Motion carried.

HIGHLAND/VENUTI MOVED TO ACCEPT PROPOSAL ONE.

Proposal 1: Allow a portion of a lot to be excluded from the watershed.

There was discussion that there is an allowance in code that a property owner can be excluded if they provide evidence the entire lot is out of the watershed. Allowing a portion of a lot to be excluded can raise issue with meandering lines, manipulating lots, and how the property can be developed.

VOTE: NO: BRADLEY, VENUTI, HIGHLAND, BOS, ERICKSON

Motion failed.

VENUTI/BOS MOVED TO ACCEPT THE PROPOSAL TO ALLOW MOVING PROPERTY LINES TO FOLLOW WATERSHED BOUNDARIES.

There was discussion that this is like proposal one, where it raises similar issues. There is already a requirement lots can't be subdivided smaller than 4.5 acres.

VOTE: NO: VENUTI, BRADLEY, BOS, ERICKSON, HIGHLAND

Motion failed.

New Business

Informational Materials

A. City Manager's Report, August 25, 2014

B. Kenai Peninsula Borough Planning Commission Notice of Decision Re: James Waddell Survey Petska Addition Time Extension Request

Comments of the Audience

Members of the audience may address the Commission on any subject. (3 minute time limit)

None

Comments of Staff

None

Comments of the Commission

Commissioner Highland said well-done Mr. Bos.

Commissioner Bradley had no comment.

Commissioner Erickson said it was a fun meeting.

Commissioner Venuti said Mr. Bos was a great Chair tonight.

Acting Chair Bos said it was a good meeting. He liked the talk about the water shed and water quality.

Adjourn

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Staff Report PL 14-83

TO:	Homer Advisory Planning Commission
THROUGH:	Rick Abboud, City Planner
FROM:	Julie Engebretsen, Deputy City Planner
DATE:	September 3, 2014
SUBJECT:	Proposal to amend the Bridge Creek Watershed Protection District

Introduction

- At the work session, Todd Cook, City of Homer City Water/Wastewater Plant Superintendent will speak about water quality in the Bridge Creek Watershed Protection District, and the water and sewer distribution and collection systems.
- If the Commission has any questions about water treatment and the BCWPD, please bring them for discussion at the work session.
- Cook InletKeeper is likely to be a speaker at a future work session (possibly the next work session). After that if the Commission is ready, staff will mail out a public hearing notice and information to all land owners within the watershed, for a public hearing at the second meeting in October.
- This staff report is divided into two sections: topics that seem to be resolved, and topics that are still under discussion. Staff requests the Commission make motions on these issues, so an ordinance can be drafted.

Resolved Topics

The following topics have been discussed. Proposals 2, 4 and 5 appear to have Commission support, while proposal 1 does not. Please make a motion, and staff will draft an ordinance accordingly.

- Proposal 1: Allow a portion of a lot to be excluded from the watershed.
- Proposal 2: Staff, rather than the Commission, will approve mitigation plans. Code requirements for mitigation plans will be drafted based on prior staff reports and meeting minutes.
- Proposal 4: Uncovered decks connected to a primary structure are exempt from impervious calculations (up to 500 square feet.)
- Proposal 5: One accessory structure up to 200 square feet is allowed without a zoning permit and is not counted toward impervious coverage on the lot.
- Citizen proposal: Mr. Treat made comments to the Commission on April 16th, and provided comments by email for the August 6th meeting. He would like the option of

moving property lines to follow watershed boundaries. Please discuss and comment on this request, or make a motion, and respond to Mr. Treat.

Continued discussion on Proposal 3. Set a maximum amount of developable area for smaller lots.

Staff and the realtors are focused on reasonable use of existing platted lots, without changing the existing regulations too much or increasing cost of water treatment. With this goal, discussion has focused on allowing between 4,000 and 6,000 square feet of impervious coverage per lot. From the discussion, **staff recommends for lots under 3 acres:**

1. An impervious surface maximum of 5,500 square feet.
2. A property may have 4.2% impervious surface without a mitigation plan.
3. Eliminate the provision of an increase to 6.4%, instead, the cap is a flat 5,500 square feet.
4. If a property wants to go over 4.2%, a mitigation plan is required.

What is the effect of this proposal, compared to existing conditions?

Staff analyzed the lots in the watershed under 3 acres, and further narrowed down which ones are readily developable for residential housing. The total impact to the watershed, if everyone built all the impervious coverage allowed, is **an increase of 2.5 acres of impervious coverage. This is an increase in total watershed coverage of 0.11%.**

How much impervious surface is allowed now?

- 89 lots under 2.5 acres, totaling 137.5 acres
- 4 lots between 2.5 and 3 acres, totaling 10.58 acres
- 137.5 acres x 6.4% = 8.8 acres
- 10.58 x 4.2% = 0.44 acres
- Total allowed now: 9.24 acres

How much impervious surface would be allowed with these changes?

- There are 93 lots under 3 acres, totaling 148 acres.
- 93 lots x 5,500 sq ft impervious surface = 11.74 acres impervious surface.

What's the difference?

11.74-9.24 = 2.5 acre increase in impervious surface.

Total percent impervious surface of these lots could total 7.9% instead of 6.4% for a majority of the area, and 4.2 % for four lots.

Staff Recommendation

1. Commission make motions on all the proposals.
2. Staff will schedule Cook InletKeeper for a future work session.
3. Staff will draft an ordinance.
4. Staff will work towards a public hearing for the second meeting in October. This timeframe can be adjusted based on public input and direction from the Commission.

Attachments

1. April 16th , 2014 HAPC meeting minutes
2. August 6th meeting minutes
3. August 20th meeting minutes
4. BCWPD Map

New Business

A. Staff Report PL 14-35, Discussion on moving a lot line in the Bridge Creek Watershed Protection District

Commissioner Stroozas left the table based on his earlier declaration in relation to being a property owner within 300 feet of the subject property.

Deputy City Planner Engebretsen noted that there is no formal action on this tonight; this is a conceptual check on whether the Commission agrees with moving property lines to match the watershed boundaries as we know them. The issue addressed here is how to address a lot with a portion that flows toward the watershed and a portion that flows away. The concept of shifting a lot line to follow the watershed boundary is an option to consider, or allow the portion of a lot that flows away considered as not part of the watershed. Either option will likely include a code amendment, but staff would like to have a conceptual conversation with the Commission as to what they think would be preferred.

David Treat explained he owns two lots in the watershed protection district that are relatively equal in size. The property line between the two lots is very close to the structures that were built on the lot that is out of the watershed. The survey showed a section of the land behind the lot that was just exempted that drains away from the watershed. He is interested in a future action to shift the lot line to encompass the portion that drains away from the watershed into this lot that was just exempted. It gives him a little more room between the structure and the property line, and allows for a clear line between what is and is not in the watershed.

The Commission discussed the situation and agreed that it would be appropriate to consider a code amendment to address circumstances where a portion of a lot flows toward and a portion that flows away from the watershed.

Deputy City Planner Engebretsen said staff will bring back some proposals for consideration.

Informational Materials

A. City Manager's Report from the March 24, 2014 City Council Meeting
B. Letter from Faith Lutheran Church Planning Board RE: changeable copy signs in the Gateway Business District.
C. KPB Platt Committee Notice of Meeting in Homer Monday, April 14, 2014 at Land's End Resort
D. KPB Plat Committee Notice of Decisions
   - Barnett's South Slope Sub. Quiet Creek Park Revised Preliminary Plat
   - Mattox Subdivision 2014 Preliminary Plat

The Commission continued discussion regarding the sign code in the GBD, and options for amending the code, which includes collecting signatures and request from a Planning Commissioner to institute

Pending Business

A. Staff Report PL 14-76, Proposal to amend to the Bridge Creek Watershed Protection District.

Commissioner Stroozas commented that he may have a conflict of interest because he resides inside the Bridge Creek Watershed District.
ERICKSON/HIGHLAND MOVED THAT COMMISSIONER STROOZAS HAS A CONFLICT OF INTEREST.

There was discussion that this addresses an aggregate amount of people in a large district. Commissioner Stroozas is one of many in a larger group.

VOTE: NO: HIGHLAND, ERICKSON, STEAD, VENUTI, BRADLEY

Motion failed.

City Planner Abboud reviewed the staff report.

In response to questions, Commissioner Stroozas reviewed his experience with filing his mitigation plan back in 2008. He noted that driveways have been a stifling issue and that decks shouldn't be counted as impermeable surface if they have gravel or grass underneath.

Commissioner Highland recalled comments from a previous meeting about getting an overlay of the area from NRCS or the Soil and Water Conservation District. She believes there is land in the district that isn't going to negatively affect the reservoir.

Commissioner Stead questioned if the study included in the packet is the one used in establishing the district guidelines. City Planner Abboud confirmed that it is. Mr. Stead said he would like to spend more time reading the study, but noted that it addresses watershed issues in Anchorage. He questions how applicable they are to the BCWPD. The study addresses various toxicity levels and chemicals that get washed in, and he noted that Anchorage has other issues associated with coal fired plants adjacent to them. He would like to have the study again at the next worksession. Regarding driveways, he commented that there are ways to build the surfaces so they don't cause problems. He isn't sure about uncovered decks; his own uncovered deck impedes water getting into the ground.

The Commissions reviewed the 5 proposals included in the staff report. Comments included:

Proposal 1. Allow a portion of a lot to be excluded from the watershed.

- There should be concern about people shaping their lot by bringing fill onto the lot to take usable filtering land away from the watershed or modifying the natural drainage.
- Depending on the area it might be acceptable to do it through subdividing.
- Consider ways for more leniencies in allowing exclusions and still protecting the watershed.
- Consider if exclusion should be allowed through a CUP process.
- Limiting it to natural drainage could be a consideration rather than a CUP process.

Proposal 2. Allow mitigation plans to be approved by staff.

- There was general support of proposal 2. The review and approval can easily be done by staff.

- Consider whether city engineer will be included in the review.
- Consider more specific re-vegetation related to construction timeframe.

Proposal 3. Allow a flat amount of developable area for smaller lots under 4.5 acres.

- The realtors suggested 6200 sf and the staff recommends 4000-5000 sf. That's a variance of 25% from one figure to the other.
- 6000 sf triggers a CUP, so to keep it simpler it needs to be under 6000 sf.
- There was general support of allowing up to 5000 sf.
- The 1 acre lot with 5000 sf brings it up to 7.6%, it isn't a dramatic difference from 6.4%. Most of the smaller lots are closer to the 1.5 acre size.
- A mitigation plan would still be required at 5000 sf.

The group discussed their interest in knowing information about water quality of the reservoir, before the water is treated. Monitoring the pretreated water is the only way to tell if these regulations are making a difference in maintaining water quality. City Planner Abboud said he would see if there is information available.

Proposal 4. Exempt uncovered decks connected to a primary structure from the impervious calculation.

- It's difficult to determine how much water comes off a deck.
- A percentage of the structure could be a way to address it.

Proposal 5. Exempt one accessory structure under 200 sf from the impervious calculation.

- There was general support regarding proposal 5.

The Commission took a break at 8:40 p.m. and the meeting resumed at 8:43 p.m.

New Business

A. Staff Report PL 14-74, CIP List Recommendations. Bring CIP from the July 16th packet

ERICKSON/HIGHLAND MOVED TO RECOMMEND INCLUDING A CIP ITEM FOR AT LEAST ONE RESTROOM AT THE TRAILHEAD ON KACHEMAK DRIVE AND THE SPIT ROAD.

There was brief discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

HIGHLAND/STEAD MOVE TO RECOMMEND INCLUDING IN THE 2015 CIP LIST, WATER STORAGE DISTRICT IMPROVEMENTS AND STORM WATER MASTER PLAN.

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Session 14-15, a Regular Meeting of the Homer Advisory Planning Commission was called to order by Chair Stead at 6:30 p.m. on August 20, 2014 at the City Hall Cowles Council Chambers located at 491 E. Pioneer Avenue, Homer, Alaska.

PRESENT: COMMISSIONERS BOS, BRADLEY, ERICKSON, HIGHLAND, STEAD, STROOZAS, VENUTI

STAFF: CITY PLANNER ABBOUD
DEPUTY CITY CLERK JACOBSEN

Approval of Agenda

Chair Stead called for approval of the agenda.

HIGHLAND/BOS SO MOVED

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

Public Comment

The public may speak to the Planning Commission regarding matters on the agenda that are not scheduled for public hearing or plat consideration. (3 minute time limit).

Joel Cooper, non-resident who lives in the Bridge Creek Watershed Protection District, commented that he has reviewed the information provided by the staff and the realtors. He thinks the commission should go back and look at the USGS report, speak with them about their work, and how they assess how things are working. He thinks they should calculate the impervious cover for the watershed as a whole, based on the numbers they have and current development. He submitted a table he prepared using the parcel viewer and applied the recommended 6200, 4000, and 5000 square footages recommended and lot sizes 4.5 acres and below. It starts to give an idea of what the impact might be in relation to Todd Cook's feedback relating to density of development and also concerns about fuel tanks and septic tanks. In reference to the draft ordinance, Mr. Cooper suggested including some kind of containment system for fuel tanks so there will be a buffer should an accidental spill occur. A question came up in the worksession if the current ordinance working and since the water quality is not degrading, then you can say to some extent that it is working.

Reconsideration

None

Adoption of Consent Agenda

All items on the consent agenda are considered routine and non-controversial by the Planning Commission and are approved in one motion. There will be no separate discussion of these items unless requested by a Planning Commissioner or someone from the public, in which case the item will be moved to the regular agenda and considered in normal sequence.

Pending Business

A. Staff Report PL 14-80, Proposal to amend to the Bridge Creek Watershed Protection District

City Planner Abboud touched on the discussion at the worksession and advised the Commission that Water/Wastewater Superintendent Todd Cook will be talking to them at their next meeting.

Commissioner Erickson expressed that she supports a reasonable backup containment system for anything that brings potential disaster. It's more than fair, it's responsible, and it shouldn't be that costly. Her thought is that existing property owners could be asked to do it, and new construction would require it. It isn't only regarding fuel tanks but anything that could cause a potential hazard.

Commissioner Stroozas supports 6200 square feet as the maximum amount of developable area for lots less than 4.5 acres.

Commissioner Highland questioned the numbers provided in Mr. Cooper's calculations, also the suggestion of working with USGS, and looking at overall impervious for the area. City Planner Abboud said they could come up with more useable numbers, as an example one could build more on a 2.5 acre lot with an approved mitigation plan than on a larger lot with no mitigation plan. He said he isn't sure what the role of USGS was in the process and will have to investigate it further. There was discussion that there might be new information after 13 years. In looking at total impervious area, Mr. Abboud said it doesn't really change the framework of what we are doing.

Commissioner Highland said she would like the property owners in the area to be surveyed to get their input on their concerns and more concrete information. City Planner Abboud agreed that is something that can be done.

Chair Stead commented that he prefers percentages of allowable square footage rather than a set number. He also thinks they should look at buffer zones between properties and try to figure out how that works. He read the report that was provided in the last packet and the report is focused mostly on the soils surrounding Anchorage, which are different than the soils that surround Homer and the Bridge Creek Watershed District; also the report is focused on the entire watershed of a particular stream. We are looking at this from a perspective of the realtors, who are only focused on a couple of small subdivisions and there is a lot of undeveloped land in the district that needs to be considered, so he thinks it's relevant to look at the entire district and the entire impervious surface. This needs to be looked at more in a holistic picture than on a per lot basis. He suggested they may want to look at the subdivision restriction of 4.5 acres. There are a lot of things that need to be reviewed in the Bridge Creek Watershed District. The issue here is maintaining water quality and maintaining ability for people to develop the land further.

There was discussion regarding looking toward the future and what development could potentially occur. City Planner Abboud said what is before the commission now is minimal incremental changes, but to consider anything more would mean stepping way back and spending a lot of money to restudy the whole area.

Commissioner Bos expressed his concern with holding people accountable to their mitigation plan and the runoff from their property. There are a lot of people who don't want to be held accountable for anything, junk, antifreeze leaking from cars, and that kind of thing. He thinks they can give a little bit, but he thinks they need some input from a lot of people. If the water up there isn't preserved, property down here won't be worth anything.

Further discussion ensued regarding developing buffer zones, mitigation plans, and ways for property owners to be able to develop their property to the fullest extent.

This agenda item will come back at the next meeting.

New Business

Informational Materials

A. City Manager's Report from August 11, 2014 City Council Meeting
B. Resolution 14-086 scheduling a joint worksession with Homer City Council and the Advisory Planning Commission to discuss tower regulation and permit requirements, and other planning matters on Thursday, October 23, 2014 at 6pm
C. Planning Commission Memo to City Council Re: CIP Recommendations
D. Kenai Peninsula Borough Plat Committee Notice of Decision Re: Bidarka Heights Unit 3 Knutson Replat Preliminary Plat

Comments of the Audience
Members of the audience may address the Commission on any subject. (3 minute time limit)

None

Comments of Staff

Deputy City Clerk Jacobsen announced that another Volunteer Appreciation Party is in the works for September 25th and that invitations will be going out soon.

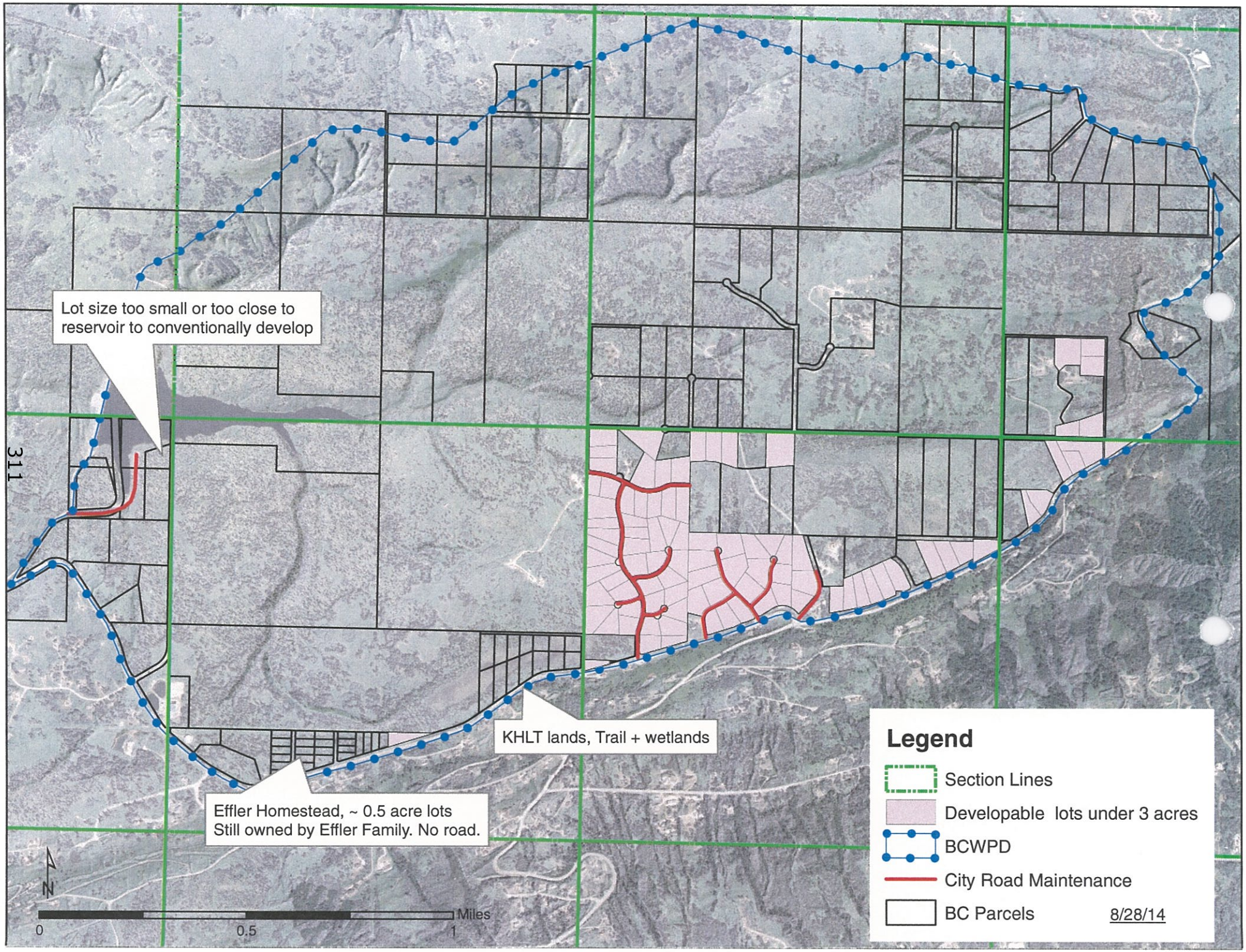
Comments of the Commission

Commissioner Bos congratulated Mr. Stead and Mr. Stroozas for stepping up, thanked Mr. Venuti for his great service, and welcomed Ms. Bradley as a new commissioner. This was a good meeting with good input.

Commissioner Highland asked to add storm water to their agenda at the City Council worksession.

Commissioner Bradley thanked everyone for a fantastic second meeting.

Commissioner Erickson suggested that if people in the watershed district bought a second lot, leave it blank, and get a tax break for preserving the land.


Lot size too small or too close to reservoir to conventionally develop
311
KHLT lands, Trail + wetlands
Effler Homestead, ~ 0.5 acre lots
Still owned by Effler Family. No road.
N
0
0.5
1
Miles
Legend
Section Lines
Developable lots under 3 acres
BCWPD
City Road Maintenance
BC Parcels
8/28/14

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Staff Report PL 14-80

TO:	Homer Advisory Planning Commission (HAPC)
FROM:	Rick Abboud, City Planner
DATE:	August 20, 2014
SUBJECT:	Proposed changes to the Bridge Creek Watershed Protection District

Introduction:
At the August 6, 2014 HAPC meeting, the Commission discussed several proposals to amend land use regulations in the Bridge Creek Watershed Protection District (BCWPD). This conversation will continue at the August 20th HAPC meeting with Kachemak Board of Realtors (KBP) and Cook Inlet Keeper present.

Since this is a 'continued' conversation, in regular font are excerpts from the August 6th staff report 14-76. *Italicized is a staff summary of the HAPC responses plus additional information that might further the conversation.*

Proposal 1. Allow a portion of a lot to be excluded from the watershed.
Currently, the entire lot must drain away from the watershed to be eligible for exclusion from the regulations. Staff did not count the number of lots that might be eligible for exclusion, but it's reasonable to say not very many lots will be affected by allowing a portion to be excluded. Another option would be to allow lots to be subdivided along the watershed boundaries, but that gets more complicated due to the minimum lot size. It would be simpler to allow the exclusion of a portion of a lot. See HCC 21.40.020(c) for exclusion criteria.

HAPC Concerns are:
- *Surface contours do not necessarily indicate subsurface flows.*
- *Meandering lot lines or boundaries,*
- *Property owners reshaping lots,*
- *Splitting lots (based on topography)*
- *Limiting development of portion within the watershed*

HAPC did not seem to support this proposal.

Proposal 2. Allow mitigation plans to be approved by staff.
Currently, a property owner with a lot less than 2.5 acres can apply to the Planning Commission for a mitigation plan. This allows the property owner to develop up to 6.4% of the property, rather than 4.2%. Since the ordinance was adopted in 2003, 13 land owners

have applied for mitigation plans. The requirements of the mitigation plans have become more consistent as staff and the Commission gain experience working with the code. Today when a property owner applies for a mitigation plan, staff spends a lot of time working with them. The HAPC reviews the plan and generally approves them, with the same set of mitigation strategies. Staff proposes allowing staff to approve mitigation plans, and amending code to set the minimum requirements for the mitigation plan. This will result in faster more consistent approvals for land owners, less work for staff, less review for the Commission, and clear code requirements.

These requirements were generally supported by the HAPC. Staff will pursue amendments to allow a mitigation plan to be approved by staff for lots less than 2.5 acres.

Mitigation Plan Requirements

1. Construct a dry well, rain garden or some method of capturing footer drains or rain gutter water. Goal: slower infiltration of water back into soil, rather than quick runoff.

There are examples in City code that aim to capture and filter runoff from roofs and foundation drains with a submerged dry or rock wells and rain gardens, such as mitigation for 2-year, 3-hr storm, HCC 21.74.020(g) Development. Activity Plan (DAP). Retention volumes and basic designs can be done by the property owner and staff.

2. Reseed construction site by August 31st.
Goal: inexpensive, effective way to minimize soil erosion.

Or upon completion of earthwork determined by permit.

3. Ditch driveway and line with filter fabric and rock. Only required when appropriate to the site; i.e. enough slope (defined) so water is slowed either on the way to the street ditch, or if it runs downhill. This mitigation may not necessarily be appropriate on level sites with short driveways. Goal: slow water runoff from driveways and encourage infiltration of water into the ground.

Runoff created by driveways and parking areas can be treated with permanent channels, ditching or retention swales. This is similar, by interest to Erosion and Sediment control prescribed in HCC 21.40.080(b)(1)

Proposal 3. *Set a maximum* amount of developable area for smaller lots under 4.5 acres. Rather than a calculated percentage, land owners would have a set, consistent area they could develop. The realtors proposed roughly 6200 square feet per lot.

The Planning Commission supported development of 5,000 sf per lot with a staff approved mitigation plan. Research has found this will apply practically to lots 2.5 acres. Larger lots presently have an allowance to develop more than 6000 square feet.

Proposal 4.
Exempt uncovered decks connected to a primary structure from the impervious calculation.
After using the watershed rules, staff finds there are a few things that are hard for new landowners to work with. For example, nonconforming home may already exceed the watershed rules. Or a newer home may be close to the maximum impervious area. A potential buyer comes to the Planning Department, looking to see if they can add a deck, small greenhouse, dog run, tree house etc. to a property. And the answer to this very minor improvement is no. Staff would like to see the regulations eased to allow some small, minor increases in impervious surface. Rather than change the amount of impervious surface allowed (the 4.2% rule), staff recommends excluding uncovered decks attached to homes.

This does not allow for the construction of larger garages or big accessory structures, its just for the small improvements people like to make to their homes to make them more livable.

Staff recommends a maximum allowance of less than 500 square feet or appropriate number.

Proposal 5. Exempt one accessory under 200 square feet from the impervious calculation.

This is supported by the HAPC:
Exempt one accessory structure under 200 sf from the impervious calculation. Most of small structures are built on pilings or on skids which minimizes the land disturbance. To be consistent with other zoning districts, staff would recommend referencing:

" Erection or construction of a one-story detached accessory building used as a tool and storage shed, playhouse, or other accessory use, provided the building area does not exceed 200 square feet; and further provided, that there is already a main building on the same lot." HCC 21.70.010(c)(1).

Conversation with Todd Cook

Mr. Cook, Water/Wastewater Treatment Superintendent is responsible for the water and sewer systems in the City. He reviewed out proposals and in general did not take issue with the suggestions. He has not seen any indication that the quality of the water in the reservoir has changed in the past ten years. His main concerns are with the possibility of high density development. Fuel tanks, septic systems and general erosion are of the greatest concern. So far, negative impacts from these sources have not been indicated in the testing of the water. He has

a great deal of technical knowledge and information and is willing to present to the Planning Commission if so desired.

What happens next? *After listening to input we can further refine the suggestions and seek more public input once they are on paper. We are working on numbers that will show the cumulative effect in consideration of the entire watershed in relation to current regulations. We still need to schedule to hear from others in the field, such as Todd Cook or Cook Inletkeeper to get more input. Cook Inletkeeper requested to present at a worksession in September. A public hearing must also be scheduled.*

Lay Down at August 6, 2014 HAPC Meeting

-----Original Message-----
From: Dave Treat [mailto:dave@treatsheating.com]
Sent: Friday, August 01, 2014 9:34 PM
To: Julie Engebretsen
Subject: Re: Bridge Creek regs

Thanks Julie for the update, I like the way it's going on a set footage for small lots, instead of the 4.2% calculation. That does simplify the situation.

But that's not the answer I'm waiting for, I want to do a lot line adjustment . Adjusting the two lots I own, to match topography, Equalizing the size, creating a larger buffer from my existing structures and the watershed boundary, and just generally getting the two lots to make common sense. Getting what's in the watershed in, and what's out, out.

I will be back in homer August 10, so I can attend the 8-20 meeting and, again, plead my case for a decision. This just makes good sense.

Let me know what I need to bring to prepare for this, if anything. You all already have the topos by the engineer.

Thanks

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Staff Report PL 14-76

TO:	Homer Advisory Planning Commission
THROUGH:	Rick Abboud, City Planner
FROM:	Julie Engebretsen, Deputy City Planner
DATE:	August 6, 2014
SUBJECT:	Proposed changes to the Bridge Creek Watershed Protection District

Introduction

The Kachemak Board of Realtors (KBP) approached the Planning Commission in April to talk about the Bridge Creek Watershed Protection District (BCWPD). They expressed concern that the regulations are making it difficult to develop the smaller residential lots in the watershed. The Kelly Ranch Estates Subdivision in particular has small lots.

In the same timeframe, a watershed land owner requested exemption of his lot from the watershed, because his land drained away from the watershed. The exclusion brought to light that some aspects of the regulation may be more rigorous than needed.

The BCWPD rules were adopted in February, 2003, have been in place for 13 years. The City and the Commission have never reviewed how they are working, and if there are things that could be improved. This staff report is an introduction to a few ideas to improve some of the processes and regulations and to continue the dialogue between the Board of Realtors and the Planning Commission. This staff report is for introduction at the August 6th HAPC meeting, and to be continued to the August 20th meeting. The KBR will be the guest at the work session to talk about this staff report and the ideas they previously brought forward.

The first attachment is information KBR presented at the 4/16/14 work session. The second attachment is the study that the Planning Commission originally used when the regulations were drafted in the early 2000's. The study identified that fairly low impervious surface within a watershed had more negative impact on water quality than previously thought.

Analysis

Bridge Creek regulations: What works?

- The code requires a minimum lot size of 4.5 acres. This has worked as there have been no new subdivisions with small lots.

- The code regulates the amount of impervious surface. This has generally resulted in smaller homes with more compact driveways. Regulating by impervious surface has worked.

What's not working?
~The requirement for 100% of a lot to be outside the watershed boundary for exclusion.
~The requirement for PC approval of a mitigation plan.
~ The inability for some home owners to make minor improvements like build a deck, greenhouse, or other small structure that creates impervious surface. (Not talking about larger building like a garage).

Staff presents a series of proposals, below. Staff suggests discussing each one separately. If there is consensus on any of them, we will take the time to analyze the overall impact to the watershed before moving to any public hearings. **Staff recommendation:** Discuss each proposal, and move to accept or reject each one. As this conversation developed, these proposals can be considered alone or in combination.

Proposal 1. Allow a portion of a lot to be excluded from the watershed.
Currently, the entire lot must drain away from the watershed to be eligible for exclusion from the regulations. Staff did not count the number of lots that might be eligible for exclusion, but its reasonable to say not very many lots will be affected by allowing a portion to be excluded. Another option would be to allow lots to be subdivided along the watershed boundaries, but that gets more complicated due to the minimum lot size. It would be simpler to allow the exclusion of a portion of a lot. See HCC 21.40.020(c) for exclusion criteria.

Proposal 2. Allow mitigation plans to be approved by staff.
Currently, a property owner with a lot less than 2.5 acres can apply to the Planning Commission for a mitigation plan. This allows the property owner to develop up to 6.4% of the property, rather than 4.2%. Since the ordinance was adopted in 2003, 13 land owners have applied for mitigation plans. The requirements of the mitigation plans have become more consistent as staff and the Commission gain experience working with the code. Today when a property owner applies for a mitigation plan, staff spends a lot of time working with them. The HAPC reviews the plan and generally approves them, with the same set of mitigation strategies. Staff proposes allowing staff to approve mitigation plans, and amending code to set the minimum requirements for the mitigation plan. This will result in faster more consistent approvals for land owners, less work for staff, less review for the Commission, and clear code requirements.

The requirements for a mitigation plan would be:

1. Construct a dry well, rain garden or some method of capturing footer drains or rain gutter water. Goal: slower infiltration of water back into soil, rather than quick runoff.

2. Reseed construction site by August 31st.
Goal: inexpensive, effective way to minimize soil erosion.

3. Ditch driveway and line with filter fabric and rock. Only required when appropriate to the site; i.e. enough slope (defined) so water is slowed either on the way to the street ditch, or if it runs downhill. This mitigation may not necessarily be appropriate on level sites with short driveways.
Goal: slow water runoff from driveways and encourage infiltration of water into the ground.

Proposal 3. Allow a flat amount of developable area for smaller lots under 4.5 acres. Rather than a calculated percentage, land owners would have a set, consistent area they could develop. The realtors proposed roughly 6200 square feet per lot.

Staff has three comments on this idea.
1. Mitigation plans should be required, following the guidelines and staff approval outlined in Proposal 2.

2. It would be a lot simpler to tell land owners they had a certain square footage to develop, rather than calculate 4.2 and 6.4% each and every time someone has a question. The simplicity would be nice.

3. At 6,000 square feet, a conditional use permit is required for a soil and erosion sediment control plan. If the Commission wants to talk about a flat amount of developable area, staff proposes 4-5,000 square feet.

Below is a table of developable area by lot size, and another table showing % impervious coverage. Staff analyzed the vacant lots in the Kelly Ranch Estates subdivision, and the subdivisions further east with small lots. In summary, there are 26 lots under 1.5 acres, 12 lots between 1.5 and 1.99 acres, and 5 lots between 2-2.49 acres that are vacant. As you can see from the table, lots over 2.5 acres have a large developable area, and so far, don't seem to have a problem developing within the allowable 4.2% impervious coverage. But the smaller lots are more difficult to develop. If the Commission likes the idea of a set developable area, staff recommends applying that standard to lots under 2.5 acres, and limiting the area to 4,000-5000 square feet.

Developable area (square feet) by lot size at 4.2 and 6.4% Impervious Coverage

	Percent Impervious		
	4.20%	6.40%	
1	1829.52	2787.84	26 vacant lots under 1.5 acres
1.5	2744.28	4181.76	12 lots 1.5-1.99
2	3659.04	5575.68	5 lots 2-2.4
2.5	4573.8	6969.6	
3	5488.56	NA	
3.5	6403.32	NA	
4	7318.08	NA	
4.5	8232.84	NA	

Lot Size in Acres

Developable area converted to % coverage

	Square feet of developable area		
	4,000	5,000	6,000
1	0.091827	0.114784	0.137741
1.5	0.061218	0.076523	0.091827
2	0.045914	0.057392	0.068871

Acres

Example: *A 1 acre lot with 4,000 square feet of impervious surface has 9.18% impervious coverage.*

Proposal 4.

Exempt uncovered decks connected to a primary structure from the impervious calculation.

After using the watershed rules, staff finds there are a few things that are hard for new landowners to work with. For example, nonconforming home may already exceed the watershed rules. Or a newer home may be close to the maximum impervious area. A potential buyer comes to the Planning Department, looking to see if they can add a deck, small greenhouse, dog run, tree house etc to a property. And the answer to this very minor improvement is no. Staff would like to see the regulations eased to allow some small, minor increases in impervious surface. Rather than change the amount of impervious surface allowed (the 4.2% rule), staff recommends excluding uncovered decks attached to homes.

This does not allow for the construction of larger garages or big accessory structures, its just for the small improvements people like to make to their homes to make them more livable.

Proposal 5. Exempt one accessory under 200 square feet from the impervious calculation. Again, buyers frequently ask if they can build a small greenhouse or tool shed. Outside of the watershed, these small accessory structures must meet property line setback requirements, but don't need a zoning permit. In the watershed, they do require a permit and they are considered impervious.

What happens next? The Board of Realtors will be a guest at the next work session. Staff has also forwarded this staff report to Cook InletKeeper. Staff recommends having a conversation about these proposals. If there is consensus on any of them, staff can draft an ordinance. These changes can be posted to the City website. If there is a lot of community interest, we can schedule future work sessions and meetings to discuss it. Staff would like opportunity for public input before the public hearing stage.

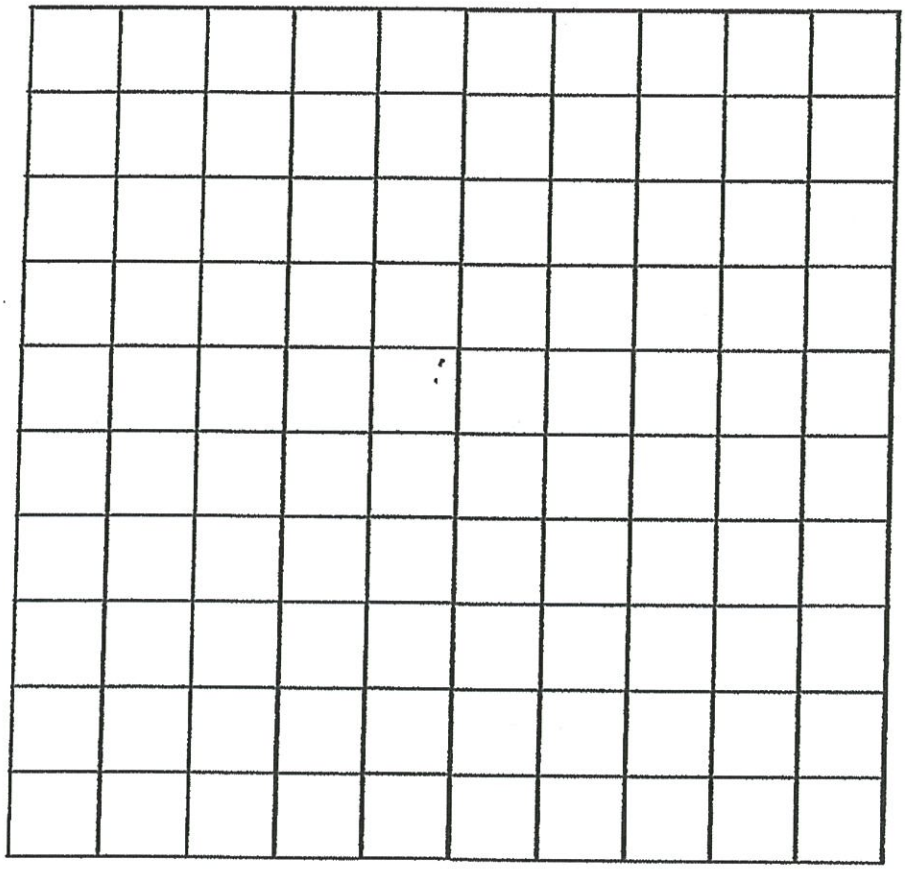
Staff Recommendation: Ask questions at the August 6th meeting. At the August 20th work session, discuss the proposals with the KBR.

Attachments

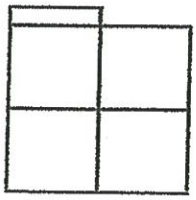
1. Information from the Kachemak Board of Realtors from 4/16/2014 HAPC work session
2. Identification of linear and threshold responses in streams along a gradient of urbanization in Anchorage, Alaska, 2003

Kachemak Board of Realtors HABC laydown 4/16/14 mk

WHAT YOU PAY FOR
and
WHAT YOU PAY TAXES ON



WHAT YOU GET TO USE

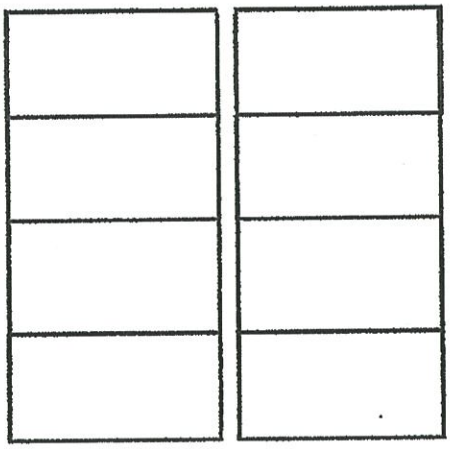


The Kachemak Board of Realtors is asking the Homer Planning Commission to reconsider the Bridge Creek Watershed Protection Ordinance. This ordinance has had a severe negative impact on the use a and marketability of the property in the area. This has been witnessed first hand in Kelly Ranch Estates. Originally these lots sold quickly and many were developed with nice middle range homes. Upon the passage of BCWP ordinance marketing has become extremely difficult. This of course is only one area of the watershed, but it is a good example of what has happened and the inhibitions on any future development in the area.

The Realtors are not insensitive to the purpose of the ordinance and would like to suggest to the commission a simpler manner of handling the watershed protection while at the same time allowing the smaller lots to develop.

The watershed is about 2100 acres. The reservoir itself is about 35 acres. This leaves 2065 acres. If you allow 4.2% of that remaining land to be developed that would be a total of 88 acres of impervious area.

There are 30 non-city owned lots comprising 1236 acres that could still be subdivided to the minimum lot size of 4.5 acres. This could generate an additional 262 lots at most. Added to the existing 150 smaller lots this is a total of 412 potential lots.



Above is 40 acres with a 60 ft ROW through acre tract with a 30 ft wide road bed you would have 30' x 1320' length = .9 acres or 2.3% of the property impermeable due to the road. If we take 2.3% of the entire 1236 acres of large lots is 28 acres that needs to be deducted for roads. So 88 acres of total impermeable minus the 28 acres for roads = 60 acres for homeowner development. Spread over 412 lots this is 6343 square feet per lot.

If you rewrite the uses to be residential with maybe secondary home business usage and limit the larger animals you make the watershed district strictly residential. Eliminate the increased impermeable allowance for an engineered discharge and simply allow 6300 square feet of impermeable development per lot. This keeps the larger parcels strictly residential, protects the watershed even if they subdivide and provides a means for the smaller lots to be utilized in a more practical manner and become more marketable.

Here's an example:

2000 sf house + 600 sf garage + 1200 shop + 12'x200' driveway = 6200 impervious sf. This allowance give great flexibility to the smaller lots and in the end allow only 88 acres of impermeable impact on the 2100 acres. It also leaves a built in cushion as the City of Homer owns 330 acres besides the reservoir itself.

So in summary:

Only same 88 acres are impacted.

Watershed is strictly residential.

No engineering for more impermeable usage.

More flexible usage for smaller parcels.

More control on larger parcels.

Summary of Larger Lots.

Size Acres	Number	Total sf	Possible 196,020 sf (4.5 acre) lots
115	1	5,009,400	25
130	1	5,662,800	28
160	1	6,969,600	34
111	1	4,835,160	24
80	2	6,969,600	34
40	6	10,454,400	52
50	1	2,178000	10
35	1	1,524,600	7
34	1	1,481,040	7
30	1	1,306,800	6
20	3	2,613,600	13
11	1	479,160	2
10	1	435,600	2
18	1	784,080	3
9	8	3,136,320	15
	30	53,840,160 (1236 ac)	262

Hydrobiologia **501**: 117–131, 2003.

Identification of linear and threshold responses in streams along a gradient of urbanization in Anchorage, Alaska*

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Received 26 March 2002; in revised form 22 April 2003; 19 May accepted

Key words: urbanization, impervious area, macroinvertebrates, thresholds, water quality

Abstract

We examined biotic and physiochemical responses in urbanized Anchorage, Alaska, to the percent of impervious area within stream basins, as determined by high-resolution IKONOS satellite imagery and aerial photography. Eighteen of the 86 variables examined, including riparian and instream habitat, macroinvertebrate communities, and water/sediment chemistry, were significantly correlated with percent impervious area. Variables related to channel condition, instream substrate, water chemistry, and residential and transportation right-of-way land uses were identified by principal components analysis as significant factors separating site groups. Detrended canonical correspondence analysis indicated that the macroinvertebrate communities responded to an urbanization gradient closely paralleling the percent of impervious area within the subbasin. A sliding regression analysis of variables significantly correlated with percent impervious area revealed 8 variables exhibiting threshold responses that correspond to a mean of 4.4 – 5.8% impervious area, much lower than mean values reported in other, similar investigations. As contributing factors to a subbasin's impervious area, storm drains and roads appeared to be important elements influencing the degradation of water quality with respect to the biota.

Introduction

Anchorage is unique with respect to urbanization effects on streams (Milner & Oswood, 2000), as it has a relatively large population (~260 000) and exhibits a steep urbanization gradient over short distances. This includes rapid changes from uninhabited wilderness along mountains in upper reaches of the basins to densely populated, urbanized areas near the mouths of streams draining the city. In most other regions, areas upstream from urban development have been disturbed by logging, mining, agriculture, or additional urbanization.

Numerous studies document the effects of nonpoint source contamination from urban runoff on water quality and stream biota (Klein, 1979; Sloane-Richey et al., 1981; Whiting & Clifford, 1983; Garie & McIntosh, 1986; Winter & Duthie, 1998; Paul & Meyer, 2001). Nonpoint source contaminants detrimental to water quality include salts from road deicing, pathogens from wildlife and pets, nutrients from fertilizer application to gardens, and oil and gasoline runoff from roadways. Urbanization can also alter the hydrologic characteristics of a stream by increasing the magnitude and frequency of peak discharges (Booth, 1991). As urbanization encroaches on riparian areas, the sources of woody debris to stream channels may be reduced or lost (Booth, 1991), resulting in increased channelization and decreased habitat complexity. Although riparian vegetation buffer zones typically improve local stream habitat conditions, watershed- or landscape-scale land use may be more important to biotic integrity (Roth et al., 1996).

In general, urbanization within a watershed may be characterized in terms of land cover changes or,

more specifically, as the percentage of impervious area (PIA) (Arnold & Gibbons, 1996, Booth & Jackson, 1997; Wear et al., 1998; McMahon & Cuffney, 2000; Paul & Meyer, 2001). The percentage of impervious area at which degradation of water quality begins is varied, ranging from 4–5% (May et al., 1997) to 10–12% (Klein, 1979; Booth & Jackson, 1997; Wang et al., 2000). Land cover reported as total impervious area may be misleading in that the effective impervious area may be substantially less (Dinicola, 1989). Effective impervious area relates to the 'connectedness' of impervious area to a watercourse and intuitively has a greater effect on water quality than does impervious area separated from the watercourse. In other words, buffer areas and open space near water bodies are important in controlling runoff from impervious areas. In addition to buffer areas, the reduction of impervious area also must be considered. This was demonstrated in planned subdivisions where reduced individual lot sizes and increased open space resulted in a decrease in total impervious area for the subdivision from 17.5% to 10.7% (Arnold & Gibbons, 1996).

The goals of this study were (1) to determine those variables most closely related to the chosen urbanization surrogate, percent impervious area, within the boundaries of the Municipality of Anchorage, and (2) to characterize the nature of the biotic and physiochemical responses to urbanization as defined by percent impervious area.

Study area

The Municipality of Anchorage encompasses a large area (~4900 km^2) north and west toward the top of the Knik Arm and south and east past the start of the Turnagain Arm, the majority of the land being undeveloped, remote, and mountainous terrain. Twelve sites in four stream basins (Chester, Campbell, Rabbit and Little Rabbit Creeks) were selected lying within the Municipality of Anchorage (Table 1; Fig. 1). Campbell Creek was considered a 4th-order stream near the mouth, whereas the other streams were 2nd order. All four basins lay immediately downslope of the western edge of the Chugach Mountains and proximal to the intersection of the Knik and Turnagain Arms of Cook Inlet.

The geology of the Anchorage area is primarily unconsolidated alluvium and glacial deposits, typical of the Cook Inlet-Susitna Lowlands physiographic region (Brabets et al., 1999). This lowland region is also the most developed and populated area in Alaska, accounting for more than 50% of the State's population. Climate in the Cook Inlet Basin in the vicinity of Anchorage is considered 'transitional' (between continental and maritime climates) and is characterized by annual precipitation of about 50 cm/yr. The mean annual temperature is approximately −3°C (Brabets et al., 1999).

The sites were selected on the basis of the degree of upstream urban development and density of roads as determined from U.S. Geological Survey (USGS) topographic maps (1:25 000 for developed areas and 1:63 360 for undeveloped, remote areas) and coverages based on geographic information system (GIS) source data of the area provided by the Municipality of Anchorage. The coverages included land use (residential, commercial, industrial, institutional, military, parks, vacant, waterbodies, and transportation right-of-ways), roads, sewers and storm drains, and census tracks. Three sites per basin were selected. Upstream sites were considered reference or low-impact sites, followed by intermediate sites with increasing amounts of impervious area. The downstream-most sites were the most urbanized, that is, comprised the greatest percentage of impervious area, within each basin. The increasing urbanization in a downstream direction presented a potential problem with observed impacts being confounded by natural downstream changes. However, this was considered when reaching practical conclusions regarding urban impacts related to impervious area.

Methods and materials

Macroinvertebrate, water-chemistry, and habitat data were collected during the summer low-flow period (June/July) in 2000. Sediment-chemistry data were collected the previous summer during site reconnaissance. All data represent an instantaneous sampling regime: only one sample was collected and used for each parameter or constituent in the subsequent analyses in this paper. While this presents limitations, such as identifying variation in biological communities and chemical constituents, this project was designed as a synoptic study and the one-time sampling efforts were utilized to identify potentially problematic stream conditions related to urbanization in the Anchorage area.

Table 1. Description of urban synoptic sites. Map ID's correspond to site locations on Figure 1.Sites are ordered from least to greatest percent impervious area [Dishcharge, Conductivity, pH, Water Temperature, and Dissolved Oxygen Concentration measured at time of collection of macroinvertebrate samples]

Site ID	USGS Station ID	Description	Elevation (m)	Subbasin Area (km^2)	Discharge (m^3/s)	Conductivity ($\mu S/cm$)	pH	Water Temperature (°C)	Dissolved Oxygen Concentration (mg/l)	Subbasin Road Density (km/km^2)	Subbasin Population Density ($no./km^2$)	Subbasin Storm Drainage Density ($km\ storm\ sewers/km^2$)	Subbasin Percent Impervious Area
CH1	15274296	South Branch Of South Fork Chester Creek at Tank Trail	109	11	0.10	117	8.2	4.5	11.4	0	0	0	0
C1	15274000	South Fork Campbell Creek near Anchorage	71	76	1.64	72	7.7	4	12.7	0.2	4	0	0.3
R1	15274020	Rabbit Creek at Hillside Drive	267	25	0.85	86	7.3	3.5	12.2	0.6	12	0	0.4
LR1 Street	15273990	Little Rabbit Creek at Nicklaus	375	7	0.18	109	7.7	1	12.6	1.0	23	0	1.2
LR2	15274097	Little Rabbit Creek at Goldenview Drive	180	8	0.42	128	7.9	2.5	12.8	3.5	70	0	3.4
C2	15274395	Campbell Creek at New Seward Highway	30	43	2.21	84	7.6	5	11.6	1.0	180	0.77	3.7
R2	15273930	Rabbit Creek at East 140th Avenue	133	4	0.79	90	7.6	6	12.5	6.4	323	0	7.5
R3	15273940	Rabbit Creek at Porcupine Trail	37	5	0.96	96	7.6	6	12.2	7.3	378	0	8.1
LR3	15273100	Little Rabbit Creek near Anchorage	28	2	0.42	137	7.9	3	12.4	5.7	222	0.74	6.5
CH2	15274830	South Branch of South Fork Chester Creek at Bonifice Parkway	60	27	0.34	162	7.7	8	11.7	3.5	665	2.82	10.6
C3	15274557	Campbell Creek at C Street	16	91	2.52	92	7.9	8	8.9	6.1	690	2.61	20.6
CH3	15273100	Chester Creek at Arctic Blvd	5	32	0.88	265	8.1	11.5	10.4	9.4	1747	7.05	39.9

Instream habitat

Reaches 90–150 m in length were chosen according to a combination of factors including representative habitat features for the immediate upstream and downstream area, the repetition of geomorphic channel units (pool, riffle, run) within the reach, meander frequency, and location of obstructions that would limit reach length (such as culverts) (Fitzpatrick et al., 1998). Channel, bank, and riparian characteristics (for example, bankfull channel width, bank vegetative cover) were recorded at each of 11 equidistant transects delineating the reach. Water depth, current velocity, and substrate particle size were also measured. Each stream reach was surveyed using total station equipment that was georeferenced with a survey-grade global-positioning system (GPS). The variables collected were used in metric calculations and subsequent correlation analyses.

Macroinvertebrates

Semiquantitative macroinvertebrate samples were collected during June/July of 2000 from five riffle locations within each reach using a 0.5-m-wide rectangular net with 425-μm mesh. Large particles were brushed by hand to dislodge macroinvertebrates, and finer grained sediments were disturbed to a depth of 10 cm within a 0.25-m^2 area in front of the net opening for 1 min (Cuffney et al., 1993). The five samples collected from each reach were composited into a single sample and elutriated onsite. Organisms were identified to the lowest practical taxonomic level (usually genus) at the Biological Unit of the USGS National Water-Quality Laboratory (NWQL) in Denver, Colorado (Moulton et al., 2000).

Ambiguous taxa were removed where low-level identification of damaged or immature specimens was not possible or because the lack of appropriate keys prevented a finer level of identification. In most cases, the higher level taxa abundances were proportioned among the lower levels relative to the abundances of the lower levels. In cases where lower level abundances were lower than or equal to the higher level abundances, lower level abundances were combined with higher-level abundances. Terrestrial macroinvertebrates were removed.

Water and sediment chemistry

Water-chemistry sampling (major ions, nutrients, and field parameters – pH, dissolved oxygen, specific conductance, and temperature) was performed as described by Shelton (1994). Stream water was collected with a handheld, depth-integrating sampler using the equal-width-increment sampling method. Water samples were collected at the same cross section as the discharge measurement. Samples were processed in the field, then shipped to and analyzed by the NWQL before being used in analyses.

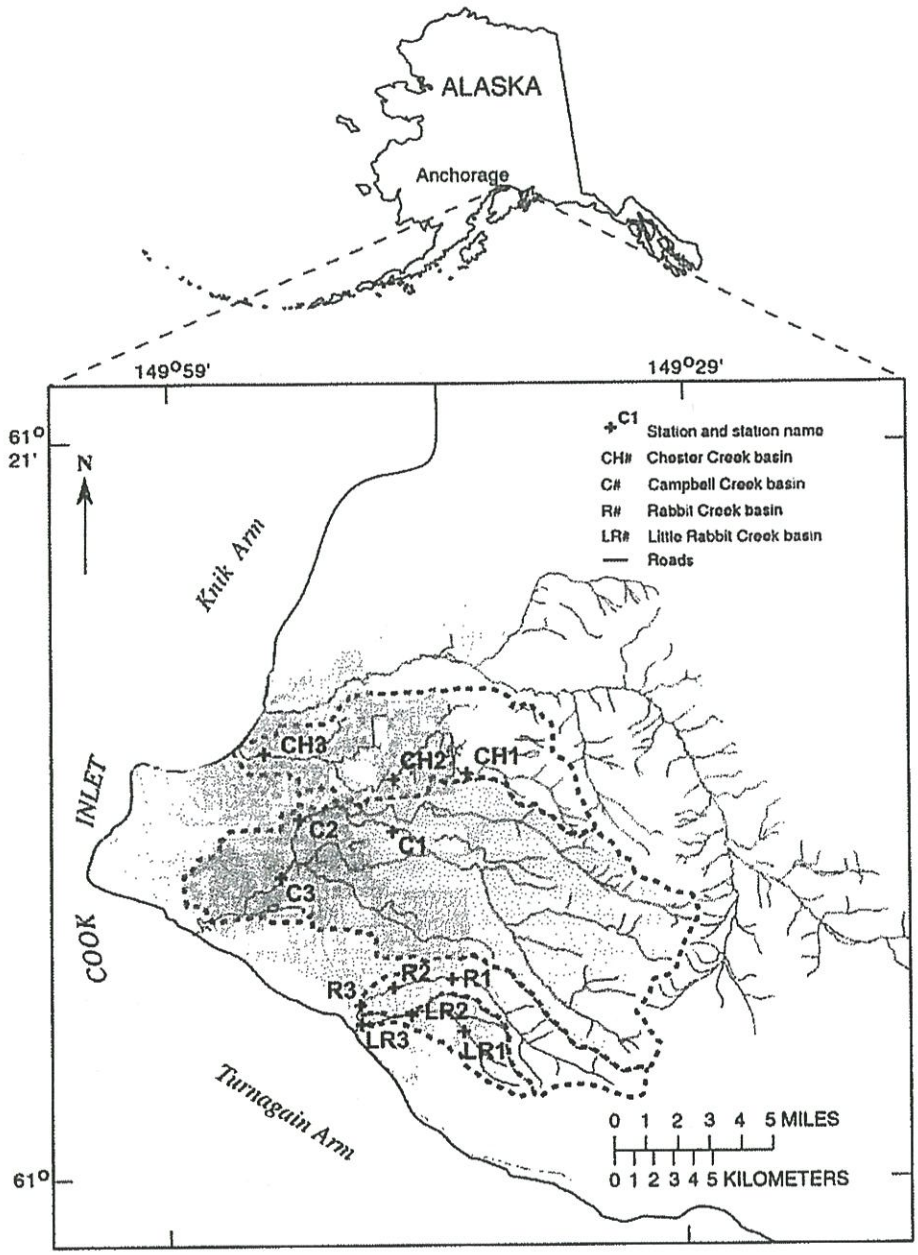

Figure 1. Basins, sites and roads in the Municipality of Anchorage.

Streambed sediments were sampled for trace elements as described by Shelton & Capel (1994). Fine-grained materials were collected from depositional areas of study reaches and wet-sieved in the field to less than 63 μm. Sieved sediments were sent to the NWQL for analysis of trace elements and major metals, such as aluminum and iron. The samples were dried, subjected to complete strong-acid digestion, and analyzed by atomic spectroscopy. Major constituents measured included aluminum, arsenic, cadmium, iron, lead, manganese, nickel, organic carbon, selenium, and zinc (Shelton & Capel, 1994).

Geographic characterization

Spatial data were determined from USGS 1:25 000 and 1:63 360 topographic maps, source data, land-use coverages (Municipality of Anchorage), satellite imagery (IKONOS 4-m multispectral images), and aerial photography (1-m grayscale Digital Orthorectified Quarter Quads [DOQQ]) and were entered into a GIS database. Subbasins were delineated from USGS maps and basin coverages were defined as the catchment area from a reach to the next reach upstream, or to the source from the furthest upstream reaches (Fig. 1). This strategy of creating incremental subbasins instead of cumulative subbasins reduces autocorrelation between sites within a basin. Associated spatial data were fit into each of the respective subbasins for future analysis.

Impervious area

Multispectral IKONOS satellite imagery with a resolution of 4 m and red and near-infrared bands generated a modified normalized difference vegetation index (NDVI), which was then used to isolate impervious areas. NDVI is a mathematical classification technique to determine pixel illumination condition (Deering et al., 1975). Values <0.32 were delineated as impervious areas. Verification involved a visual inspection of the imagery and groundtruthing, as well as inspection of 1-m grayscale panchromatic IKONOS imagery and USGS DOQQs.

Data analysis

Correlations and multivariate analysis

Spearman rank correlation analysis was used to identify response variables related to percent impervious area (PIA) (Statsoft Inc., 2001). Variables significantly correlated ($P < 0.05$) with impervious area were retained for additional analyses. Habitat, water and sediment chemistry variables, as well as land-use types were analyzed using principal components analysis (PCA) to reduce the number of variables in a detrended canonical correspondence analysis (DCCA). All variables used in the correlation analysis, except macroinvertebrate metrics, were grouped according to type and were used in PCA. Variables were separated into four groups; (1) variables associated with riparian and geomorphic characteristics (channel condition factors), (2) variables associated with instream cover and sediment characteristics (instream habitat factors), (3) land-use types, and (4) water- and sediment-chemistry (chemical factors). The first component PCA site scores were calculated for each of the four groups for use as environmental variables in the DCCA.

A direct gradient analysis (DCCA) using the abundance of macroinvertebrate taxa at all 12 sites was performed using the Multivariate Statistical Package (MVSP, 1999). Direct gradient analysis methods allow species data to be related directly to environmental data. DCCA assumes that the species exhibit distributions with a single mode along environmental gradients based on environmental variables.

The macroinvertebrate community was described relative to a gradient of urbanization by using a Spearman correlation of the first DCCA axis score against macroinvertebrate metric calculations. The macroinvertebrate metrics that were used are listed in appendix 1. Functional feeding group classifications followed those outlined by the U. S. Environmental Protection Agency (Barbour et al., 1999). This technique provided greater insight into the groups of macroinvertebrates driving the gradient with respect to biological properties, such as tolerance to perturbation, feeding ecology, and taxonomic diversity.

Determination of threshold response

A sliding regression was performed on each of the correlated variables with respect to PIA. The technique is based on a modification of linear regression comparison as described by Zar (1996). The PIA values were arcsine transformed to normalize the data. Response variables were either arcsine or log transformed to generate a more normal distribution. Beginning with the four sites containing the lowest PIA (group 1 – CH1, C1, R1, LR1), a regression line was fit to the points (subbasins). A regression line then was fit to the remaining eight sites (group 2 – LR2, C2, R2, R3, LR3, CH2, C3, CH3), and the slopes of the two lines were tested for significant differences. This procedure was repeated with the exception that the lowest PIA site within group 2 was moved into group 1 and the comparison of slopes was performed again. This process was repeated until a significant difference in slopes was noted or until all but the four highest PIA sites were left within group 2. If no significant difference in slope was identified, the variable was considered to exhibit a linear response. Variables with significantly different slopes were con-

Table 2. Significant ($P < 0.05$) Spearman correlations (r_s) between physical habitat, macroinvertebrate metrics, water and sediment chemistry variables, and subbasin percent impervious area (PIA)

PIA vs Variable	Spearman r_s	P-level
Channel Condition		
Sinuosity	–0.844	0.0006
Percent Bank Erosion	–0.671	0.0168
Instream Habitat		
Percent Reach >20% Embedded	0.587	0.0448
Macroinvertebrate Metrics		
EPT Abundance	–0.734	0.0065
Percent EPT	–0.587	0.0446
EPT Family Txa Richness	–0.740	0.0059
Hilsenhoff Family-Level Biotic Index	0.748	0.0051
Percent Shredders	–0.608	0.0358
Total Family Richness	–0.651	0.0218
Water Chemistry		
Sodium	0.610	0.0351
Chloride	0.788	0.0023
Iron	0.732	0.0068
Manganese	0.800	0.0018
Sediment Chemistry Selenium	–0.913	<0.0001
Cadmium	0.659	0.0198
Zinc	0.866	0.0003
Lead	0.651	0.0219
Nickel	0.650	0.022

sidered to exhibit a threshold response if the slope of the regression of the greatest number of sites differed significantly from the slope of the regression of all sites. The threshold values were derived by determining the range between the highest PIA site in group 1 and the lowest PIA site in group 2.

Results

Water-chemistry response

Four water chemistry variables of 17 analyzed were significantly correlated with PIA; sodium, chloride, iron, and manganese (Table 2). Sodium concentrations were typically high in downstream subbasins, with the exception of the Campbell Creek Basin. Concentrations were found at CH3 (7.3 mg/l, Table 3) exceeding mean concentrations for the Cook Inlet Basin. Chloride was also high at CH3. Iron was highest at CH2 (130 μg/l), and the next-highest concentration was at CH3 (70 μg/l) (reddish-brown sediments from oxidized iron were observed upstream from the sample point at CH2). Iron concentrations did not exceed mean concentrations for the Cook Inlet Basin.

Water-chemistry variables did not show a significant threshold response, although both sodium and iron exhibited breaks during the first iteration of the sliding regression (7.5–8.1% and 8.5–10.7%, respectively). Chloride (Fig. 3A) and manganese displayed the highest coefficients of determination (0.72 and 0.70, respectively) of the four water-chemistry variables, exhibiting strong linear responses to increasing PIA.

Magnesium had the highest PCA loading of all chemical variables (water and sediment). Specific conductance, calcium, manganese, sulfate, potassium, sodium, and chloride also showed high relative loadings on the first component, which accounted for 46% of the variance. Dissolved oxygen was the only constituent of water or sediment chemistry that loaded negatively on the first component. Water chemistry appears to have greater relative importance (explains more of the variance) with respect to the first component than sediment chemistry has. Site scores are shown in Table 4.

Sediment-chemistry response

Five of the 19 sediment-chemistry variables were significantly correlated with PIA: selenium, cadmium, zinc, lead, and nickel (Table 2). Selenium, the most highly correlated sediment-chemistry variable ($r_s = -0.913$, $P < 0.01$), was negatively correlated with PIA, whereas the remaining trace elements were positively correlated with PIA. Concentrations of selenium were highest at the upstream subbasins (5.8–2.1 μg/g), with CH1 concentrations more than double the next highest value (Table 3).

Cadmium concentrations were highest at CH2 and CH3 (0.7 and 1.0 μg/g, respectively). Concentrations in all other subbasins were relatively stable at 0.2–0.3 μg/g and were comparable to the mean concentrations at other sites throughout the Cook Inlet Basin (Frenzel, 2000). Concentrations of zinc and lead were high at CH2 and CH3 (Table 3) and exceeded the Cook Inlet Basin mean concentrations. Nickel concentrations significantly increased with increasing PIA, though no exceptionally high concentrations were noted.

Table 3. Variables and metrics significantly correlated with percent impervious area (PIA). Sites are arranged from lowest to highest PIA [CIB mean values = Cook Inlet Basin mean values as determined from Glass (1999) and Frenzel (2000)]

Sites		Habitat		Macroinvertebrate Metrics				Water Chemistry				Sediment Chemistry				
	Sinuosity	Percent Bank Erosion	>20 Percent Embedded	Hilsenhoff Family-Level Biotic Index	Percent Shredders	Total Taxa Richness (family)	EPT Taxa Richness (family)	Sodium (mg/l)	Chloride (mg/l)	Iron (µg/l)	Manganese (µg/l)	Selenium (µg/g)	Cadmium (µg/g)	Zinc (µg/g)	Lead (µg/g)	Nickel (µg/g)
CH1	1.47	77	6	3.74	6.4	18	8	1.8	0.7	10	1	5.8	0.2	82	10	29
C1	1.99	50	0	4.19	4.7	20	10	1	0.2	5	1	2.2	0.2	100	11	44
R1	1.9	50	6	3.75	6.1	17	8	1.3	0.4	5	1	2.1	0.2	110	10	32
LR1	1.19	32	45	3.83	8.2	22	11	1.7	0.7	10	2	2.1	0.2	110	10	28
LR2	1.36	45	64	3.51	2.5	19	7	2.2	2.2	20	5	2.1	0.3	140	10	30
C2	1.32	59	61	3.6	3.9	18	9	1.3	0.6	30	5	1.4	0.2	92	11	40
R2	1.34	32	12	4.02	4.9	17	7	1.7	1.1	5	1	1.5	0.2	110	10	35
R3	1.21	36	0	4.26	6.5	19	9	2.1	1.7	10	2	1.5	0.2	120	11	36
LR3	1.21	14	18	5.59	5.5	18	7	2.9	3.4	20	3	1.6	0.2	160	10	31
CH2	1.01	0	55	5.55	1.3	16	5	2.5	2.6	130	30	1.4	0.7	420	61	47
C3	1.09	23	76	5.13	0.4	16	5	1.7	1.4	50	14	1.1	0.3	180	17	62
CH3	1.03	45	64	7.68	0	12	4	7.3	15	70	62	1.1	1	590	110	50
CIB mean values								4.7	4.2	200	41	0.6	0.4	140	18	49

Table 4. PCA site scores for each of the four groups of variables analyzed. Each group represents a reduction of related variables, expressed as a single surrogate environmental variable

Sites	Channel Condition	Instream Habitat	Chemical Factors	Land-Use Factors
CH1	–0.116	0.098	0.111	–0.54
C1	0.518	–0.609	–0.747	–0.413
R1	–0.202	–0.71	–0.988	–0.341
LR1	–0.598	–0.324	–0.541	–0.542
LR2	–0.469	1	–0.06	–0.408
C2	1.195	0.612	–0.71	–0.081
R2	–0.358	–0.856	–0.766	–0.269
R3	–0.284	–0.844	–0.648	–0.158
LR3	–0.449	–0.594	–0.07	–0.173
CH2	–0.184	0.896	1.081	–0.107
C3	0.996	0.331	–0.112	1.707
CH3C	–0.048	1	3.451	1.325
Percent of total variance explained by component 1	37.7	33.7	45.7	65

Table 5. Ranges of incremental percent impervious area (PIA) thresholds as determined through sliding regression, r^2 and P values were calculated from regressions of all sites

	PIA	r^2	P
Selenium (Sediments)	3.4–3.7	0.6307	0.0020
Cadmium (Sediments)	7.5–8.1	0.5529	0.0056
Zinc (Sediments)	7.5–8.1	0.7417	0.0003
Lead (Sediments)	7.5–8.1	0.5826	0.0039
Nickel (Sediments)	No Break	0.3730	0.0349
Sodium	No Break	0.6164	0.0025
Chloride	No Break	0.7236	0.0005
Iron	No Break	0.4868	0.0117
Manganese	No Break	0.7006	0.0007
Percent of Reach >20% Embedded	3.4–3.7	0.3170	0.0566
Percent Bank Erosion	1.2–3.4	0.2017	0.1430
Stream Sinuosity	No Break	0.5016	0.0100
Hilsenhoff Family-Level Biotic Index	3.7–7.5	0.7266	0.0004
Percent Shredders	No Break	0.5599	0.0051
Total Taxa Richness (family level)	1.2–3.4	0.5998	0.0031
EPT Taxa Richness (family level)	No Break	0.6133	0.0026
Mean = 4.4–5.8			

Four sediment-chemistry variables showed a threshold response with respect to PIA (Table 5). The threshold for selenium was between 3.4 and 3.7 PIA. Thresholds for cadmium, zinc (Fig. 3B), and lead were between 7.5 and 8.1 PIA. Nickel exhibited a linear response (no breakpoint) characterized by a relatively weak straight-line association ($r^2 = 0.373$, Table 5).

PCA was used on a combination of all sediment- and water-chemistry data. Lead concentration had the highest loadings (relative importance) of all the sediment chemistry constituents on the first component. Cadmium, zinc, manganese, and arsenic also were highly loaded on the first component and accounted for the largest proportion of the variance explained by sediment chemistry in the newly created environmental variable, chemical factors. The first component accounted for about 46% of the variance (Table 4).

Physical response

Two channel condition metrics, sinuosity and percent bank erosion, exhibited significant negative correlations with PIA (Table 2). Sinuosity decreased with increasing PIA; CH2 showed the lowest value (1.01, or nearly straight) and all other downstream reaches displayed low values (range – 1.03–1.21) (Table 3). No threshold response was observed for sinuosity. Percent bank erosion values also decreased with increasing PIA [threshold response ranging from 1.2 to 3.4 PIA (Table 5)]. Percent bank erosion values were highest at upstream reaches and decreased downstream.

One instream habitat metric, percent reach >20% embedded, was significantly correlated with PIA (Table 2), with a threshold response from 3.4 to 3.7 (Table 5). This range generally related to road density values >1.8 km/km^2. Embeddedness was highest in subbasins with storm drains, except for LR1 and LR2 subbasins, which were undergoing substantial residential development during the study.

PCA showed that the new variable, instream habitat, was dominated on the first component by positive loadings of percent habitat abundance, >20% embeddedness, and by negative loadings of percent dominant large and small cobbles. The first component explained about 34% of the variance (Table 4). The other new physical response variable, channel condition, was dominated by positive loadings of run length and average bankfull width and by negative loadings of shade and riffle length on the first component. The first component explained approximately 38% of the variance. Table 4 shows the site scores for both new physical response variables.

Biotic response

Six biotic metrics were significantly correlated with PIA. Percent of EPT taxa and EPT relative abundance ($P = 0.05$ and 0.01 , respectively) were considered redundant and removed from further analyses, as both were less significant when compared with EPT taxa richness (family level) ($P = 0.01$). The three other macroinvertebrate metrics were Hilsenhoff FBI, percent shredders, and total family richness (Table 2).

Percent shredders, total family richness, and EPT taxa richness decreased with increasing PIA. Percent shredders was generally lower at all sites within the Campbell Creek Basin (C1, C2, and C3) compared to other basins, except LR2 and CH2 (Table 3), but no threshold response was apparent. Percent shredders showed the lowest correlation with PIA of the macroinvertebrate metrics (Table 5). Total taxa richness (family level) was generally highest at the upstream sites (CH1, C1, R1, LR1). A threshold response between 1.2 and 3.4 PIA separated the upstream sites from the middle and downstream sites (Table 5, Fig. 3C). EPT taxa richness was highest at LR1 and C1 and showed a linear response to PIA.

Conversely, FBI values increased with increasing PIA (Table 3, Fig. 3D). This was expected, as the metric measures the tolerances of invertebrates to perturbation, and the higher the value for a site, the greater the probability of organic pollution (Hilsenhoff, 1988). According to this index, the upstream subbasins ranged from excellent (organic pollution unlikely) for CH1 and R1 to very good (possible slight organic pollution) for LR1 and C1. Water quality in two middle subbasins, LR2 and C2 was rated as excellent, but was rated as very good at R2 and as fair at CH2. As in the upper subbasins, water quality was higher in subbasins with lower PIA. Water quality in only one of the downstream subbasins, R3, was rated as good (some organic pollution probable). Water quality at LR3 and C3 was rated as fair and, at CH3, was rated very poor (severe organic pollution likely).

Land use

PCA of land-use variables showed residential, transportation right-of-way, and institutional land uses as having the highest positive variable loadings. None of the variables were negatively loaded. The first component explained 65% of the variance. The site scores on the first component of the PCA (Table 4) were used as the new land-use environmental variable in the DCCA.

Direct gradient analysis

DCCA incorporated the four new variables created from the first component site scores derived from the PCA as environmental variables. It was necessary to minimize the number of environmental variables because the number of sampling sites was relatively small. The DCCA biplot was based on 57 macroinvertebrate taxa from the 12 sites (Fig. 2). The environmental variables are represented as vectors: the length relates to relative importance, and the direction relates to approximate correlation with the axes. The first axis accounted for 30.8% of the variance in the macroinvertebrate data and was correlated with land-use and chemical factors ($r = 0.80$ and 0.69, respectively), whereas the second axis accounted for

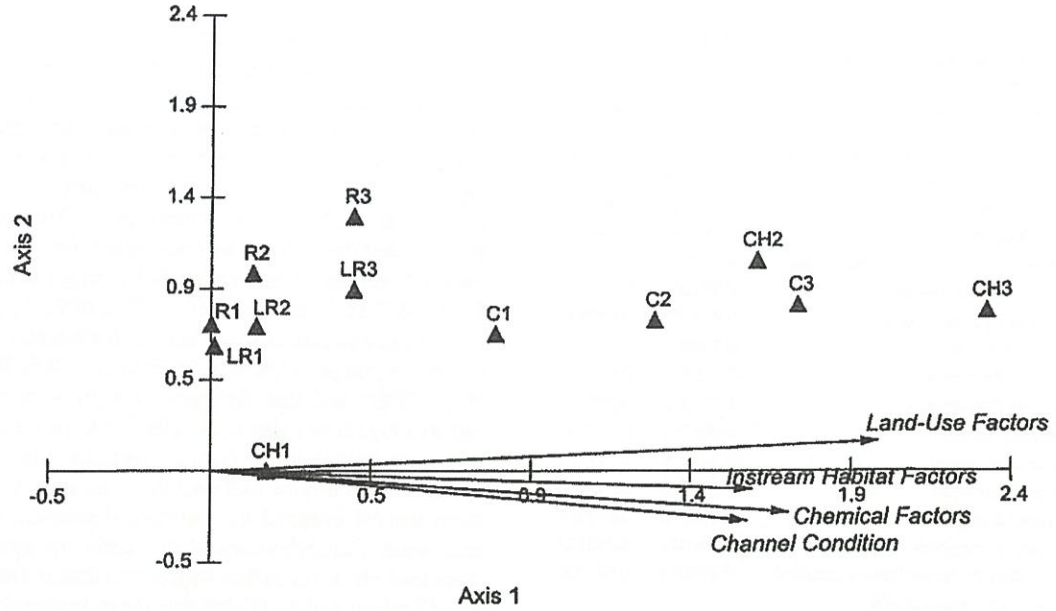

Figure 2. Detrended canonical correspondence analysis (DCCA) of the 12 study sites and relative abundance of macroinvertebrate taxa. Length of vectors indicates the relative importance of that environmental variable.

6.9% of the variance and was correlated with land use and channel condition ($r = 0.69$ and -0.08, respectively). The alignment of the sites along the first axis represents the gradient of urbanization as described by the macroinvertebrate species composition with respect to the environmental variables. According to the results of threshold responses, the split between urban affected and unaffected occurs near LR3 and R3.

The macroinvertebrate community was analyzed further by correlating the macroinvertebrate metrics with the first DCCA axis with macroinvertebrate metrics (Table 6). Positively correlated metrics (Hilsenhoff FBI and percent Oligochaeta) were related to measures of disturbance-tolerant macroinvertebrates found in areas of high PIA, whereas negatively correlated metrics (such as, percent EPT, percent shredders, and percent scrapers) were related to measures of intolerant macroinvertebrates in areas of low PIA. The second axis scores showed a marginal correlation with only the Hilsenhoff family-level biotic index ($r = 0.59$, $P = 0.04$).

Discussion

Streams in Anchorage, Alaska, showed effects from urbanization comparable to other studies (Klein, 1979; Sloane-Richey et al., 1981; Whiting & Clifford, 1983; Garie & McIntosh, 1986; Waters, 1995; May et al., 1997; Winter & Duthie, 1998; Wang et al., 2000). The gradient of urbanization, as expressed by PIA, was reflected by a shift in the macroinvertebrate community from intolerant organisms at sites with low PIA to tolerant organisms at sites with high PIA. Relatively few physiochemical variables or biotic metrics were significantly correlated with PIA, but the threshold-type responses typically occurred at PIA values lower than 10%. These values are lower than those generally observed elsewhere (Klein, 1979; Booth & Jackson, 1997; Wang et al., 2000). Some variables, such as reach >20% embedded and bank erosion, had thresholds occur at lower than 5 PIA.

The Cook Inlet Basin contains mineralized rock and soils over a wide area, especially when compared with other U.S. Geological Survey National Water-Quality Assessment Program (NAWQA) study units with respect to trace elements in streambed sediments (Brabets et al., 1999; Frenzel, 2000). Selenium concentrations for all sites in the basin exceeded the national background level (0.7 μg/g) for NAWQA study units (Gilliom et al., 1998), and concentrations were elevated even in undeveloped subbasins (Table 3). The extremely high concentration of selenium (5.8 μg/g) at CH1 may be attributable to a now-defunct

Table 6. Spearman rank order correlations between site scores from DCCA axis one and macroinvertebrate metrics. Bolded correlations are significant at $P < 0.05$

Macroinvertebrate metrics	Spearman r	P-level
Shannon-Weiner Diversity Index	0.143608	0.656129
Total Abundance	0.038529	0.905370
EPT Abundance	**–0.781087**	**0.002705**
Hilsenhoff Family-level Biotic Index	**0.591945**	**0.042590**
Percent Chironomidae	0.273205	0.390234
Percent Ephemeroptera	**–0.863158**	**0.000299**
Percent Plecoptera	–0.532400	0.074756
Percent Trichoptera	–0.568421	0.053808
Percent Oligochaeta	**0.788092**	**0.002329**
Percent Filterers	0.308232	0.329698
Percent Collectors	–0.119298	0.711915
Percent Predators	–0.101576	0.753434
Percent Scrapers	**–0.818042**	**0.001147**
Percent Shredders	**–0.746061**	**0.005329**
Total Taxa Richness (lowest practical taxonomic identification)	–0.070673	0.827231
Total Taxa Richness (family-level identification)	–0.491163	0.104899
Percent Dominant Taxa - 2	–0.230229	0.471601
Percent EPT	**–0.907182**	**0.000046**
EPT Taxa Richness (family-level)	–0.501801	0.096459
Ratio of EPT to Chironomidae	**–0.838596**	**0.000654**
Ratio of Baetidae to Ephemeroptera	0.414035	0.180880

coal-burning power generation plant nearby. The concentration at CH1 is considered a 'high hazard level' (>4 μg/g) as described by Lemly (1995), and selenium enters the food web most readily from benthic sources (Baines et al., 2002), although the biota at this site did not appear to be adversely affected during the sampling period.

Cadmium, zinc, and lead concentrations all exhibited a threshold response between 7.5 and 8.1 PIA. Cadmium concentrations were below the national median concentration (0.4 μg/g) at all sites except CH2 and CH3, two highly urbanized subbasins. None of these trace element concentrations exceeded the probable effect level (PEL) of 3.5 μg/g recommended by the Canadian Council of Ministers of the Environment (1999) and, therefore, probably had little effect on biota, even at the downstream sites. Zinc (Fig. 3B) and lead often are cited as good indicators of urbanization (Klein, 1979; Porcella & Sorensen, 1980; May et al., 1997). Zinc concentrations exceeded the PEL of 315 μg/g at CH2 and CH3, and concentrations at all sites except CH1 and C2 exceeded the national median concentration. The elevated levels of zinc (and lead) in subbasins where PIA is high are generally attributed to construction and transportation (May et al., 1997), and road sediment is a primary high-concentration source for these metals (Sutherland, 2000; Sutherland & Tolosa, 2001; Turer et al., 2001). Lead concentrations were generally below the national median concentration (24.3 μg/g) except at CH2 and CH3. Lead exceeded the PEL of 91.3 μg/g at CH3. Lead and zinc are both known to adversely affect stream organisms (Garie & McIntosh, 1986; Besser et al., 2001) and may be more of a problem during times of high flow (May et al., 1997). Storm drains and roads are probably the primary mechanisms for the transportation of zinc and lead in Anchorage, moving them toward eventual downstream deposition in the sediments. Concentrations of contaminants generally were highest in subbasins with storm drains and high PIA (Tables 1 and 4). Nickel was the only significantly correlated trace element not showing a threshold response. Although all concentrations exceeded the 25 μg/g national median, none exceeded concentrations measured elsewhere in the Cook Inlet Basin (Frenzel, 2000) and are probably naturally occurring.

Water quality related to water chemistry generally declined with increasing PIA. Sodium, chloride, iron, and manganese were significantly correlated with PIA, although no threshold responses were observed. Sodium and chloride commonly are associated with the application of deicing salts (Koryak et al., 2001) and with domestic sewage and may be considered more of a stress factor in low flow conditions because high flows often have the effect of diluting soluble forms (Klein, 1979; May et al., 1997). Because concentrations of both constituents were greater than mean concentrations for the Cook Inlet Basin (Table 3), increased PIA related to urbanization appears to be a probable factor. Conversely, manganese and iron probably are not related directly to PIA in this case, because concentrations of neither constituent exceeded the mean concentrations measured for the Cook Inlet Basin.

The three physical response variables appear to be questionable in their efficacy in accurately describing changes related to PIA. Sinuosity exhibited the best fit of the sites to the regression curve of the three variables, but only marginally ($r^2 = 0.5016$). Sinuosity generally is used at the stream segment rather than the stream reach level (Fitzpatrick et al., 1998). Reach lengths of 90–150 m, while adequate for most

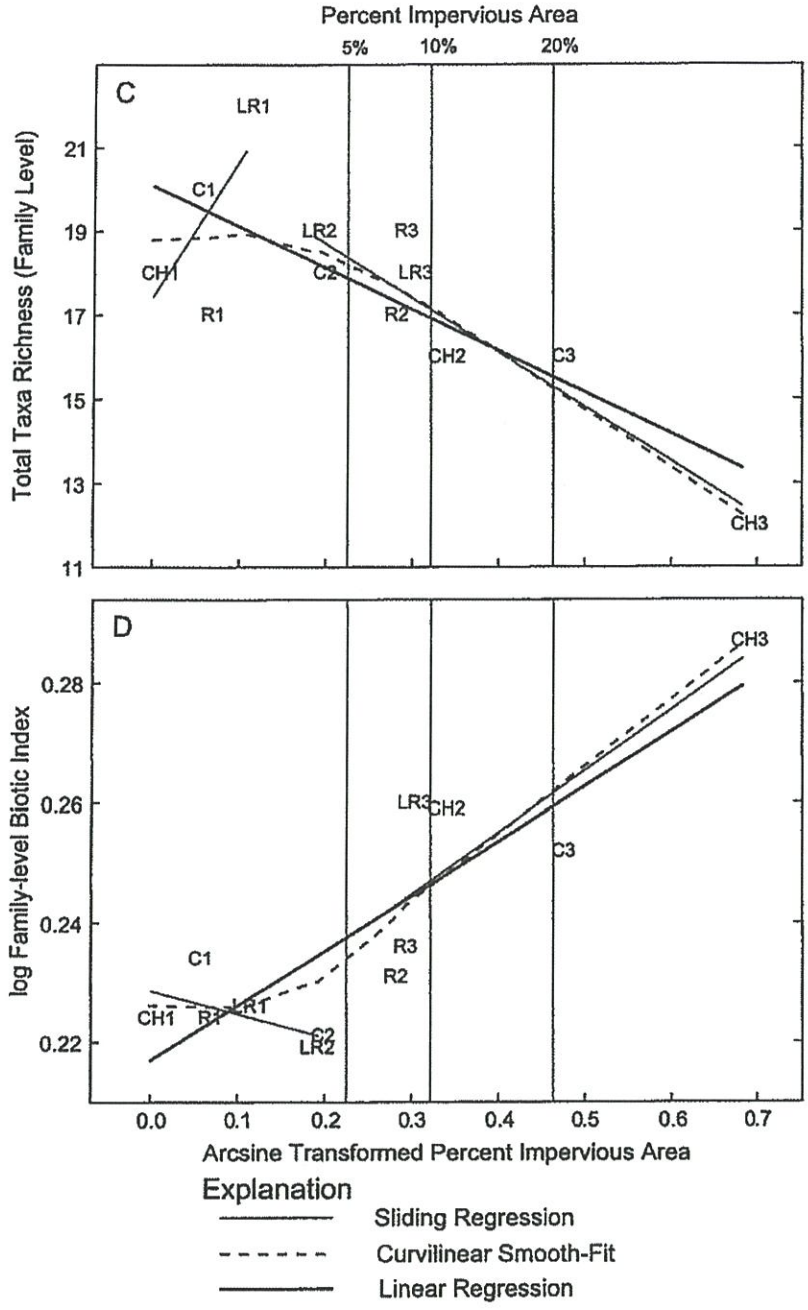

Figure 3. Selected graphs illustrating results of threshold analysis. (A) represents a linear response. (B), (C), and (D) are representative of threshold responses. The curvilinear smooth-fit line illustrates the points along the linear fit where change may be occurring, further supporting the sliding regression as a useful technique (see Ourso, 2001).

of our measures, were probably too short for an accurate accounting of sinuosity. However, sinuosity has been observed to be lower in urban streams compared to reference streams (Pizzuto et al., 2000). Increasing substrate embeddedness and bank erosion have been observed to increase in developing areas (Arnold et al., 1982; Furniss et al., 1991), but reach > 20% embedded and percent bank erosion are both subjective measures. Both variables had the lowest coefficient of determination values ($r^2 = 0.3170$ and 0.2017, respectively) of all significantly correlated variables. Although both showed threshold responses to PIA, the spread of points renders both highly suspect. A more quantitative measure for each, for example, digitized photos of substrate and streambanks, probably would provide more useful data. We feel that this is probably the case with many, if not most, subjective measures used in habitat monitoring and that such measures deserve further investigation.

In general, the macroinvertebrate community responded to PIA such that greater levels of PIA yielded taxonomically less diverse communities, composed of more disturbance-tolerant organisms. This is consistent with other studies of urban impacts on streams (Whiting & Clifford, 1983; Shutes, 1984; Garie & McIntosh, 1986; Kearns & Karr, 1994), especially a study by Jones & Clark (1987) that found the chironomid genera *Cricotopus* and *Orthocladius* associated with subbasins where PIA was high. Also characteristic of higher PIA sites were Tubificidae and Naididae worms, both highly tolerant to perturbation. Elevated concentrations of constituents associated with deicing salts may be related to the reduced diversity and greater abundance of tolerant organisms. Crowther & Hynes (1977) reported the possibility of degraded insect communities from road-salt-induced drift. Persistent exposure to even moderate levels of chemicals may act in a similar fashion by allowing the more tolerant organisms to dominate.

Conversely, subbasins with lower PIA were characterized by more diverse macroinvertebrate communities. Greater total taxa richness and EPT taxa richness at the family level (both characteristic of less perturbed environments, Table 3) were noted. The only significant metric related to functional feeding, percent shredder, was also negatively correlated with PIA. Shredders are those macroinvertebrates responsible for consuming coarse particulate organic matter which may create finer particles, and are most often associated with well canopied, headwater streams (Vannote et al., 1980).

Correlation (Spearman) analysis of macroinvertebrate metrics further demonstrated the validity of the gradient of urbanization illustrated by the first DCCA axis with respect to PIA. Increasing FBI and percent oligochaetes metrics were associated with increasing perturbation (Table 6). Both metrics were positively correlated with PIA as well as with the first DCCA axis (Tables 2 and 6), thereby suggesting that the site scores for urbanized areas were, in general, correctly predicted. Furthermore, metrics shown to decrease with increasing perturbation (EPT abundance; percentages of Ephemeroptera, scrapers, shredders, and EPT; and the ratio of EPT to Chironomidae) were negatively correlated with PIA and DCCA axis one (Tables 2 and 6). Therefore, subbasins with lower DCCA axis one scores tended to have lower PIA and support a greater diversity of organisms, including those considered intolerant to perturbation.

Campbell Creek was the possible exception with respect to site scores. C1 and C2 have higher DCCA axis one scores than would have been predicted by PIA alone (0.843 and 1.315, respectively). Given that PIA is higher in subbasins LR3 and R3, it could be assumed that C1 and C2 would be positioned to the left of LR3 and R3. Their shift to the right on the first DCCA axis may be attributed to natural differences associated with basin size (3rd order for C1, 4th order for C2) and related to the river continuum concept (Vannote et al., 1980). Slight changes in the macroinvertebrate community related to predictable downstream changes in feeding habits also were likely responsible for the shift to the right on the first DCCA axis.

The most urbanized sites, CH2, C3, and CH3, had PIA of at least 10% and macroinvertebrate communities characterized by more tolerant organisms than were present at sites with PIA less than 4%. Those subbasins are among the older residential areas in Anchorage and have population densities that would be categorized as urban using U.S. Census Bureau criterion of 386 persons/km^2. Rabbit and Little Rabbit Creek Basins have become developed as residential areas within the past 5–10 years and, at sites R2 and R3, population densities are approaching the urban category. Several of the threshold responses appeared to occur near sites R2 and R3, in other words, at PIA less than 10. Population densities at sites CH2 and C3 are similar, yet PIA at site C3 was twice that at CH2. Many of the measured responses at CH2 and C3 were similar, whereas CH2 appeared to be more similar to site CH3 with respect to chemical responses (Table 3).

The similarity of CH2 and CH3 in terms of chemical responses may be a function of streambed sediment chemistry integrating conditions at a larger scale than do some of the other measures.

Woody vegetation is well established along the banks at most sites, and along much of the lower parts of the Chester and Campbell Creek Basins, bike paths and parklands are adjacent to the creeks. This may explain why habitat variables related to riparian condition were not significantly correlated with PIA, as riparian buffer strips can successfully sustain many important habitat components (Schueler, 1995; Shaw & Bible, 1996). Urban development does exist in the flood plain at sites R2, R3, C2, C3, CH2, and CH3, but it is not reflected in the channel habitat variables measured. The extent of urban development in flood plains or within specified buffer distances from the channel may help explain the biological effects detected in this study.

Although the thresholds reported here appear low compared with values reported elsewhere (Schueler, 1994), the differences in this study may be related to the more advanced technology used to quantify PIA and the sliding regression technique used to determine threshold responses. Given that Landsat data used in many of the previous studies are at a 30-m resolution level, there is room for substantial misinterpretation related to a lack of precision. Had the technology used in this study been available for earlier investigations, a general reduction in detected response to PIA may have been possible. The low thresholds we observed also could relate to the local climate, as there are more extreme natural stressors on ecosystems in Alaska compared to those in more southerly latitudes. Future investigations using techniques discussed herein will aid in determining whether threshold responses to urbanization in Anchorage subbasins are actually low as a result of climatic differences or whether the greater resolution spatial data used in this study afforded better discernment of differences in PIA at lower levels.

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Appendix 1. Spearman correlations between all variables examined and subbasin impervious area. [Bold values indicate significant correlations at $P < 0.05$]

PIA vs Variable Spearman	*R*	*P*-level
Channel Condition		
Sinuousity	–0.844	**0.0006**
Reach Length	0.262	0.4100
Average Bankfull Width/Depth	0.000	1.0000
Bank Stability Index	0.274	0.3894
Percent Bank Erosion Abundance	–0.671	**0.0168**
Percent Riparian Closure	0.231	0.4705
Percent Shade	0.077	0.8122
Percent Riffle Length	–0.363	0.2461
Percent Run Length	0.292	0.3573
Percent Pool Length	–0.058	0.8573
Instream Habitat		
Percent Habitat Abundance	0.054	0.8682
Percent Woody Debris Abundance	0.527	0.0782
Percent Vegetation Abundance	–0.180	0.5751
Percent Boulder Habitat Abundance	0.367	0.2404
Percent Manmade Habitat Abundance	0.303	0.3391
Percent Undercut Bank Abundance	–0.467	0.1262
Percent Dominant Silt	0.179	0.5769
Percent Dominant Sand	0.225	0.4825
Percent Dominant Fine/Medium Gravel	0.075	0.8158
Percent Dominant Coarse Gravel	0.181	0.5730
Percent Dominant Very Coarse Gravel	0.211	0.5106
Percent Dominant Small Cobble	–0.310	0.3270
Percent Dominant Large Cobble	–0.070	0.8284
Percent Dominant Small Boulder	0.147	0.6483
Percent Reach 0 Percent Embedded	–0.487	0.1085
Percent Reach 1–20 Percent Embedded	0.451	0.1412
Percent Reach >20 Percent Embedded	0.587	**0.0448**
Percent Silt Abundance	0.401	0.1959
Macroinvertebrate Metrics		
Shannon Wiener Diversity Index	–0.294	0.3541
Total Abundance	0.056	0.8629
EPT Abundance	–0.734	**0.0065**
Hilsenhoff Family-level Biotic Index	0.748	**0.0051**
Percent Chironomidae	0.035	0.9141
Percent Ephemeroptera	–0.557	0.0600
Percent Plecoptera	–0.545	0.0666
Percent Trichoptera	–0.480	0.1144
Percent Oligochaeta	0.566	0.0548
Percent Filterer	–0.028	0.9312
Percent Collector	0.214	0.5049
Percent Predator	–0.049	0.8799
Percent Scraper	–0.564	0.0559
Percent Shredder	–0.608	**0.0358**
Total Taxa Richness (lowest practical taxonomic identification)	–0.370	0.2360
Total Family Richness	–0.651	**0.0218**
Percent Dominant Taxa - 2	0.361	0.2484
Percent EPT	–0.587	**0.0446**
EPT Taxa Richness	–0.740	**0.0059**
Percent EPT to Chironomidae	–0.539	0.0703
Percent Baetidae to Ephemeroptera	0.371	0.2347
Water Chemistry		
Discharge	0.308	0.3297
Dissolved Oxygen	–0.466	0.1269
pH	0.171	0.5941
Specific Conductance	0.503	0.0952
Calcium	0.545	0.0666
Magnesium	0.510	0.0899
Potassium	0.340	0.2803
Sodium	0.610	**0.0351**
Chloride	0.788	**0.0023**
Silica	0.182	0.5717
Sulfate	0.566	0.0548
Nitrate	–0.161	0.6175
Total Phosphorus	0.511	0.0892
Dissolved Organic Carbon	0.141	0.6624
Residue	0.524	0.0800
Iron	0.732	**0.0068**
Manganese	0.800	**0.0018**
Stream Density	–0.042	0.8970
Sediment Chemistry		
Phosphorus (sediment)	–0.372	0.2344
Sodium	0.373	0.2329
Magnesium	0.512	0.0885
Potassium	–0.243	0.4467
Iron	0.377	0.2264
Calcium	–0.245	0.4436
Aluminum	–0.111	0.7319
Organic Carbon	–0.503	0.0952
Inorganic Carbon	–0.190	0.5543
Total Carbon	–0.503	0.0952
Selenium	–0.913	**<0.0001**
Arsenic	0.133	0.6795
Cadmium	0.659	**0.0198**
Silver	0.118	0.7143
Zinc	0.866	**0.0003**
Lead	0.651	**0.0219**
Nickel	0.650	**0.0220**
Molybdenum	–0.315	0.3184
Manganese	0.267	0.4013

Laydown at Sept 17, 2014 meeting

Map #	Parcel Number	Acres	Square Feet	Do Improvements Exist? (Source KPB)	Is the Parcel within the Riparian Corridor?	Do Impervious Road Surfaces Exist?	Parcel Straddles BCWPD Boundary	Square Footage (Source: Kenai Peninsula Borough)	Percent Impervious Cover	Square Footage for 4.20% Impervious	Square Footage over 4.20%	Square Footage for 6.40% Impervious	Square Footage over 6.40%	Developed Area Propsed by Panning Staff (ft^2)	Percent Impervious Cover	Developed Area Propsed by Panning Staff (ft^2)	Percent Impervious Cover	Revised Developed Area Propsed by Panning Staff (ft^2)	Percent Impervious Cover	Developed Area Proposed By Realtors (ft^2)	Percent Impervious Cover
26	17402501	0.83	36154.8	Yes				2162	5.98%	1519	643	2314	-152	4000	11.06%	5000	13.83%	5500	15.21%	6200	17.15%
28	17402505	0.98	42688.8	No					0.00%	1793	-1793	2732	-2732	4000	9.37%	5000	11.71%	5500	12.88%	6200	14.52%
137	17359201	0.98	42688.8	No	no	no			0.00%	1793	-1793	2732	-2732	4000	9.37%	5000	11.71%	5500	12.88%	6200	14.52%
44	17305415	1.01	43995.6	No					0.00%	1848	-1848	2816	-2816	4000	9.09%	5000	11.36%	5500	12.50%	6200	14.09%
43	17305416	1.03	44866.8	Yes				1659	3.70%	1884	-225	2871	-1212	4000	8.92%	5000	11.14%	5500	12.26%	6200	13.82%
23	17305432	1.10	47916	Yes				1986	4.14%	2012	-26	3067	-1081	4000	8.35%	5000	10.43%	5500	11.48%	6200	12.94%
110	17407008	1.13	49222.8	Yes	yes	yes		1	0.00%	2067	-2066	3150	-3149	4000	8.13%	5000	10.16%	5500	11.17%	6200	12.60%
100	17408014	1.15	50094	Yes	no	yes		2989	5.97%	2104	885	3206	-217	4000	7.98%	5000	9.98%	5500	10.98%	6200	12.38%
10	17305447	1.20	52272	Yes				849	1.62%	2195	-1346	3345	-2496	4000	7.65%	5000	9.57%	5500	10.52%	6200	[illegible]
30	17305430	1.20	52272	No					0.00%	2195	-2195	3345	-3345	4000	7.65%	5000	9.57%	5500	10.52%	6200	11.86%
11	17305446	1.21	52707.6	No					0.00%	2214	-2214	3373	-3373	4000	7.59%	5000	9.49%	5500	10.43%	6200	11.76%
34	17305425	1.21	52707.6	No					0.00%	2214	-2214	3373	-3373	4000	7.59%	5000	9.49%	5500	10.43%	6200	11.76%
64	17405203	1.21	52707.6	Yes	no	yes		3530	6.70%	2214	1316	3373	157	4000	7.59%	5000	9.49%	5500	10.43%	6200	11.76%
46	17305413	1.22	53143.2	Yes				1	0.00%	2232	-2231	3401	-3400	4000	7.53%	5000	9.41%	5500	10.35%	6200	11.67%
77	17405101	1.23	53578.8	Yes	no	yes		3026	5.65%	2250	776	3429	-403	4000	7.47%	5000	9.33%	5500	10.27%	6200	11.57%
13	17305443	1.24	54014.4	No					0.00%	2269	-2269	3457	-3457	4000	7.41%	5000	9.26%	5500	10.18%	6200	11.48%
18	17305438	1.24	54014.4	No					0.00%	2269	-2269	3457	-3457	4000	7.41%	5000	9.26%	5500	10.18%	6200	11.48%
27	17305431	1.24	54014.4	No					0.00%	2269	-2269	3457	-3457	4000	7.41%	5000	9.26%	5500	10.18%	6200	11.48%
76	17405215	1.24	54014.4	No	no	no			0.00%	2269	-2269	3457	-3457	4000	7.41%	5000	9.26%	5500	10.18%	6200	11.48%
2	17305406	1.25	54450	No					0.00%	2287	-2287	3485	-3485	4000	7.35%	5000	9.18%	5500	10.10%	6200	11.39%
37	17305419	1.26	54885.6	No					0.00%	2305	-2305	3513	-3513	4000	7.29%	5000	9.11%	5500	10.02%	6200	11.30%
82	17405107	1.27	55321.2	Yes	no	yes		1612	2.91%	2323	-711	3541	-1929	4000	7.23%	5000	9.04%	5500	9.94%	6200	11.21%
33	17305426	1.29	56192.4	Yes				2266	4.03%	2360	-94	3596	-1330	4000	7.12%	5000	8.90%	5500	9.79%	6200	11.03%
94	17404001	1.29	56192.4	Yes	no	yes		4800	8.54%	2360	2440	3596	1204	4000	7.12%	5000	8.90%	5500	9.79%	6200	11.03%
47	17305412	1.30	56628	No					0.00%	2378	-2378	3624	-3624	4000	7.06%	5000	8.83%	5500	9.71%	6200	10.95%
50	17366009	1.30	56628	No	yes				0.00%	2378	-2378	3624	-3624	4000	7.06%	5000	8.83%	5500	9.71%	6200	10.95%
24	17305433	1.32	57499.2	No					0.00%	2415	-2415	3680	-3680	4000	6.96%	5000	8.70%	5500	9.57%	6200	10.78%
35	17305424	1.36	59241.6	No					0.00%	2488	-2488	3791	-3791	4000	6.75%	5000	8.44%	5500	9.28%	6200	10.47%
63	17405204	1.37	59677.2	Yes	no	yes		4619	7.74%	2506	2113	3819	800	4000	6.70%	5000	8.38%	5500	9.22%	6200	10.39%
104	17408016	1.37	59677.2	Yes	?	yes		2565	4.30%	2506	59	3819	-1254	4000	6.70%	5000	8.38%	5500	9.22%	6200	[illegible]
41	17305421	1.38	60112.8	No					0.00%	2525	-2525	3847	-3847	4000	6.65%	5000	8.32%	5500	9.15%	6200	10.31%
45	17305414	1.38	60112.8	No					0.00%	2525	-2525	3847	-3847	4000	6.65%	5000	8.32%	5500	9.15%	6200	10.31%
83	17404021	1.38	60112.8	No	no	no			0.00%	2525	-2525	3847	-3847	4000	6.65%	5000	8.32%	5500	9.15%	6200	10.31%
65	17405202	1.41	61419.6	No	no	yes			0.00%	2580	-2580	3931	-3931	4000	6.51%	5000	8.14%	5500	8.95%	6200	10.09%
72	17405226	1.43	62290.8	No	no	no			0.00%	2616	-2616	3987	-3987	4000	6.42%	5000	8.03%	5500	8.83%	6200	9.95%
73	17405227	1.43	62290.8	Yes	no	yes		1	0.00%	2616	-2615	3987	-3986	4000	6.42%	5000	8.03%	5500	8.83%	6200	9.95%
74	17405228	1.43	62290.8	Yes	no	yes		1574	2.53%	2616	-1042	3987	-2413	4000	6.42%	5000	8.03%	5500	8.83%	6200	9.95%
75	17405229	1.43	62290.8	Yes	no	yes		2989	4.80%	2616	373	3987	-998	4000	6.42%	5000	8.03%	5500	8.83%	6200	9.95%
3	17305405	1.44	62726.4	No					0.00%	2635	-2635	4014	-4014	4000	6.38%	5000	7.97%	5500	8.77%	6200	9.88%
31	17305428	1.45	63162	Yes				2874	4.55%	2653	221	4042	-1168	4000	6.33%	5000	7.92%	5500	8.71%	6200	9.82%
66	17405201	1.45	63162	No	no	no			0.00%	2653	-2653	4042	-4042	4000	6.33%	5000	7.92%	5500	8.71%	6200	9.82%
95	17404029	1.46	63597.6	No	no	no			0.00%	2671	-2671	4070	-4070	4000	6.29%	5000	7.86%	5500	8.65%	6200	9.75%
42	17305422	1.47	64033.2	Yes				1	0.00%	2689	-2688	4098	-4097	4000	6.25%	5000	7.81%	5500	8.59%	6200	9.68%
84	17404022	1.48	64468.8	No	no	no			0.00%	2708	-2708	4126	-4126	4000	6.20%	5000	7.76%	5500	8.53%	6200	9.62%
14	17305442	1.49	64904.4	Yes				2501	3.85%	2726	-225	4154	-1653	4000	6.16%	5000	7.70%	5500	8.47%	6200	9.55%

Laydown at Sept. 17, 2014 meeting

15	17305441	1.50	65340	Yes				2706	4.14%	2744	-38	4182	-1476	4000	6.12%	5000	7.65%	5500	8.42%	6200	9.49%
22	17305434	1.50	65340	Yes				3033	4.64%	2744	289	4182	-1149	4000	6.12%	5000	7.65%	5500	8.42%	6200	9.49%
32	17305427	1.51	65775.6	Yes				3098	4.71%	2763	335	4210	-1112	4000	6.08%	5000	7.60%	5500	8.36%	6200	9.43%
81	17405106	1.51	65775.6	Yes	no	yes		5981	9.09%	2763	3218	4210	1771	4000	6.08%	5000	7.60%	5500	8.36%	6200	9.43%
114	17407012	1.52	66211.2	Yes	no	yes		473	0.71%	2781	-2308	4238	-3765	4000	6.04%	5000	7.55%	5500	8.31%	6200	9.36%
8	17305402	1.53	66646.8	Yes				1088	1.63%	2799	-1711	4265	-3177	4000	6.00%	5000	7.50%	5500	8.25%	6200	9.30%
20	17305437	1.54	67082.4	Yes				2468	3.68%	2817	-349	4293	-1825	4000	5.96%	5000	7.45%	5500	8.20%	6200	9.24%
85	17404023	1.54	67082.4	No	no	no			0.00%	2817	-2817	4293	-4293	4000	5.96%	5000	7.45%	5500	8.20%	6200	9.24%
101	17408015	1.54	67082.4	Yes	no	yes		3790	5.65%	2817	973	4293	-503	4000	5.96%	5000	7.45%	5500	8.20%	6200	9.24%
16	17305440	1.56	67953.6	Yes				4362	6.42%	2854	1508	4349	13	4000	5.89%	5000	7.36%	5500	8.09%	6200	9.12%
39	17305417	1.56	67953.6	No					0.00%	2854	-2854	4349	-4349	4000	5.89%	5000	7.36%	5500	8.09%	6200	9.12%
36	17305423	1.60	69696	Yes				2987	4.29%	2927	60	4461	-1474	4000	5.74%	5000	7.17%	5500	7.89%	6200	8.90%
51	17366010	1.60	69696	No	yes				0.00%	2927	-2927	4461	-4461	4000	5.74%	5000	7.17%	5500	7.89%	6200	8.90%
48	17305411	1.61	70131.6	No					0.00%	2946	-2946	4488	-4488	4000	5.70%	5000	7.13%	5500	7.84%	6200	8.84%
103	17408011	1.63	71002.8	No	Yes	no			0.00%	2982	-2982	4544	-4544	4000	5.63%	5000	7.04%	5500	7.75%	6200	8.73%
138	17307063	1.68	73180.8	No	yes	no			0.00%	3074	-3074	4684	-4684	4000	5.47%	5000	6.83%	5500	7.52%	6200	[illegible]
38	17305418	1.70	74052	Yes				2073	2.80%	3110	-1037	4739	-2666	4000	5.40%	5000	6.75%	5500	7.43%	6200	[illegible]
96	17404028	1.73	75358.8	No	no	no			0.00%	3165	-3165	4823	-4823	4000	5.31%	5000	6.63%	5500	7.30%	6200	8.23%
115	17407011	1.73	75358.8	Yes	no	yes		775	1.03%	3165	-2390	4823	-4048	4000	5.31%	5000	6.63%	5500	7.30%	6200	8.23%
49	17305410	1.75	76230	Yes				3022	3.96%	3202	-180	4879	-1857	4000	5.25%	5000	6.56%	5500	7.22%	6200	8.13%
7	17305401	1.76	76665.6	Yes				2693	3.51%	3220	-527	4907	-2214	4000	5.22%	5000	6.52%	5500	7.17%	6200	8.09%
17	17305439	1.76	76665.6	No					0.00%	3220	-3220	4907	-4907	4000	5.22%	5000	6.52%	5500	7.17%	6200	8.09%
40	17305420	1.77	77101.2	No					0.00%	3238	-3238	4934	-4934	4000	5.19%	5000	6.48%	5500	7.13%	6200	8.04%
52	17366011	1.80	78408	No	yes				0.00%	3293	-3293	5018	-5018	4000	5.10%	5000	6.38%	5500	7.01%	6200	7.91%
87	17404025	1.80	78408	No	no	no			0.00%	3293	-3293	5018	-5018	4000	5.10%	5000	6.38%	5500	7.01%	6200	7.91%
109	17407009	1.80	78408	No	yes	no			0.00%	3293	-3293	5018	-5018	4000	5.10%	5000	6.38%	5500	7.01%	6200	7.91%
86	17404024	1.82	79279.2	No	no	no			0.00%	3330	-3330	5074	-5074	4000	5.05%	5000	6.31%	5500	6.94%	6200	7.82%
29	17305429	1.85	80586	Yes				4367	5.42%	3385	982	5158	-791	4000	4.96%	5000	6.20%	5500	6.83%	6200	7.69%
58	17405220	1.86	81021.6	Yes	no	yes		1	0.00%	3403	-3402	5185	-5184	4000	4.94%	5000	6.17%	5500	6.79%	6200	7.65%
59	17405219	1.86	81021.6	Yes	no	yes		1514	1.87%	3403	-1889	5185	-3671	4000	4.94%	5000	6.17%	5500	6.79%	6200	7.65%
60	17405218	1.86	81021.6	Yes	no	yes		1290	1.59%	3403	-2113	5185	-3895	4000	4.94%	5000	6.17%	5500	6.79%	6200	7.65%
61	17405216	1.86	81021.6	Yes	no	yes		3	0.00%	3403	-3400	5185	-5182	4000	4.94%	5000	6.17%	5500	6.79%	6200	7.65%
62	17405217	1.86	81021.6	Yes	no	yes		1912	2.36%	3403	-1491	5185	-3273	4000	4.94%	5000	6.17%	5500	6.79%	6200	7.65%
67	17405223	1.86	81021.6	Yes	no	no		1890	2.33%	3403	-1513	5185	-3295	4000	4.94%	5000	6.17%	5500	6.79%	6200	7.65%
68	17405224	1.86	81021.6	No	no	yes			0.00%	3403	-3403	5185	-5185	4000	4.94%	5000	6.17%	5500	6.79%	6200	7.65%
71	17405225	1.86	81021.6	Yes	no	yes		981	1.21%	3403	-2422	5185	-4204	4000	4.94%	5000	6.17%	5500	6.79%	6200	7.65%
1	17305407	1.88	81892.8	No	Yes				0.00%	3439	-3439	5241	-5241	4000	4.88%	5000	6.11%	5500	6.72%	6200	[illegible]
106	17406006	2.00	87120	Yes	?	yes		1509	1.73%	3659	-2150	5576	-4067	4000	4.59%	5000	5.74%	5500	6.31%	6200	[illegible]
19	17305436	2.03	88426.8	No					0.00%	3714	-3714	5659	-5659	4000	4.52%	5000	5.65%	5500	6.22%	6200	7.01%
78	17405102	2.04	88862.4	Yes	no	yes		3419	3.85%	3732	-313	5687	-2268	4000	4.50%	5000	5.63%	5500	6.19%	6200	6.98%
79	17405103	2.12	92347.2	NO	no	no			0.00%	3879	-3879	5910	-5910	4000	4.33%	5000	5.41%	5500	5.96%	6200	6.71%
21	17305435	2.16	94089.6	No					0.00%	3952	-3952	6022	-6022	4000	4.25%	5000	5.31%	5500	5.85%	6200	6.59%
69	17405222	2.16	94089.6	Yes	no	yes		1153	1.23%	3952	-2799	6022	-4869	4000	4.25%	5000	5.31%	5500	5.85%	6200	6.59%
70	17405221	2.16	94089.6	Yes	no	yes		1290	1.37%	3952	-2662	6022	-4732	4000	4.25%	5000	5.31%	5500	5.85%	6200	6.59%
97	17404027	2.21	96267.6	No	no	no			0.00%	4043	-4043	6161	-6161	4000	4.16%	5000	5.19%	5500	5.71%	6200	6.44%
9	17305403	2.31	100623.6	No					0.00%	4226	-4226	6440	-6440	4000	3.98%	5000	4.97%	5500	5.47%	6200	6.16%
12	17305448	2.39	104108.4	Yes				2331	2.24%	4373	-2042	6663	-4332	4000	3.84%	5000	4.80%	5500	5.28%	6200	5.96%
54	17366013	2.50	108900	No	yes				0.00%	4574	-4574	6970	-6970	4000	3.67%	5000	4.59%	5500	5.05%	6200	5.69%
105	17408017	2.54	110642.4	Yes	yes	yes		3962	3.58%	4647	-685	7081	-3119	4000	3.62%	5000	4.52%	5500	4.97%	6200	5.60%
113	17407014	2.68	116740.8	Yes	no	yes		5340	4.57%	4903	437	7471	-2131	4000	3.43%	5000	4.28%	5500	4.71%	6200	5.31%
5	17305408	2.86	124581.6	No					0.00%	5232	-5232	7973	-7973	4000	3.21%	5000	4.01%	5500	4.41%	6200	4.98%

ORDINANCE REFERENCE SHEET
2015 ORDINANCE
ORDINANCE 15-24

An Ordinance of the Homer City Council Enacting HCC 2.52.080, Correctional Officer Qualifications, Regarding the Qualification and Certification of City Correctional Officers.

Sponsor: City Manager

1. City Council Special Meeting June 29, 2015 Introduction

    a. Memorandum 15-090 from Police Chief as backup

CITY OF HOMER
HOMER, ALASKA

City Manager

ORDINANCE 15-24

AN ORDINANCE OF THE HOMER CITY COUNCIL ENACTING HCC 2.52.080, CORRECTIONAL OFFICER QUALIFICATIONS, REGARDING THE QUALIFICATION AND CERTIFICATION OF CITY CORRECTIONAL OFFICERS.

THE CITY OF HOMER ORDAINS:

Section 1. Homer City Code 2.52.080, Correctional officer qualifications, is enacted to read as follows:

2.52.080. Correctional officer qualifications.

A full-time city correctional officer shall meet the requirements of AS 18.65.130 - 18.65.290 that are applicable to municipal correctional officers, including without limitation certification under AS 18.65.242, on or before the later of:

a. Six months after the effective date of this section; and

b. One year after the date of hire.

Section 2. This Ordinance is of a permanent and general character and shall be included in the City Code.

ENACTED BY THE CITY COUNCIL OF HOMER, ALASKA, this ____ day of _____, 2015.

CITY OF HOMER

_____
MARY E. WYTHE, MAYOR

ATTEST:

_____
JO JOHNSON, MMC, CITY CLERK

AYES:
NOES:
ABSTAIN:
ABSENT:

First Reading:
Public Hearing:
Second Reading:
Effective Date:

Reviewed and approved as to form:

_____	_____
Mary K. Koester, City Manager	Thomas F. Klinkner, City Attorney
Date: _____	Date: _____

City of Homer
www.cityofhomer-ak.gov

Police Department
4060 Heath Street
Homer, Alaska 99603
police@cityofhomer-ak.gov
(p) 907-235-3150
(f) 907-235-3151/ 907-226-3009

Memorandum 15-090

TO: City Manager Koester

FROM: Mark Robl, Chief of Police

DATE: June 18, 2015

SUBJECT: Jail Officer Certifications

It is important for us to ensure our jail officers are certified by the state and conform to state standards for Municipal Corrections Officers. Having our officers certified helps to reduce liability for us and conform to the state jail standards for jail operations. The state passed AS 18.65.290(5) which requires us to adopt an ordinance under AS 18.65.285 to require our officers to meet Alaska Police Council Standards for municipal officers if we want them to be certified. Our city attorney has drafted an ordinance to accomplish this. I recommend we ask council to approve the ordinance.

ORDINANCE REFERENCE SHEET
2015 ORDINANCE
ORDINANCE 15-25

An Ordinance of the City Council of Homer, Alaska, Re-Appropriating the 2003 Allocation From the Alaska Department of Community and Economic Development as Fisheries Revitalization Aid for the Purpose of Refurbishing a Fish Dock Crane.

Sponsor: City Manager/Port and Harbor Director

1. City Council Special Meeting June 29, 2015 Introduction

    a. Memorandum 15-089 from Port and Harbor Director as backup
    b. Ordinance 03-52
    c. Port and Harbor Advisory Commission Minutes of 01/28/15

CITY OF HOMER
HOMER, ALASKA

City Manager/
Port and Harbor Director

ORDINANCE 15-25

AN ORDINANCE OF THE CITY COUNCIL OF HOMER, ALASKA, RE-APPROPRIATING THE 2003 ALLOCATION FROM THE ALASKA DEPARTMENT OF COMMUNITY AND ECONOMIC DEVELOPMENT AS FISHERIES REVITALIZATION AID IN THE AMOUNT OF $80,914.12 FOR THE PURPOSE OF REFURBISHING A FISH DOCK CRANE.

WHEREAS, In 2003 the City received Fisheries Revitalization Aid funds in the amount of $80,914.12 from the Alaska Department of Community and Economic Development (Ordinance 03-52); and

WHEREAS, The Port and Harbor Advisory Commission directed staff to use the monies for restrooms near the Fish Dock; and

WHEREAS, Since that time private businesses in the area have provided their employees with restroom facilities, eliminating the necessity of the City providing restrooms within the area; and

WHEREAS, Staff and the Port and Harbor Advisory Commission have determined the funds would be better used if re-allocated to the Fish Dock crane refurbishment project.

NOW, THEREFORE, THE CITY OF HOMER ORDAINS:

Section 1. The Homer City Council hereby re-appropriates the allocation from the 2003 Alaska Department of Community and Economic Development Fisheries Revitalization Aid for the purpose of refurbishing a Fish Dock crane.

Expenditure:

Account	Description	Amount
456-0380	Refurbish Fish Dock Crane	$80,914.12

Section 2. This is a budget amendment ordinance only, is not permanent in nature, and shall not be codified.

ENACTED BY THE CITY COUNCIL OF HOMER, ALASKA this _____ day of _____, 2015.

CITY OF HOMER

_____
MARY E. WYTHE, MAYOR

ATTEST:

_____
JO JOHNSON, MMC, CITY CLERK

AYES:
NOES:
ABSTAIN:
ABSENT:

First Reading:
Public Reading:
Second Reading:
Effective Date:

Reviewed and approved as to form:

_____ _____
Mary K. Koester, City Manager Thomas F. Klinkner, City Attorney

Date: _____ Date: _____

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Port and Harbor
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Memorandum 15-089

TO: MAYOR BETH WYTHE & HOMER CITY COUNCIL
FROM: BRYAN HAWKINS, PORT DIRECTOR/HARBORMASTER
DATE: JUNE 17, 2015
SUBJECT: RE-APPROPRIATE FISH DOCK RESTROOM MONIES TO CRANE REFURBISHMENT PROJECT

Several years ago, the Fish Dock Restrooms project was proposed to construct additional restrooms as dock workers did not have adequate restroom facilities in the area. In 2003, the City Fisheries Revitalization Aid funds from Alaska Department of Community and Economic Development were received. The Port and Harbor Advisory Commission directed staff to use the monies for Fish Dock restrooms; the attached memos from Harbormaster Steve Dean give background information.

What has changed since then is the fact that Auction Block has built a processing plant next to the Fish Dock and their employees now have restroom facilities in the plant. Another new development is Snug Harbor's construction project, which when completed will supply their employees with facilities as well. Given these new improvements, and the fact that the Fish Dock Restrooms were never constructed, staff feels that the State monies should be re-appropriated to another project.

Staff feels that this money would be far better used if re-allocated to the Fish Dock crane refurbishment project. This project began in 2013 and will continue over the next few years until all eight cranes have been rebuilt. Four cranes have been refurbished so far.

The Port and Harbor Advisory Commission discussed re-appropriating this money towards the crane refurbishment project at their regular meeting on January 28, 2015. The commission passed the following motion:

HOWARD/HARTLEY MOVED TO USE THE MONEY RECEIVED IN THE 2003 GRANT FROM THE ALASKA DEPARTMENT OF COMMUNITY AND ECONOMIC DEVELOPMENT AS FISHERIES REVITALIZATION AID FOR THE PURPOSE OF REFURBISHING ANOTHER FISH DOCK CRANE.

Recommendation

Approve Ordinance 15-25 an Ordinance of the City Council of Homer, Alaska, Re-Appropriating the 2003 Fisheries Revitalization Aid from the Alaska Department of Community and Economic Development for the Purpose of Refurbishing a Fish Dock Crane.

Attachments:
Memo to Port & Harbor Commission from Steve Dean Re: Fish Dock Area Restroom dated 5/17/2006
Memo to Port & Harbor Commission from Steve Dean Re: Fish Dock Area Restroom dated 6/21/2006
Memo to Homer City Council from Port & Harbor Commission Re: Fish Dock Area Restroom dated 6/30/2006
PHC Meeting Minutes 1/28/15 Re: Fish Dock Restroom Monies

City of Homer
Port / Harbor
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Homer, Alaska 99603-8005

Telephone *(907) 235-3160*
Fax *(907) 235-3152*
E-mail *Port@ci.homer.ak.us*
Web Site *http://port.ci.homer.ak.us*

TO: Port and Harbor Advisory Commission

FROM: Steve Dean, Port and Harbor Director

DATE: May 17, 2006

RE: New Business, Item C, Fish Dock area rest room

Background

In July, 2003 City of Homer received a grant of $80,914.12 from Alaska Department of Community and Economic Development. This Fisheries Revitalization Aid was allocated to regions of the state that were adversely impacted by the downturn in the commercial salmon fisheries.

Homer City Council sought Port and Harbor Advisory Commission advice as to the best use of these funds. The Commission recommended that these funds be used for a plumbed rest room in the vicinity of the Fish Dock. An additional expenditure of $40,000 from Port and Harbor Reserves was authorized by Homer City Council to increase available funds to $120,914.

Due to the passage of time and increased cost of construction City Administration has asked the Port and Harbor Advisory Commission to review this proposed project.

Recommendation

Please review the attached information and develop a recommendation to forward to Homer City Council for their consideration.

City of Homer
Port / Harbor
4350 Homer Spit Road
Homer, Alaska 99603-8005

Telephone (907) 235-3160
Fax (907) 235-3152
E-mail Port@ci.homer.ak.us
Web Site http://port.ci.homer.ak.us

TO: Port and Harbor Advisory Commission

FROM: Steve Dean, Port and Harbor Director

DATE: June 21, 2006

RE: Pending Business, Item A, Fish Dock area rest room

Background

The Port and Harbor Advisory Commission discussed a number of different improvements that could be implemented in the vicinity of the Fish Dock allowing better access to rest rooms for area workers.

These included:

1) Seek City Council approval for additional funds to construct a heated year round facility in the wood grid/fuel float area. Funds currently appropriated $120,914, additional estimated cost $60,000.

2) Modify access to fish dock rest room in a manner that would maintain secure access to the card reader but allow free access to existing rest rooms.

3) Construct a pumpable, unplumbed, unheated facility similar to the one at Baycrest Hill overlook.

4) Distribute cards for a nominal fee that would only provide access to the rest rooms.

5) Provide temporary Port-A-Potty for fish dock workers, truck drivers and others that don't have access to a crane card.

Recommendation

Please review the options out lined above and develop a recommendation to forward to Homer City Council for their consideration.

City of Homer
Port / Harbor
4350 Homer Spit Road
Homer, Alaska 99603-8005

Telephone *(907) 235-3160*
Fax *(907) 235-3152*
E-mail *Port@ci.homer.ak.us*
Web Site *http://port.ci.homer.ak.us*

TO: Mayor Hornaday and Homer City Council

FROM: Port and Harbor Advisory Commission

DATE: June 30, 2006

RE: Fish Dock Area Rest Room

Background

The Port and Harbor Advisory Commission discussed construction of a public rest room in the Fish Dock area as Item C, under New Business at its May 24, 2006 meeting and again as Item A, under Pending Business at its June 28, 2006.

After receiving input from Port and Harbor staff, Public Works Director Carey Meyer, Homer City Council member Val McLay and others, the Commission passed the following motion:

VELSKO/ULMER – MOVED TO MOVE FORWARD THE ORIGINAL RESTROOM PROPOSAL AT THE WOOD GRID FUEL DOCK AREA BACK TO CITY COUNCIL WITH THE COMMISSION'S RECOMMENDATION TO PROCEED WITH RFP.

Motion carried.

The Commission further recommended that Port and Harbor staff contract for a portable toilet to be placed in the Fish Dock area and that rest room only access cards be made available to Fish Dock area workers upon request at a nominal fee. Both these interim measures are being implemented.

Recommendation

Please consider the advice provided by the Port and Harbor Commission to proceed with a Request for Proposal to construct a plumbed public rest room in the area of the fuel float/wood grid and Coal Point Park.

U:office/PhComm/Comm06/FishDockJune30

NEW BUSINESS

A. Re-allocation of Fish Dock Restroom Monies
   i. Memo to Port & Harbor Commission from Bryan Hawkins, Port Director/Harbormaster Re: Re-Appropriate Fish Dock Restroom Monies to Crane Refurbishment Project dated January 21, 2015
      a. Prior Memos for Back-up Information dated May – June 2006

HOWARD/HARTLEY MOVED TO USE THE MONEY RECEIVED IN THE 2003 GRANT FROM THE ALASKA DEPARTMENT OF COMMUNITY AND ECONOMIC DEVELOPMENT AS FISHERIES REVITALIZATION AID FOR THE PURPOSE OF REFURBISHING ANOTHER FISH DOCK CRANE.

There was discussion if there is a need for an additional restroom on the fish dock. Harbormaster Hawkins noted that Auction Block has facilities for their employees and Snug Harbor will when they complete their building. There are bathrooms now for truck drivers that can be accessed with crane cards or bathroom cards and it works well. In talking with staff there doesn't seem to be an issue with people coming around looking for a restroom. The ice plant restroom could be modified to add another stall or two but he thinks the money is better used to rebuild a crane.

Some members felt there is a need to improve ice plant restrooms. Harbormaster Hawkins said he could talk to some contractors and see what it would take to make modifications to the ice plant restroom. He is reluctant to have it open all the time and prefers the access card.

It was suggested they approve the motion to fix the crane and when we know more about a porta potty or restroom improvements they can take money from the reserves to address it. It won't be a huge expense.

VOTE: YES: ULMER, HOWARD, ZIMMERMAN, CARROLL, HARTLEY, STOCKBURGER

Motion carried.

INFORMATIONAL ITEMS

A. Monthly Statistical & Performance Report
B. Weekly Crane and Ice Report
C. Deep Water Dock Report
D. Pioneer Dock Report & Ferry Landings Report
E. Water Usage Report
F. 2014 EOY Fuel Wharfage Comparison
G. 2014 EOY Parking Pass Comparison
H. 2014 EOY Load & Launch Pass Comparison
I. Spit Lease Expiration Calendar
J. 2015 Council Meeting Attendance

Harbormaster Hawkins addressed the year-end report, noting moorage sales had increases in daily transient, monthly, and annual reserves increase. To his knowledge they have never broke 800 annual

CITY OF HOMER
HOMER, ALASKA

City Manager
P/H
Finance

ORDINANCE 03-52

AN ORDINANCE OF THE CITY COUNCIL OF HOMER, ALASKA, APPROPRIATING MONIES FROM THE ALASKA DEPARTMENT OF COMMUNITY AND ECONOMIC DEVELOPMENT, FISHERIES REVITALIZATION AID IN THE AMOUNT OF $80,914.12, FOR A PORT/HARBOR RESTROOM AND AUTHORIZING THE CITY MANAGER TO EXECUTE THE APPROPRIATE DOCUMENTS.

WHEREAS, On July 3, 2003 the Mayor was notified that the City of Homer was being granted $80,914.12 for Fisheries Revitalization Aid; and

WHEREAS, The allocation method was applied evenly across all salmon fishing regions of the state; and

WHEREAS, This grant may be used by the City of Homer, at the City of Homer's discretion for any purpose for which it has the power to expend funds; and

WHEREAS, The Port/Harbor Advisory Commission, as requested by the Homer City Council on August 25, 2003, took action during their Regular Meeting of August 27, regarding the allocation of the $80,914.12; and

WHEREAS, The City of Homer deems it essential that these fisheries funds be allocated to the Port and Harbor for restrooms; and

WHEREAS, the Port/Harbor Commission requests these funds be used for a Port/Harbor plumbed restroom in the vicinity of the Fish Dock.

NOW, THEREFORE, the City of Homer Ordains:

Section 1. That the Fisheries Revitalization Aid money is hereby appropriated in the amount of $80,914.12, as follows and that the City Manager is hereby authorized to execute the appropriate documents:

Account No.	Description	Amount
Revenue:	Fisheries Revitalization Aid	$80,914.12
Expenditure: 415-380	Port/Harbor Restrooms	$80,914.12

Section 2. This ordinance is a budget amendment only, is not of a permanent nature and is a non code ordinance.

PASSED AND ENACTED by the Homer City Council this 26th day of January 2004.

CITY OF HOMER

By John Fenske
JACK CUSHING, MAYOR

ATTEST:

Mary L. Calhoun
MARY L. CALHOUN, CMC, CITY CLERK

Introduction: ~~09/08/03~~ Postponement 10/13/03, 12/08/03
Public Hearing: ~~09/22/03~~ 01/12/04
Second Reading: ~~09/22/03~~ 01/26/04
Effective Date: 01/27/04

Ayes: 6
Noes: 0
Abstain: 0
Absent: 0

Reviewed and approved as to form and content:

Walt E. Wrede City Manager
1/27/04
Date

Gordon Tans, City Attorney
2 Feb 04
Date

Fiscal Note: Fiscal information included in body of Ordinance.

MLC/mlc

NEW BUSINESS

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   i. Memo to Port & Harbor Commission from Bryan Hawkins, Port Director/Harbormaster Re: Re-Appropriate Fish Dock Restroom Monies to Crane Refurbishment Project dated January 21, 2015
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It was suggested they approve the motion to fix the crane and when we know more about a porta potty or restroom improvements they can take money from the reserves to address it. It won't be a huge expense.

VOTE: YES: ULMER, HOWARD, ZIMMERMAN, CARROLL, HARTLEY, STOCKBURGER

Motion carried.

INFORMATIONAL ITEMS

A. Monthly Statistical & Performance Report
B. Weekly Crane and Ice Report
C. Deep Water Dock Report
D. Pioneer Dock Report & Ferry Landings Report
E. Water Usage Report
F. 2014 EOY Fuel Wharfage Comparison
G. 2014 EOY Parking Pass Comparison
H. 2014 EOY Load & Launch Pass Comparison
I. Spit Lease Expiration Calendar
J. 2015 Council Meeting Attendance

Harbormaster Hawkins addressed the year-end report, noting moorage sales had increases in daily transient, monthly, and annual reserves increase. To his knowledge they have never broke 800 annual

CITY OF HOMER
HOMER, ALASKA

City Manager/Police Chief

RESOLUTION 15-052

A RESOLUTION OF THE CITY COUNCIL OF HOMER, ALASKA, APPROVING AND ACCEPTING THE RENEWAL OF THE SPECIAL SERVICES CONTRACT FOR FY 2016 WITH THE ALASKA DEPARTMENT OF PUBLIC SAFETY IN THE AMOUNT OF $36,000.00 AND AUTHORIZING THE CITY MANAGER TO EXECUTE THE APPROPRIATE DOCUMENTS.

WHEREAS, The Alaska Department of Public Safety, State Troopers Special Services Contract pays the City for the provision of services related to assistance in the efficient conduct of the Alaska Department of Public Safety business within the general geographic region of the City of Homer; and

WHEREAS, Services provided include pre-arraignment prisoner care and access to and utilization of professional facilities and equipment instrumental to the overall efficient and effective operation of law enforcement and emergency response component; and

WHEREAS, The Special Services Contract is an annually budgeted revenue in the amount of $36,000.00 to be paid in four payments of $9,000.00; and

WHEREAS, The Alaska Department of Public Safety has requested renewal of the contract for a one year period from July 1, 2015 through June 30, 2016.

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Homer, Alaska, hereby approves and accepts the renewal of the Special Services Contract for the FY 2016 with the Alaska Department of Public Safety in the amount of $36,000.00 and authorizes the City Manager to execute the appropriate documents.

PASSED AND ADOPTED by the Homer City Council this 29th day of June, 2015.

CITY OF HOMER

_____
MARY E. WYTHE, MAYOR

ATTEST:

_____
JO JOHNSON, MMC, CITY CLERK

Fiscal Impact: Revenues of $36,000.00 budgeted in 100.030.4505.

City of Homer
www.cityofhomer-ak.gov

Police Department
4060 Heath Street
Homer, Alaska 99603
police@cityofhomer-ak.gov
(p) 907-235-3150
(f) 907-235-3151/ 907-226-3009

Memorandum 15-093

TO: Katie Koester, City Manager

FROM: Mark Robl, Chief of Police

DATE: June 18, 2015

SUBJECT: FY 2016 Special Services Contract Renewal

The State Troopers have requested we renew the special services contract we have with them. I recommend we obtain council approval to renew this contract.

We have had a special services contract with the state for over 25 years. The contract reimburses us for allowing troopers to use our facilities and equipment as needed. It also pays us for transporting state prisoners to and from arraignments and for housing their title 47 detainees. The state proposes to renew the contract at the existing rate of $36,000 annually. I feel this is fair compensation for the services we provide to them.

CITY OF HOMER
HOMER, ALASKA

City Manager/
Fire Chief

RESOLUTION 15-053

A RESOLUTION OF THE HOMER CITY COUNCIL AWARDING THE CONTRACT FOR THE REFURBISHMENT OF HOMER FIRE DEPARTMENT APPARATUS TANKER 2 TO U.S. FIRE EQUIPMENT LLC OF SUMNER, WASHINGTON, IN THE AMOUNT OF $154,375.01 AND AUTHORIZING THE CITY MANAGER TO EXECUTE THE APPROPRIATE DOCUMENTS.

WHEREAS, In accordance with the Procurement Policy, the Request for Proposals was advertised in the Homer News on May 21 and the Homer Tribune on May 27, 2015 and posted on the Clerk's home page; and

WHEREAS, Bids were due on June 19, 2015 and two bids were received; and

WHEREAS, Proposals were opened and reviewed and the firm of US Fire Equipment LLC of Sumner, Washington, was determined to be the low responsive bidder and found to be qualified to complete the work; and

WHEREAS, The cost of the refurbishment of Fire Department Tanker 2, as reflected in the low bid, is within the budget authorized by the City Council; and

WHEREAS, This award is not final until written notification of award is received by US Fire Equipment LLC, from the City of Homer.

NOW, THEREFORE, BE IT RESOLVED that the City Council of Homer, Alaska, approves the contract award for the refurbishment of Fire Department Apparatus Tanker 2 to US Fire Equipment LLC of Sumner, Washington, in the Amount of $154,375.01 and authorizes the City Manager to execute the appropriate documents.

PASSED AND ADOPTED by the Homer City Council this 29th day of June, 2015.

CITY OF HOMER

_____
MARY E. WYTHE, MAYOR

ATTEST:

_____
JO JOHNSON, MMC, CITY CLERK

Fiscal Note: Account No. 151-7001, $154,375.01.

City of Homer
www.cityofhomer-ak.gov

Volunteer Fire Department
604 East Pioneer Ave
Homer, Alaska 99603
fire@cityofhomer-ak.gov
(p) 907-235-3155
(f) 907-235-3157

Memorandum 15-094

TO: Katie Koester, City Manager

THROUGH:

FROM: Robert Painter, Chief

DATE: June 22, 2015

SUBJECT: Award of Lowest Bid

A total of two proposals were received for the advertised RFP for the refurbishing of our Tanker 2, a 1989 E-One Tanker/Pumper. Unfortunately, only one bid complied with the requirements of the RFP by being listed on the "Plan Holders List", that received by U. S. Fire Equipment LLC of Sumner WA. In a review of the bids submitted, prior to notification of submission error, the only viable submission was also the lowest of the two bids received, that being the one from U.S. Fire Equipment LLC, for $136,475.01 FOB. This amount is within the budget provided. There are also $17,900 in requested options that will be considered in addition to the base contact amount.

Request for Proposals
Refurbishment of Homer Fire Department Apparatus
Tanker 2
City of Homer, Alaska

Proposals to refurbish Tanker 2 will be received at the Office of the City Clerk, City Hall, City of Homer, 491 East Pioneer Avenue, Homer, Alaska, until ***4:30 p.m., Friday June 19, 2015***.

The time of receipt will be determined by the City Clerk's time stamp. Proposals received after the time fixed for the receipt of the bids shall not be considered. All firms submitting proposals must be listed on the "Plan Holder's List" maintained by the City Clerk. All bidders must submit a City of Homer Plan Holders Registration form to be on the Plan Holder's List and to be considered responsive. Plan holder registration forms, and Plans and Specifications are available on line at http://www.cityofhomer-ak.gov/rfps. Respondents not on the plan holder's list shall be deemed unresponsive and shall not be considered. The City shall not accept faxed proposals.

For proposal specifications and evaluation criteria please visit the city website **http://www.cityofhomer-ak.gov/rfps** or contact:

City Clerk's Office
491 E. Pioneer Avenue
Homer, Alaska 99603
907-235-3130

Please direct all questions regarding this project to:

Robert Painter, Fire Chief
604 E. Pioneer Ave.
Homer, Alaska 99603
907-235-3155, Extension 1

The intent of this proposal effort is to provide an opportunity for fire apparatus manufacturers and service centers to bid on the project to refurbish an existing fire engine to NFPA Level 2 requirements. This is the first of two projects to be considered (the second to follow the initial project).

CITY OF HOMER

Katie Koester

Katie Koester, City Manager

Advertisement:
Homer News – May 21, 2015
Homer Tribune – May 27, 2015
Acct. No. 100-0150-5227

Request for Proposals
Homer Volunteer Fire Department
Tanker 2 Refurbishment
2015

I. Overview – The City of Homer, Homer Volunteer Fire Department is seeking proposals to perform a Level II Refurbishing as outlined in NFPA 1912 Fire Apparatus Refurbishing, 2011 Edition. The apparatus is a 1989 E-One Tanker/Pumper, 6-wheel drive, 2000 gallon tank with 1500 GPM Hale pump.
   a. As a Level II Refurbishment is primarily an "advise and repair/replace as approved" project, all work outside that specified shall be approved prior to beginning the modifications to the apparatus.
   b. The "Optional Equipment/Work" is to be quoted separately per item. The Fire Department will determine what additional work/equipment may be added to the project once the initial service and inspection work is completed.

II. Proposals shall be submitted, in writing to:
Robert Painter, Chief
C/O City of Homer
City Clerk's Office
491 E. Pioneer Ave.
Homer, AK 99603
E-mail: clerk@ci.homer.ak.us

Questions should be directed to:
Robert Painter, Chief
(907) 235-3155
E-mail: rpainter@ci.homer.ak.us

III. Carrying Capacity
   a. Tanker 2 is designed to carry 5 fire personnel including the driver/operator. No changes to this configuration shall be allowed.

IV. Frame – inspect for wear, broken or loose bolts or other fittings, bent or damaged members, or other components.
   a. Advise of any repairs or modifications needed.

V. Drivetrain – inspect all components of the drivetrain for wear, balance, stress cracks, or other damage, including the drive shaft, end yokes, flanges, universal joints and associated mountings.

VI. Engine and Engine System Design – inspect the engine and all related accessories for wear, fluid leaks, loss of power, excessive smoke, or other potential problems.
   a. All belts and filters shall be replaced
   b. The vehicle engine shall be services to manufacturer's specifications for the model year/hours on the engine.

VII. Cooling System – inspect all portions of the cooling system for leaks, blockages, wear, and other conditions that could affect the cooling of the vehicle's engine.
   a. The cooling system shall be flushed, and new coolant that meets the engine manufacturer's requirements shall be added.

VIII. Lubrication System – inspect for wear, leaks or other problems that could affect the performance of the system.

IX. Fuel and Air Systems – inspect for wear, leaks, and other problems that could affect the system.
   a. All fuel system filters and air system filters shall be replaced.

X. Exhaust System – inspect all portions of the system for leaks, loose hangers, rusted tubing, wear, and other problems that could affect the performance of the exhaust system.

XI. Braking Systems – inspect all components of the braking system for excessive wear, leakage, loss of performance or other problems that could affect braking of the apparatus, including exhaust brakes.

XII. Suspension – inspect all axles and wheels, springs, hangers, mountings, and suspension system accessories for wear, stress cracks, sagging, improper bolt torque, or other problems.
   a. The refurbished apparatus shall meet all applicable federal and Alaska state weight ratings upon completion.

XIII. Steering – inspect the entire system, including steering box, steering gear, drag links, power steering pump,, hose, and accessories for wear, leakage, loss of performance or other problems.
   a. Replace existing turn indicator with automatic cancelling indicator on steering column.

XIV. Transmission/Transfer Case – inspect all components of the transmission/transfer case, their mountings, and the associated accessories for wear, leaks or damage.
   a. All fluid levels shall be checked and all filters replaced.

XV. Fuel Tank – inspect all components of the fuel tank, its mountings and accessories for wear, leaks, or damage.

XVI. Low Voltage Electrical Systems and Warning Devices
   a. The existing lighting shall be replaced, where possible, with low voltage LED lighting to include: tail, brake and turn indicators, marker/running lights, compartment lights and all emergency lighting.
   b. All existing wiring harnesses shall be inspected and replaced if worn.

XVII. Load Management – a load management system shall be installed to protect the electrical system from damage and to allow continuous charging/conditioning of the vehicle batteries while plugged into shore power.

XVIII. Optical Warning Devices – all shall be replaced with LED lighting to current NFPA specifications for new apparatus.

XIX. Audible Warning Devices – all shall be replaced with suitable audible devices per NFPA specifications. No mechanical sirens will be permitted on the apparatus.

XX. Driving and Crew Compartments
   a. There shall be seating for 5 personnel: 3 in the cab of the vehicle, including the driver/operator and two in rear facing jump seats.
   b. Seating shall be installed to incorporate "walk-away" SCBA storage, with the exception of the driver/operator seat. All brackets shall meet current NFPA recommendations

XXI. Body, Compartment, and Hose Storage
   a. The hose bed shall be capable of carrying 1,000' of 5" nitrile hose with Storz couplings in the right side of the hose bed and 800' of 3 inch nitrile hose on the left side of the hose bed.
   b. Hose bed covers are to be installed to comply with current NFPA standards.
   c. Crosslays will consist of 2 trays for 1 ¾" preconnected lines of 200' nitrile hose and 1 tray for 3" preconnected 200' nitrile hose. Appliances to secure the attached nozzles (gated wye on the 3 inch) shall be provided and installed on the apparatus. (hose will be placed once the unit arrives at its final destination)
   d. Compartments shall be lighted, with dry-decking installed in the bottoms of each compartment.
   e. The existing Zico ladder lowering device on the office side of the apparatus will be maintained and serviced according to manufacturer's recommendations.

XXII. Metal Finish – the entire cab and body shall be completely cleaned and prepped for repainting and refinished in the same color. All lettering shall be similar as to what currently exists on the apparatus.
   a. It is our intent to add rear chevrons, per current NFPA standards, to the apparatus. Recommendations for accomplishing this are expected.

XXIII. Fire Pump – the fire pump shall be completely overhauled per manufacturers recommendations.
   a. An on-board Foam Pro Class A and Class B foam, shall be installed on the apparatus to provide either type foam to all pre-connected fire hoses.
   b. 40 gallons of Class B foam, and 20 gallons of Class A foam will be the minimum levels permitted.
   c. It shall be required to be able to refill foam tanks from the ground.
   d. Foam tank level indicator lights are to be mounted on pump panel.

XXIV. Water Tank – inspect tank for leaks, damage or corrosion that would reasonably result in a leak in the near future.

XXV. Equipment Carried on the Fire Apparatus – there will be no new equipment provided with the apparatus, except for the that specified below.
   a. The top-mounted electrical generator shall be replaced with a new, comparable rated Honda generator and wired to provide line voltage power to all external junction boxes and pole mounted scene lights. A diesel powered generator, if can be plumbed to the vehicle fuel system, will be considered.
   b. The pole mounted scene lights shall be replaced with comparable lumen LED lighting to reduce the voltage demands on the generator.

XXVI. Existing Communications Equipment - shall be retained and reinstalled following refurbishment of the apparatus. This includes primary radio and headset system.

XXVII. Test and Delivery Data Requirements

a. The refurbished apparatus shall be completely tested and certified by the company providing the refurbishment, as per NFPA 1912, 2011 edition, including:
   i. Pump testing
   ii. Pumping Engine Overload Test
   iii. Pressure Control Device Test
   iv. Priming System Test
   v. Vacuum Test
   vi. Water Tank-to-Pump Flow Test
   vii. Water Tank Capacity Test
   viii. Low-voltage Electrical System Test
   ix. Line-voltage Electrical System Test
   x. Foam System Test
   xi. Road Test
   xii. Delivery Acceptance Testing – will be conducted on the manufacturer's site prior to delivery of the apparatus. A representative of the fire department shall witness final acceptance testing.

XXVIII. Optional Equipment/Work (to be quoted per item, separately)

a. Provide and install electric intake valves on draft hose intake ports.
b. Provide and install Electronic Pump Control FRC model J1939, or comparable.
c. Modify pump access panels to a button/latch system to facilitate ease of removal for service and maintenance.
d. Provide and install a TFT Extend-a-Gun Package (XFC-1)
e. The Tank Level Gauge was recently replaced. We would like to add indicators in the cab and rear of the apparatus (visible from the ground).
f. Provide and Install air horn remote activation button on pump panel for use by engineer.
g. Provide and install clapper'ed tank to pump valve, if not previously installed.
h. Modify Fol-da-tank, compartment by removing exterior compartment, except for most forward compartment for single SCBA, finish new exterior surfaces, and install a Zico Quick-Lift System to carry the existing tank, with finished exterior.
i. Provide wireless interface between Engineers headset and existing Sigtronics system.

XXIX. Delivery

a. The successful bidder will submit proposals for the delivery both to and from the site of the work to be done. Homer Alaska is situated on the road system so the apparatus can be driven overland, driven and barged to a suitable port of call, or shipped via flatbed trailer/truck to the shop location.

CITY OF HOMER

HOMER, ALASKA

City Manager

RESOLUTION 15-054

A RESOLUTION OF THE CITY COUNCIL OF HOMER, ALASKA, AUTHORIZING LEASE NEGOTIATIONS FOR LOT 19 ON THE HOMER SPIT BETWEEN THE CITY AND JOSE RAMOS, DBA HARBOR GRILL, AND FINDING THAT AWARDING A NEW LEASE TO THE CURRENT LESSEE WITHOUT A COMPETITIVE BIDDING PROCESS IS IN THE PUBLIC INTEREST.

WHEREAS, Jose Ramos' land lease on Lot 19 expires February 1, 2016 including all options; and

WHEREAS, Mr. Ramos has requested a new lease without a competitive bidding process pursuant to the provisions of Chapter 11.2 (F) of the Lease Policies; and

WHEREAS, The Lease Committee met on March 26 and May 28, 2015 to consider Mr. Ramos' lease proposal; and

WHEREAS, Given the good lease history with Mr. Ramos, his investment in the property, positive financial flow from the business, and employment of people for the business, the Lease Committee recommends a new lease; and

WHEREAS, The Lease Committee recommends that Mr. Ramos be given the opportunity to negotiate a new lease on Lot 19 with a term of twenty years with two 5-year options; and

NOW, THEREFORE, BE IT RESOLVED that the Homer City Council hereby authorizes the City Manager to negotiate a new lease on Lot 19 with Jose Ramos, dba Harbor Grill for a term of twenty years with two 5-year options.

BE IT FURTHER RESOLVED that the City Council finds that it is in the public interest to award a new lease to the current lessee without a competitive bidding process as authorized in Chapter 11.2 (F) of the Lease Policy for the reasons stated above by the Lease Committee.

PASSED AND ADOPTED by the City Council of Homer, Alaska, this 29th day of June, 2015.

CITY OF HOMER

_____
MARY E. WYTHE, MAYOR

ATTEST:

_____
JO JOHNSON, MMC, CITY CLERK

Fiscal Note: Lease revenues to be determined.

City of Homer
www.cityofhomer-ak.gov

Port and Harbor
4350 Homer Spit Road
Homer, AK 99603
port@cityofhomer-ak.gov
(p) 907-235-3160
(f) 907-235-3152

Memorandum 15-096

TO: MAYOR BETH WYTHE & HOMER CITY COUNCIL

FROM: LEASE COMMITTEE

CC: PORT & HARBOR ADVISORY COMMISSION

DATE: MAY 29, 2015

SUBJECT: HARBOR GRILL LEASE RENEWAL RECOMMENDATIONS

The City has received a lease renewal request from Jose Ramos for his Harbor Grill restaurant, located next to Ramp 3 on the Homer Spit. Mr. Ramos's lease expires February 1, 2016 with no options remaining, and has requested a new long-term lease for Lot 19 without it going out for RFP. Mr. Ramos's justifications for this request are outlined in the letter from his Attorney, Ms. Lindsay Wolter, and in his lease application; see attached.

The Lease Committee first met to review this proposal on March 11, 2015 where a few questions seeking clarification were generated:

- Were the financial statements in the application for the Homer Spit restaurant, or were they for the Pioneer Avenue restaurant?
- How many employees does the Harbor Grill employ during the summer season?
- We see that there is a camera on the NE corner of the building, what is it used for?

The Lease Committee received the answers to these questions and reviewed the proposal again on May 28, 2015. Given the good lease history with Mr. Ramos, the investment in the property, the positive financial flow reported from this business activity, and the number of employees his business employs, the Lease Committee recommends that a new lease be issued to Don Jose, LLC for Lot 19. The Lease Committee recommends that the term of this lease be for 20 years with the possibility of two, five-year extensions based on performance.

Lot 19 was recently appraised on April 15, 2014 with an annual market rent of $11,000. This current information can be used during lease negotiations; therefore an appraisal prior to award/negotiations would not be required. Additionally, one of the findings discovered by the Lease Committee is that the original lease for this property is out of date. If a new lease is granted, it will be in accordance with current lease policies/code and follow the existing boilerplate lease.

Recommendation

The Lease Committee recommends Homer City Council do not advertise this property through the Request for Proposals process, and award a new 20-year lease with two, five-year options to Don Jose, LLC of Homer, Alaska, for Lot 19 on the Homer Spit, and instruct the City Manager to move forward with lease negotiations.

Attached: Harbor Grill Lease Proposal & Application
Letter from Lindsay Wolter to City of Homer Re: Lease Application Questions dated April 3, 2015

CITY OF HOMER
PROPERTY MANAGEMENT
LEASE APPLICATION CHECKLIST

Applicant Name:

Date Application Received:

CHAPTER 5: LEASE APPLICATION PROCESS

5.1: POLICY

A. It is the policy of the City of Homer to provide for a streamlined, standardized, and easily understood lease application process. A full and complete application packet shall be provided to all applicants. Applicants must be qualified under Section 18.08.50 of the Homer City Code:
(a) a natural person and is responsible, meaning the applicant has sufficient skill, experience and financial capability to perform all the obligations of the lessee under the proposed lease; and
(b) a person who is at least nineteen years of age; or
(c) a group, association or corporation which is authorized to conduct business under the laws of the State of Alaska. (Ord. 92-10 (part), 1992). 183 (Homer 06/04)

B. The City administration will provide for pre-application meetings with all potential applicants to provide relevant information on things like land use regulations, lease policies, the permitting process, and other relevant topics.

5.2 PROCEDURES

A. A responsive lease application / proposal shall include:

1. A completed application form provided by the City

YES	NO	N/A	INCOMPLETE

NOTES:

2. Any applicable fees

YES	NO	N/A	INCOMPLETE

NOTES:

3. A clear and precise narrative description of the proposed use of the property

YES	NO	N/A	INCOMPLETE

NOTES:

4. A specific time schedule and benchmarks for development

YES	NO	N/A	INCOMPLETE

NOTES:

5. A proposed site plan drawn to scale that shows at a minimum property lines, easements, existing structures and other improvements, utilities, and the proposed development including all structures and their elevations, parking facilities, utilities, and other proposed improvements.

YES	NO	N/A	INCOMPLETE

NOTES:

6. Any other information that is directly pertinent to the proposal scoring criteria contained herein

YES	NO	N/A	INCOMPLETE

NOTES:

7. All other **required attachments** requested on the application form including, but not limited to, the following documentation: applicant information, plot plan, development plan, insurance, proposed subleases, environmental information, agency approvals and permits, fees, financial information, partnership and corporation statement, certificate of good standing issued by an entity's state of domicile, and references.

- ☑ Applicant information
- ☑ Plot Plan
- ☐ Development Plan N/A
- ☑ Insurance
- ☐ Proposed Subleases N/A
- ☐ Environmental Information N/A
- ☑ Agency approvals and permits
- ☑ Financial Information (Financial Statement **REQUIRED**, Surety, bankruptcy, pending litigation are situational.
- ☐ Partnership information and a copy of the partnership agreement OR N/A
- ☑ Corporation information and a copy of the Articles of Incorporation and Bylaws
- ☐ Certificate of good standing issued by the entity's state if domicile
- ☑ Appropriate References (Total of 4 persons or firms with whom the applicant or its owners have conducted business transactions with during the past three years. Two references must have knowledge of your financial management history (One of which MUST be your principal financial institution) and two must have knowledge of your business expertise).

YES	NO	N/A	INCOMPLETE

NOTES:

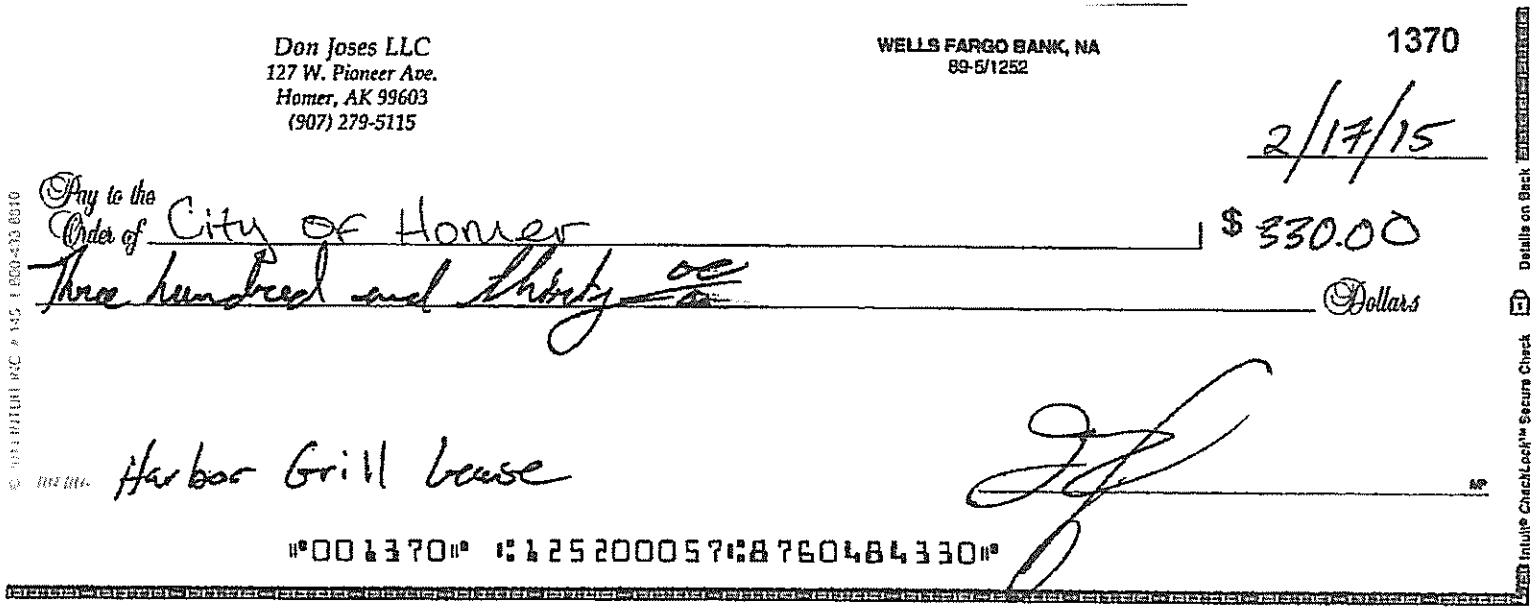
8. Any other information required by the solicitation or request for proposals.

YES	NO	N/A	INCOMPLETE

NOTES:

Harbor Grill owners are requesting not to RFP if possible.

☑ Application review completed by: Misty Worland 03/11/2015.



Don Joses LLC
127 W. Pioneer Ave.
Homer, AK 99603
(907) 279-5115

WELLS FARGO BANK, NA
89-5/1252

1370

2/17/15

Pay to the Order of City of Homer $ 330.00

Three hundred and thirty ^00 Dollars

Memo Harbor Grill lease

⑈001370⑈ ⑆125200057⑆ 8760484330⑈

Details on Back

Intuit® CheckLock™ Secure Check

Don Joses LLC 1370

Lindsay Wolter
Attorney at Law

4164 Pennock Street, Suite A
Homer, Alaska 99603
(907) 235-2717-Phone
(907) 235-2715-Fax

March 4, 2015

VIA HAND DELIVERY
Misty Worland
Assistant to City Manager
City of Homer
491 E. Pioneer Avenue
Homer, Alaska 99603

RE: Lease Application

Dear Ms. Worland:

I am submitting the enclosed Lease Application form on behalf of Jose Ramos. Mr. Ramos currently operates a restaurant on the Homer spit and has an existing lease with the city that is set to expire on February 1, 2016 (there are no provisions for extension). Mr. Ramos would like to continue operating the restaurant at the current location, and is therefore submitting this Lease Application, along with a request that the City Council and Lease Committee elect to not require a competitive bidding process.

Mr. Ramos has operated The Harbor Grill (formerly El Pescador) at its current location since 1999. Mr. Ramos anticipates continued operation of the Harbor Grill in its current location for the indefinite future. The restaurant is consistent with applicable land use regulations, including the City's Comprehensive Plan, and the Overall Economic Development Plant. It has a long history of bringing tax revenues and economic stimulation to the City, and Mr. Ramos hopes to continue that history with The Harbor Grill in its current location.

As indicated above, Mr. Ramos would prefer that the City issue Mr. Ramos a new lease (essentially renew his existing lease), as opposed to going through the RFP process. Given Mr. Ramos' long history at the location, his excellent rental payment record, and his desire to continue generating revenue for the City, we believe this is a reasonable request.

Please let me know if you have any questions or if I can be of any assistance.

Best Regards,

Lindsay Wolter

LWmca
Enclosures
cc: Jose Ramos

Lindsay Wolter
Attorney at Law

4164 Pennock Street, Suite A
Homer, Alaska 99603
(907) 235-2717-Phone
(907) 235-2715-Fax

April 3, 2015

VIA HAND DELIVERY
Misty Worland
Assistant to City Manager
City of Homer
491 E. Pioneer Avenue
Homer, Alaska 99603

RE: Lease Application

Dear Ms. Worland:

I am writing in response to your letter dated March 27, 2015. Per your request, I have provided the additional information below:

- The financials provided by Mr. Ramos are for the Harbor Grill only;
- The number of employees currently employed at the Harbor Grill is 26; and
- Mr. Ramos is happy to continue allowing the City and the Chamber to maintain use of the web cam for as long as they would like.

Please let me know if you have any questions or if any additional information will be needed.

Best Regards,

Lindsay Wolter

LWmca
cc: Jose Ramos

Don José's LLC

127 W Pioneer Ave

Homer, AK 99603

(907) 279-5115 phone (907) 279-5114 fax

Date: 2/11/2015

ATTN: City Manager

Jose Ramos is hereby requesting that The City Council allow Don Jose's LLC to renew the lease for Harbor Grill located at 4262 Homer Spit Road in Homer, Alaska without the competitive bidding process.

Don Jose's LLC intends to continue operating Harbor Grill as a seasonal restaurant without any additional developments or changes to the property.

Sincerely,

Jose Ramos

City of Homer-Lease Application/Assignment Form

Directions:
1. Please type.
2. Please submit this application form to the City Clerk's Office, 491 Pioneer Avenue, Homer, Alaska 99603.
3. Please answer all questions on this form, or put "N/A" in the space if it is non applicable.

Applicant Name: Social Security No.s	Jose Ramos - -
Mailing Address:	127 West Pioneer Avenue
City, State, ZIP code:	Homer, Alaska 99603
Business Telephone No.	(907) 229-7196
Representative's Name:	Lindsay Wolter
Mailing Address:	4164 Pennock Street, Suite A
City, State, ZIP code:	Homer, Alaska 99603
Business Telephone No.	(907) 235-2717
Property Location:	4262 Homer Spit Road, Homer, Alaska
Legal Description:	Lot 19, Homer Spit Amended Subdivision, according to Plat No. 87-34, in the Homer Recording District, Third Judicial District, State of Alaska.
Type of Business to be placed on property:	Existing Restaurant
Size of Buildings to be placed or leased:	Building is 5,498 sq. ft. (4,000 sq. ft. on the 1st floor)
Duration of Lease requested:	20 years
Options to re-new:	2 renewal terms, each for 5 years
Special lease requirements:	Assignment provision
Number of parking spaces required, per code:	One per 3 indoor seats. One per 10 seats of seasonal outdoor seating.

The following materials must be submitted when applying for a lease of City of Homer real property		
1.	**Plot Plan**	A drawing of the proposed leased property showing: ☒ Size of lot - dimensions and total square footage. – to scale, please. ☒ Placement and size of buildings, storage units, miscellaneous structures planned – to scale, please. ☒ Water and sewer lines – location of septic tanks, if needed. ☐ Parking spaces – numbered on the drawing with a total number indicated – please refer to Homer City Code _____ Will submit a supplement when this information is received.
2.	**Development Plan**	☐ List the time schedule from project initiation to project completion, including major project milestones. **Dates** **Tasks** _____ No additional developments _____ Continuation of the existing restaurant operations _____ _____ For each building, indicate: **Building Use** **Dimensions and square footage** _____ _____ _____ _____ _____ _____
3.	**Insurance**	☒ Attach a statement of proof of insurability of lessee for a minimum liability insurance for combined single limits of $1,000,000 showing the City of Homer as co-insured. Additional insurance limits may be required due to the nature of the business, lease or exposure. Environmental insurance my be required. If subleases are involved, include appropriate certificates of insurance.
4.	**Subleases** N/A	☐ Please indicate and provide a detailed explanation of any plans that you may have for subleasing the property. The City of Homer will generally require payment of 25% of proceeds paid Lessee by subtenants. Refer to chapter 13 of the Property Management Policy and Procedures manual.
5.	**Health Requirements**	☐ Attach a statement documenting that the plans for the proposed waste disposal system, and for any other necessary health requirements, have been submitted to the State Department of Environmental Conservation for approval. Granting of this lease shall be contingent upon the lessee obtaining all necessary approvals from the State DEC. If applicable, will submit this information when received.
6.	**Agency Approval**	☒ Attach statement(s) of proof that your plans have been inspected and approved by any agency which may have jurisdiction of the project; i.e. Fire Marshall, Army Corps of Engineers, EPA, etc. The granting of this lease shall be contingent upon lessee obtaining approval, necessary permits, and/or inspection statements from all appropriate State and/or Federal agencies.

7.	**Fees**	All applicable fees must be submitted prior to the preparation and/or execution of a lease. ☒ **Application fee - $30.00.** Covers costs associated with processing the application. ☒ **Lease fee - $300.00.** Covers the costs of preparing and processing the actual lease. ☐ **Assignment fee - $250.00.** Covers the costs of preparing and processing the lease transfer.
8.	**Financial Data**	Please indicate lessee's type of business entity: ☐ Sole or individual proprietorship. ☐ Partnership. ☐ Corporation. ☒ Other – Please explain: ___LLC; Certificate of organization by State of Alaska September 28, 1995 ☒ **Financial Statement** – Please attach a financial statement showing the ability of the lessee to meet the required financial obligations. ☐ **Surety Information** – Has any surety or bonding company ever been required to perform upon your default or the default of any of the principals in you organization holding more than a 10% interest ☒ No ☐ Yes. If yes, please attach a statement naming the surety or bonding company, date and amount of bond, and the circumstances surrounding the default or performance. ☐ **Bankruptcy information** - Have you or any of the principals of your organization holding more than a 10% interest ever been declared bankrupt or are presently a debtor in a bankruptcy action? ☒ No ☐ Yes. If yes, please attach a statement indicating state, date, Court having jurisdiction, case number and to amount of assets and debt. ☐ **Pending Litigation** – Are you or any of the principals of your organization holding more than a 10% interest presently a party to any pending litigation? ☒ No ☐ Yes. If yes, please attach detailed information as to each claim, cause of action, lien, judgment including dates and case numbers.
9.	**Partnership Statement**	☐ If the applicant is a partnership, please provide the following: **Date of organization:** _____ **Type:** ☐ General Partnership ☐ Limited Partnership **Statement of Partnership Recorded?** ☐ Yes ☐ No Where _____ When _____ **Has partnership done business in Alaska?** ☐ Yes ☐ No Where _____ When _____ **Name, address, and partnership share. If partner is a corporation, please complete corporation statement.** Limited/ General Name Address Share %

		_____ _____ **Please attach a copy of your partnership agreement.**
10.	**Corporation Statement**	☐ If the applicant is a corporation, please provide the following: **Date of Incorporation:** Articles of Incorporation of LLC 9/28/1995 **State of Incorporation:** Alaska **Is the Corporation authorized to do business in Alaska?** ☐ No ☒ Yes. If so, as of what Date? 09/28/1995 **Corporation is held?** ☐ Publicly ☒ Privately If publicly held, how and where is the stock traded? _____ **Officers & Principal Stockholders [10%+]:** Name / Title / Address / Share Jose Ramos — Member — 127 W. Pioneer Ave, Homer, AK — 51% Maria Ramos — Member — 127 W. Pioneer Ave, Homer, AK — 49% ☒ **Please furnish a copy of Articles of Incorporation and By-laws. (LLC's have Articles of Incorporation and Operating Agreements)** **Please furnish name and title of officer authorized by Articles and/or By-laws to execute contracts and other corporate commitments.** Name / Title Jose Ramos — Member Maria C. Ramos — Member A copy of the Operating Agreement will be submitted upon receipt.

11.	**Applicant References**	Please list four persons or firms with whom the Applicant or its owners have conducted business transactions with during the past three years. Two references named shall have knowledge of your financial management history, of which at least one must be your principal financial institution. Two of the references must have knowledge of your business expertise. **Name:** Lucinda Martin **Firm:** Wells Fargo **Title:** Business Relationship Manager **Address:** 88 Sterling Hwy Homer, AK 99603 **Telephone:** 907-235-6125 x 225 **Nature of business association with Applicant:** financial institution **Name:** Steve Vogler **Firm:** Newhouse and Vogler, CPAs **Title:** Partner **Address:** 237 E. Fireweed Lane, Ste 200 Anchorage, AK 99503 **Telephone:** 907-258-7555 **Nature of business association with Applicant:** Business and personal income tax return preparation **Name:** Diane Edge **Firm:** Sysco **Title:** Credit Analyst **Address:** 6601 Changepoint Dr. Anchorage, AK 99518 **Telephone:** 907-565-5532 **Nature of business association with Applicant:** vendor **Name:** Diane Guintu **Firm:** K&L Distributors **Title:** Credit Manager **Address:** 6307 Arctic Spur Rd. Anchorage, AK 99518 **Telephone:** 907-786-0202 **Nature of business association with Applicant:** Vendor

I hereby certify that the above information is true and correct to the best of my knowledge.

Signature: **Date:** 2 05. 2015

ARTICLES OF ORGANIZATION
OF DON JOSÉ'S, LLC

The undersigned as Organizers and prospective Members of a limited liability company having two or more members pursuant to the Alaska Limited Liability Act adopt the following Articles of Organization.

1. **Name.** The name of the limited liability company is **DON JOSÉ'S, LLC.**

2. **Duration.** Its period of duration is thirty years from the date of filing of these Articles with the Alaska Division of Banking, Securities and Corporations unless (a) extended by the Members, (b) sooner dissolved by the Members, or (c) dissolved upon a statutory event of dissolution.

3. **Purpose.** This Limited Liability Company is organized for all lawful purposes. This Limited Liability Company is intended to own and manage restaurants and to conduct any other lawful business as determined by the owners. The SIC code which best describes the activities of the Company is 5812.

4. **Principal Place of Business.** The address of its principal place of business is 127 Pioneer, Homer Alaska 99603

5. **Registered Agent & Office.** The name of its registered agent is José Ramos, and the address of the registered office is 127 Pioneer, Homer Alaska 99603.

6. **Capitalization.** The interest of the Members in the Company will be evidenced a Statement of Ownership to be maintained in the records of the Company. A new Statement will be issued upon any change in the interest of the members, including any change in membership. The initial capitalization of the company is $375,000. The initial interests of the respective members are:

José Ramos	51%
Maria C. Ramos	49%

7. **Additional Liability of Members.** No capital contributions will be required of the members. The members will have no liability for debts of the Company on account of their membership.

8. Classes of Ownership. With respect to voting and preference rights, the Members of the Company may provide in their Operating Agreement for issuance of classes of ownership.

9. Transfer of Interest. Except as provided herein, a Members interest in the Company is not subject to transfer. Any Member who shall be desirous of selling or otherwise transferring his share and interest in the Company shall obtain the consent of all other Members in writing prior to such or transfer. When allowed the transferee shall be entitled only to the transferring Members proportionate share of the capital and profits of the Company but shall have no other rights, including management rights, unless later elected by the Members to be a Member.

10. Admission of Additional Members. New owners who take their interest directly from the Company by unanimous vote of the members will be admitted as Members. New owners who take their interest by assignment, inheritance, or operation of law will be admitted only with the unanimous consent of all Members and upon such terms as are agreed to by all Members.

11. Amendment of Articles. These articles may be amended only by a unanimous vote of the Members.

12. Agency Authority. All authority to contract and otherwise act for the Company is vested in its Members and evidenced by a written Resolution of all members. The members may by unanimous resolution appoint one of their number as executive with the authority to enter into agreements on behalf of the company in the ordinary course of business.

13. Continuity. The remaining Members of the company will have the right to continue the business upon the death, retirement, resignation, expulsion, bankruptcy or dissolution of a Member or occurrence of any other event which terminates the continued Membership of a Member in this Limited Liability Company, upon affirmative vote of a majority of interest in the company. Any return of capital or distribution of profits shall be determined from the Company's books by the members, and paid at the direction of the members, at a time determined by them, without diminishing the prospects of the Company's ventures and subject to the limitations of Alaska Statutes.

14. Management. The business of the company shall be conducted under the exclusive management of its Members, who vote according to their percentage of share ownership. Members and their address are:

José Ramos of 127 W. Pioneer, Homer Alaska 99603
Maria C. Ramos of 127 W. Pioneer, Homer Alaska 99603

DATED:

José Ramos

Maria C. Ramos

State of Alaska)
) ss.
Third Judicial District)

The foregoing instrument was acknowledged before me, a notary public for the State of Alaska, this 21st day of Sept, 1995 by José Ramos and Maria C. Ramos.

My commission expires: 8/8/99

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 1/29/2015

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Conrad-Houston Insurance
507 W. Northern Lights Blvd.
Anchorage AK 99503

CONTACT NAME: Tashia Best
PHONE (A/C, No, Ext): (907)276-7667 **FAX (A/C, No):** (907)258-3105
E-MAIL ADDRESS: tashiab@chialaska.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A: Ohio Security Insurance Company	24082
INSURER B:	
INSURER C:	
INSURER D:	
INSURER E:	
INSURER F:	

INSURED
Don Jose's, LLC, DBA: Harbor Grill, Creekside
2052 E. Northern Lights Blvd.
Anchorage AK 99508

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	GENERAL LIABILITY X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: X POLICY PRO-JECT LOC	X		BKS54750224	4/28/2014	4/28/2015	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ 1,000,000 $ 15,000 $ 1,000,000 $ 2,000,000 $ 2,000,000
	AUTOMOBILE LIABILITY ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS HIRED AUTOS NON-OWNED AUTOS						COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ $ $ $
	UMBRELLA LIAB OCCUR EXCESS LIAB CLAIMS-MADE DED RETENTION $						EACH OCCURRENCE AGGREGATE	$ $
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N If yes, describe under DESCRIPTION OF OPERATIONS below	N/A					WC STATU-TORY LIMITS OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ $ $

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)
RE: Tenant Lease @ 4262 Homer Spit Rd., Homer, AK 99603

CERTIFICATE HOLDER
abrowning@ci.homer.ak.us
City of Homer
491 E Pioneer Ave
Homer, AK 99603

CANCELLATION
SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE
Micheal Dennis/CARIM

State of Alaska
Office of the State Fire Marshal
Plan Review

This is to certify that the plans for this building were reviewed by the *State Fire Marshal* on April 29, 1999 for conformance with AS 18 70.010 -- 100; 13 AAC 50.027.

This certificate shall be posted in a conspicuous place on the premises named El Pescador and shall remain posted until construction is completed.

NOTICE: Any changes or modifications to the approved plans must be resubmitted for review by the *State Fire Marshal*

Plan Review #: 99A-331 By: Carol MacDonald

Carol L. MacDonald
Deputy Fire Marshal

Authority .AS 18.70.080
Form: 12-741
(6/97)

Hood & Duct Drawings Due

Jose Ramos
235-7963
229-7196

File No 56813-D

State of Alaska
Department of Commerce and Economic Development
Division of Banking, Securities and Corporations

CERTIFICATE
OF
ORGANIZATION
Limited Liability Company

The undersigned, as Commissioner of Commerce and Economic Development of the State of Alaska, hereby certifies that Articles of Organization of

DON JOSE'S, LLC.

have been received in this office and have been found to conform to law.

ACCORDINGLY, the undersigned, as Commissioner of Commerce and Economic Development, and by virtue of the authority vested in him by law, hereby issues this Certificate of Organization and attaches hereto the original copy of the Articles of Organization.

IN TESTIMONY WHEREOF, I execute this certificate and affix the Great Seal of the State of Alaska on

September 28, 1995.

William L. Hensley

COMMISSIONER OF COMMERCE
AND ECONOMIC DEVELOPMENT

Alaska Business License # 954687

Alaska Department of Commerce, Community, and Economic Development
Division of Corporations, Business and Professional Licensing
P.O. Box 110806, Juneau, Alaska 99811-0806

This is to certify that

HARBOR GRILL

2052 E NORTHERN LIGHTS BLVD ANCHORAGE AK 99508

owned by

DON JOSE'S, LLC

is licensed by the department to conduct business for the period

October 02, 2014 through December 31, 2015
for the following line of business:

72 - Accommodation and Food Services

This license shall not be taken as permission to do business in the state without having complied with the other requirements of the laws of the State or of the United States.

This license must be posted in a conspicuous place at the business location.
It is not transferable or assignable.

Fred Parady
Commissioner

406

CITY OF HOMER
491 East Pioneer Avenue
Homer, Alaska 99603-7624

BUILDING PERMIT # [illegible]

DATE May 6, 1999

This permit is issued to [illegible] who certifies that he/she has met the requirements of the City of Homer for the construction/demolition of an installation of:

[illegible]

at [illegible] [illegible] [illegible]
Street Lot Block Subdivision

KPB Assessor Number [illegible]

For a period from May 6, 1999 to May 7, 2000

This permit may not be transferred or assigned by the original permittee and shall be displayed in a prominent, readily visible place at the site. If the work is not completed within the above specified time, application for an extension MUST be made to the City of Homer.

The City assumes no responsibility for the accuracy of any City held as-built drawings or for the permittee's interpretation thereof.

This permit is issued with the expressed understanding that the City of Homer assumes no responsibility hereunder with regard to maintenance of private drainage systems that terminate in City ditch lines or drainages, including but not limited to foundation drains, proper locations of all lines or all dimensions. The permittee, by his signature below, agrees to hold the City harmless from any and all suits, actions, or claims arising from any work undertaken.

The issuance of this permit does not imply that the permittee has met all the requirements of any agency of the State of Alaska or the Kenai Peninsula Borough. It is the responsibility of the permittee to meet whatever requirements any agency may have which may apply to the construction, demolition or installation specified in this permit.

Permit issued by [illegible]

Permittee [signature]

Address/Phone

****

Plot Plan Required: Yes X No

Utilities: Water: Municipal 0137 Private System
Sewer: Municipal 0137 Private System

** PRIVATE SEWER SYSTEM MUST BE APPROVED BY ADEC **

Zoning [illegible] Building Setback: 20 feet from Right-Of-Way

Driveway Permit No. City State Existing X

Fee from Schedule $100 Estimated Value: $275,000

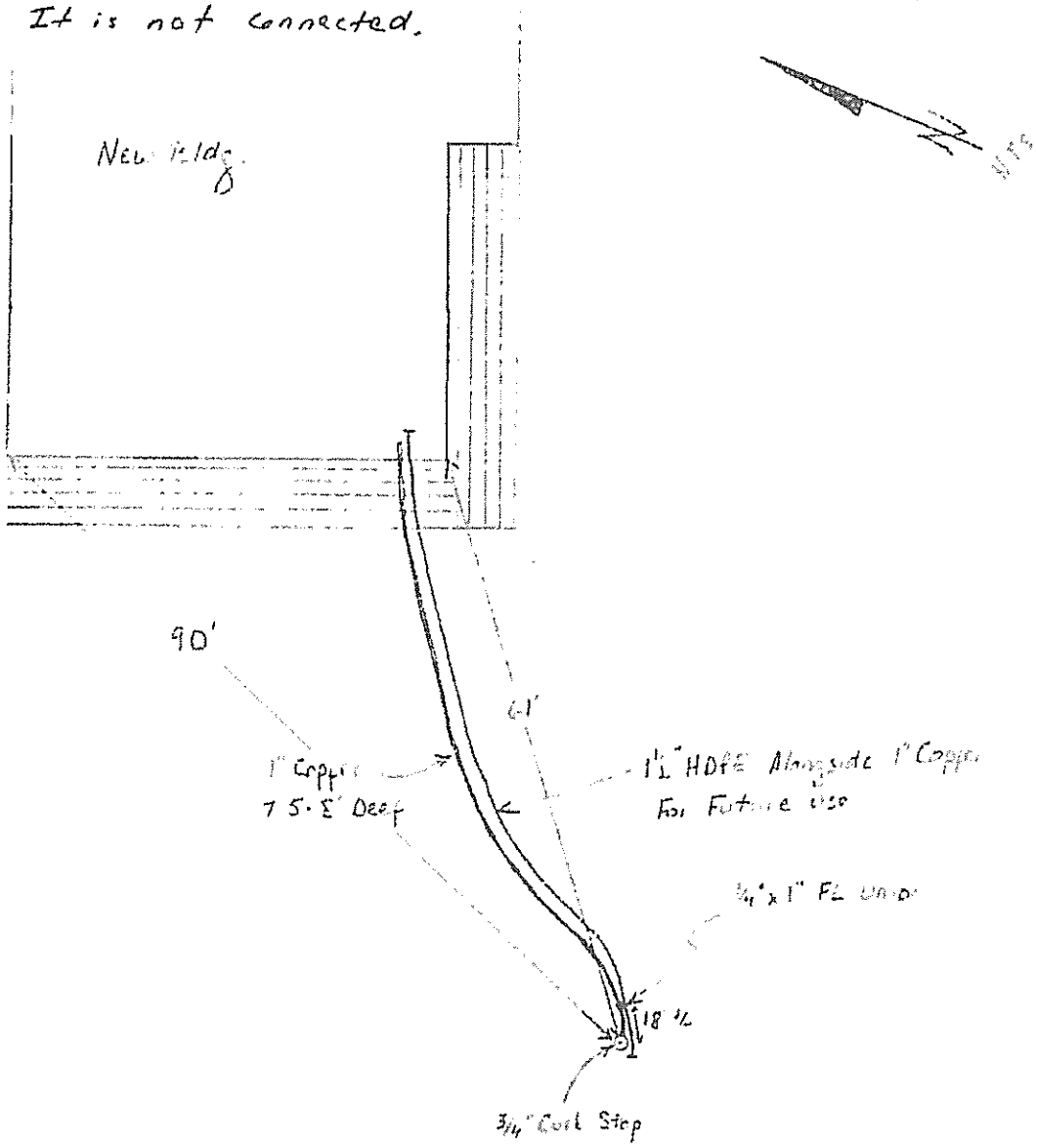
SPECIAL CONDITIONS:

(White Copy Applicant, Yellow Copy Planning, Gold Public Works, Pink Fire Dept)

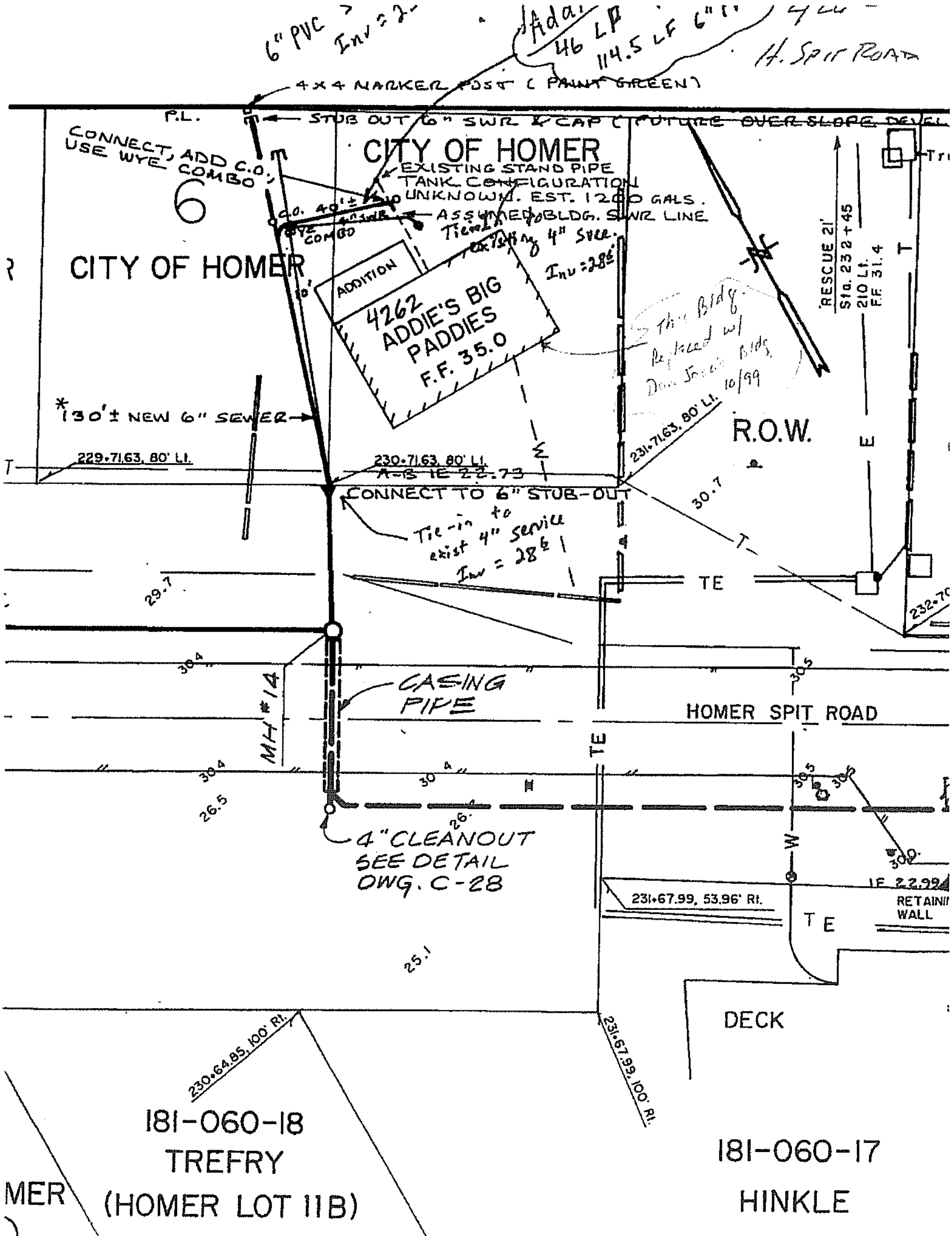
Address: 4262 Homer Spit

PUBLIC WORKS DEPT.		
	Title: Water Service As-Built	Project/Permit# 0157
	Lot 19 Blk ____ Subd. Homer Spit Amended	Contractor Twin Peaks
	KPB No. 181-032-16 Date Insp. ____	Owner Jose Ramos
	Insp. DMG Date Complete 10/15/99	

* This was where Addie's Restaurant building was. New Don Jose's Bldg erected. Connected to existing sewer riser (Not Inspected). Installed new 1" copper water service from C.O. to meter. Contractor installed 1½" HDPE alongside copper from meter to C.B. for potential future use. It is not connected.



-Spit Rd.-


6" PVC
Inv = 2-
46 LF
114.5 LF 6"
H. Spit Road
4x4 MARKER POST (PAINT GREEN)
P.L.
STUB OUT 6" SWR & CAP (FUTURE OVER SLOPE DEVEL.
CONNECT, ADD C.O.,
USE WYE COMBO
CITY OF HOMER
6
EXISTING STAND PIPE
TANK CONFIGURATION
UNKNOWN. EST. 1200 GALS.
C.O. 40'±
4" SWR
WYE COMBO
ASSUMED BLDG. SWR LINE
Tie-in to existing 4" Swr.
Inv = 28±
CITY OF HOMER
ADDITION
4262
ADDIE'S BIG
PADDIES
F.F. 35.0
This Bldg.
Replaced w/
Don Jones Bldg.
10/99
RESCUE 21
Sta. 232+45
210 Lt.
F.F. 31.4
*130'± NEW 6" SEWER
229+71.63, 80' Lt.
230+71.63, 80' Lt.
A-B IE 22.73
231+71.63, 80' Lt.
R.O.W.
CONNECT TO 6" STUB-OUT
Tie-in to
exist 4" service
Inv = 28±
30.7
29.7
TE
30.4
CASING
PIPE
MH #14
HOMER SPIT ROAD
30.5
TE
26.5
4" CLEANOUT
SEE DETAIL
DWG. C-28
IE 22.99
231+67.99, 53.96' Rt.
RETAINING WALL
TE
25.1
DECK
230+64.85, 100' Rt.
231+67.99, 100' Rt.
181-060-18
TREFRY
(HOMER LOT 11B)
181-060-17
HINKLE
MER

OPERATING AGREEMENT
OF
DON JOSÉ'S, LLC

The undersigned Members of the **DON JOSÉ'S, LLC,** do hereby enter into this Operating Agreement effective the September 28, 1995.

I. Office

The principal office of the Company shall be located at 127 W. Pioneer, Homer Alaska 99603. The Company may have such other offices as the Members may designate or as the business of the Company may require. The registered office of the Company required by the - Alaska Limited Liability Act to be maintained in the State of Alaska may be, but need not be, identical with the principal office, and may be changed from time to time by the Members.

II. Purpose

This Limited Liability Company is organized for all lawful purposes and is intended to manage and operate restaurants, and such other activities as the Members may choose.

III. Duration of the Company

The Company shall commence upon the filing of its Articles of Organization with the Alaska Division of Banking, Corporations and Securities, and shall continue for a term of thirty (30) years unless (a) extended by the Members; (b) sooner dissolved by the Members, or (c) dissolved by a statutory event of dissolution. The right to continue after a statutory event of dissolution is reserved in the Articles.

IV. Capital Contributions

The Members agree for themselves and their successors, assigns and heirs, that their participation is considered a long-term investment, and that any return of capital prior to the termination and winding up of the Company is in the sole discretion of the Members. The undersigned Members agree to share in all post formation profits and surplus of the Company pro-rata according to their share of ownership in the Company. There have been the following capital contributions to this Company by the members:

V. Additional Capital Contributions

The Members may, but are not required, to contribute any additional capital deemed necessary by them for the operation of the Company, provided, however, that in the event that any Member deems it advisable to refuse or fails to contribute his or her proportionate share of any or all of the

X. Member Duties and Restrictions

No Member, without a delegation from the Members, shall endorse any note or act as an accommodation party, or otherwise become surety for any person in any transaction involving is the Company. No Member, without written resolution delegating such authority by the members to him or her, shall on behalf of the Company borrow or lend money, or make, deliver or accept any commercial paper, or execute any mortgage, security agreement, bond, or lease, or purchase or contract to purchase, or sell or contract to sell any property for or of the Company. No Member, without written resolution delegating such authority by the members to him or her, shall mortgage, grant a security interest in the assets or property of the Company. No Member shall do any act detrimental to the best interests of the Company, or which would make it impossible to carry on the ordinary purpose of the Company. Each Member shall be reimbursed by the Company for all reasonable expenses properly incurred on behalf of the Company.

XI. Banking

All funds of the Company shall be deposited in its name in such bank account or accounts as shall be designated by the Members. All withdrawals therefrom are to be made upon the authority of such person or persons as may be authorized by the Board of Members from time to time.

XII. Books

The Company books shall be maintained at 127 W Pioneer Ave Homer AK 99603 and each Member shall have access thereto. The fiscal year of the Company shall be the calendar year, and the books shall be closed and balanced at the end of each fiscal year. The Company will furnish annual financial statements to the Members, and prepare tax returns in a timely manner, furnishing copies to all Members at least twenty (20) days before they are filed by the Company.

XIII. Voluntary Termination

The Company may be dissolved at any time by Resolution passed by a majority interest at a meeting of its Members, in which event the Members shall proceed with reasonable promptness to liquidate the Company. The assets of the Company shall be distributed in the following order:

A. To pay or provide for the payment of all Company liabilities to creditors other than Members, and liquidating expenses and obligations;
B. To pay debts owing to Members other than for capital and profits;
C. To pay the remaining funds to the Members in proportion to their share ownership.

XIV. Death of A Owner

In the event of the death of a owner, then the deceased heir or heirs shall be entitled to succeed to the economic share and interest of the deceased owner. Within 180 days after the death the members shall vote on whether to continue the Company. The Company may, upon unanimous consent of the remaining owners, as soon as practicable, provide a document by which the heir or heirs personally affirm and accept all the terms, conditions and provisions of this Operating

Agreement binding themselves to the same in writing, and select a designated representative of the deceased owner as a Member.

XV. Continuation

Upon the occurrence of a statutory event of termination, the remaining Members of the Company have the right to continue the Company by a majority vote unless a higher vote is required by the state statute or by the IRS classification regulations allowing avoidance of the corporate characteristic of continuity of interest.

XVI. Amendment

This Operating Agreement is a written contract of the Members. Amendments must be written and executed by Members holding at least 2/3 interest in the Company, and may be adopted only at a meeting of the Members.

XVII. Violation of this Agreement

Any Member who shall violate any of the terms, conditions, and provisions of this agreement shall keep and save harmless the Company property and shall also indemnify the other then Members from any and all claims, demands and actions of every kind and nature whatsoever which may arise out of or by reason of such violation of any of the terms and conditions of this agreement.

IN WITNESS WHEREOF, the parties have hereunto set their hands effective the day and first above written. This Operating Agreement may be executed in counterparts with each counterpart constituting one and the same instrument.

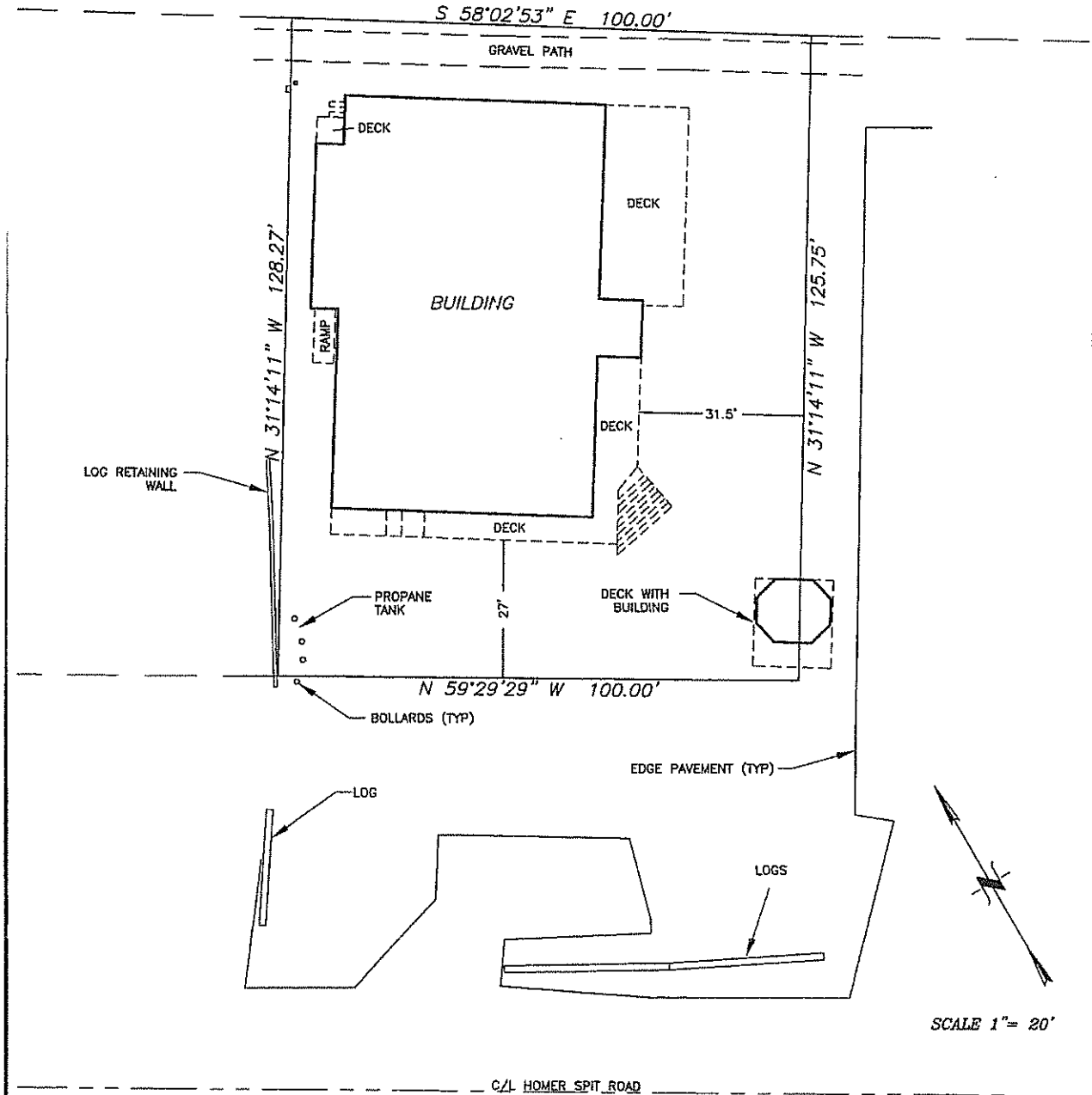
Signed:

Jose Ramos

Maria C. Ramos

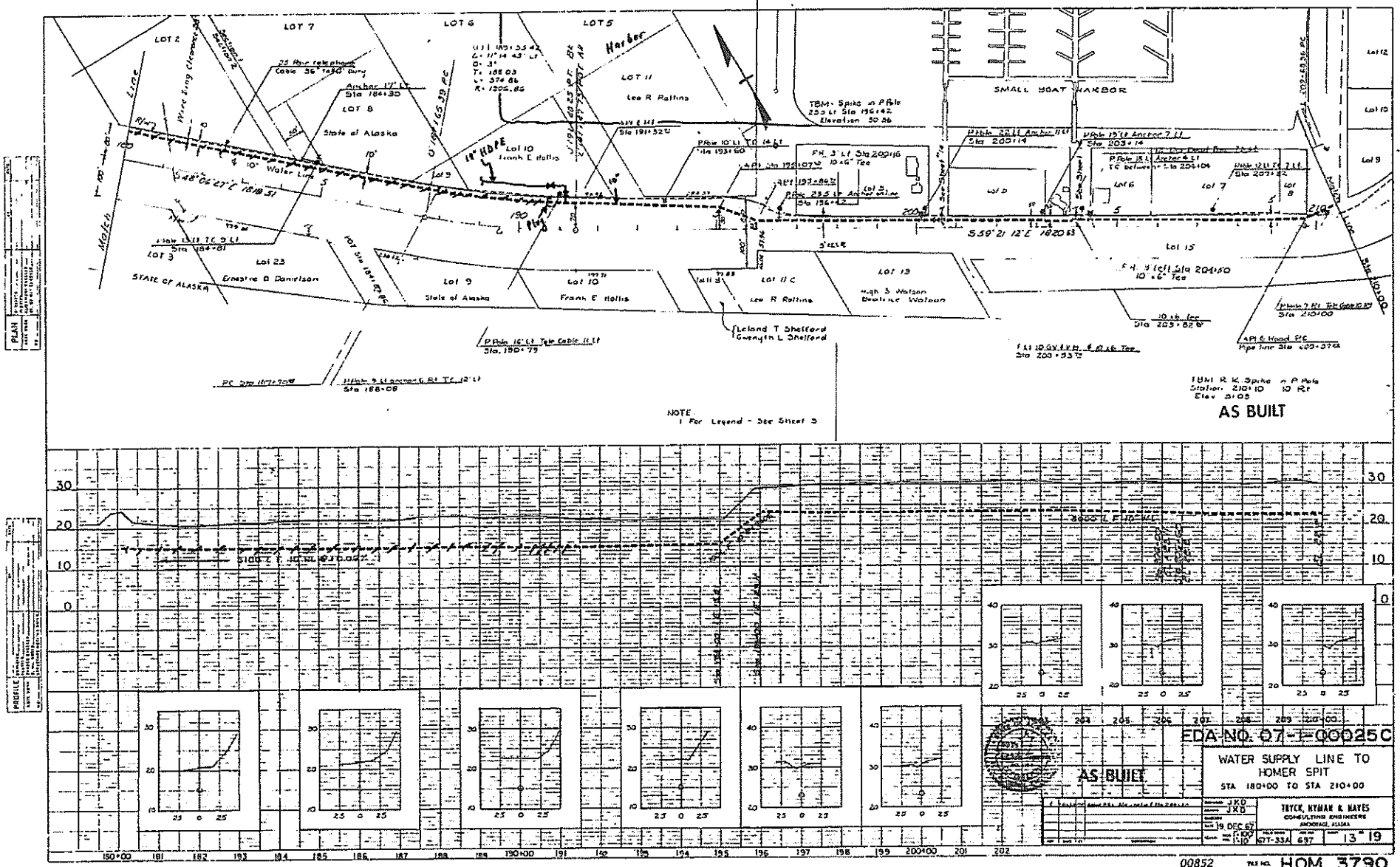
JOB #09-05
ASBUILT LOT 19, HOMER SPIT AMENDED (HRD 89-34)

NOTES:
1. BASIS OF BEARING FOR THIS ASBUILT SURVEY IS THE CITY OF HOMER COORDINATE SYSTEM AS DESCRIBED IN HOMER CITY AREA RECORD OF SURVEY (2007-115 HRD).
2. THIS ASBUILT SHALL NOT BE USED FOR ANY PURPOSE OTHER THAN THAT WHICH WOULD GIVE A GRAPHIC REPRESENTATION OF THE LOCATION OF IMPROVEMENTS ON THIS LOT. UNDER NO CIRCUMSTANCE SHOULD THE LOCATION OF FUTURE IMPROVEMENTS BE BASED ON THIS DRAWING.
3. IT IS THE RESPONSIBILITY OF THE OWNER TO DETERMINE THE EXISTENCE OF ANY EASEMENTS, RESERVATIONS OR RESTRICTIONS WHICH DO NOT APPEAR ON THE RECORDED SUBDIVISION PLAT.

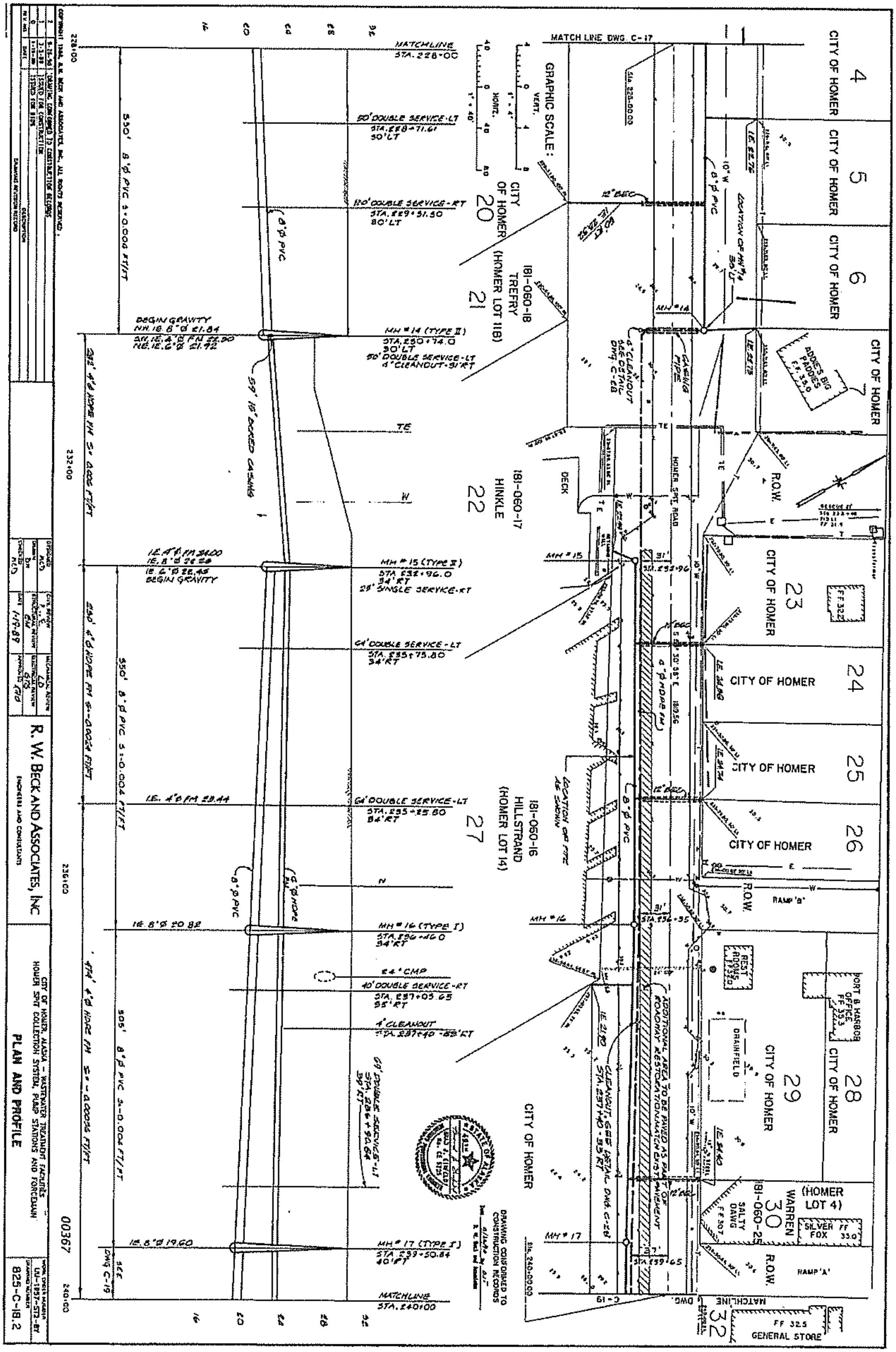


STATE OF ALASKA
49TH
Kenton T. Bloom
LS-7968
Registered Professional Land Surveyor

05/29/09


LOT 7
LOT 6
LOT 5
LOT 2
LOT 8
LOT 11
Lee R Rollins
State of Alaska
Harbor
SMALL BOAT HARBOR
Lot 10
Frank E Hollis
Lot 23
Ernestine B Danielson
STATE OF ALASKA
Lot 9
Lot 15
Lot 19
Hugh S Watson
Beatrice Watson
Leland T Shelford
Gwenyth L Shelford
AS BUILT
NOTE
1 For Legend - See Sheet 3
EDA NO. 07-1-00025C
WATER SUPPLY LINE TO HOMER SPIT
STA 180+00 TO STA 210+00
TRYCK, NYMAN & HAYES
CONSULTING ENGINEERS
ANCHORAGE, ALASKA
00852
HOM 3790

414



MATCH LINE DWG. C-17
GRAPHIC SCALE:
CITY OF HOMER
181-060-18
TREFRY
(HOMER LOT 11B)
181-060-17
HINKLE
181-050-16
HILLSTRAND
(HOMER LOT 14)
181-060-25
WARREN
(HOMER LOT 4)
SALTY DAWG
SILVER FOX
GENERAL STORE
ADDIE'S BIG PADDIES
PORT & HARBOR OFFICE
REST ROOMS
DRAINFIELD
HOMER SPIT ROAD
R.O.W.
RAMP 'A'
RAMP 'B'
DECK
MH #14 (TYPE II)
MH #15 (TYPE II)
MH #16 (TYPE I)
MH #17 (TYPE I)
MATCHLINE STA. 228+00
MATCHLINE STA. 240+00
R. W. BECK AND ASSOCIATES, INC
ENGINEERS AND CONSULTANTS
CITY OF HOMER, ALASKA - WASTEWATER TREATMENT FACILITIES
HOMER SPIT COLLECTION SYSTEM, PUMP STATIONS AND FORCEMAIN
PLAN AND PROFILE
825-C-18.2
00367

CITY OF HOMER

HOMER, ALASKA

City Manager

RESOLUTION 15-055

A RESOLUTION OF THE CITY COUNCIL OF HOMER, ALASKA, DIRECTING THE ADMINISTRATION TO ISSUE A REQUEST FOR PROPOSALS FOR JANITORIAL SERVICES.

WHEREAS, City of Homer janitorial staff keep nine (9) public buildings clean; and

WHEREAS, With the expansion at City Hall, the new library, and new harbormaster's office, the square footage of the facilities City of Homer janitorial staff are required to clean has increased without an increase in janitorial staff; and

WHEREAS, It is common for municipalities to outsource janitorial services; and

WHEREAS, The City would like to explore if there are businesses in Homer who would be interested in providing janitorial services for City facilities; and

WHEREAS, In an effort to collect as much information as possible about the janitorial services companies in Homer the RFP will solicit bids both for cleaning an individual building and all City facilities; and

WHEREAS, Any decision to outsource janitorial services will be weighed against the cost, effort of managing a contractor or multiple contractors, and effectiveness.

NOW, THEREFORE, BE IT RESOLVED that the Homer City Council directs the City Manager and the City Clerk to issue a Request for Proposals for janitorial services of City facilities.

PASSED AND ADOPTED by the Homer City Council this 29th day of June, 2015.

CITY OF HOMER

_____

MARY E. WYTHE, MAYOR

ATTEST:

_____
JO JOHNSON, MMC, CITY CLERK

Fiscal Note: N/A

City of Homer
www.cityofhomer-ak.gov

Administration
491 East Pioneer Avenue
Homer, Alaska 99603
(p) 907-235-8121 x2222
(f) 907-235-3148

Memorandum 15-103

TO: MAYOR WYTHE AND HOMER CITY COUNCIL

FROM: KATIE KOESTER, CITY MANAGER

DATE: JUNE 12, 2015

SUBJECT: JANITORIAL REQUEST FOR PROPOSALS

The Department of Public Works is requesting Council approval to advertise a Request for Proposals to provide Janitorial Services at all City buildings. The intent of this proposal is to establish private sector rates for Janitorial Services. By completing a Request for Proposals, the City will be able to decide whether or not it is advantageous to annually contract Janitorial Services for all buildings, some, or none. The contract would be for a one (1) year term, and may be extended for two (2) consecutive one (1) year terms by mutual consent of the City and the Contractor.

Anticipated scope of work includes the following facilities:

- Airport – 7 x Week
- City Hall – 4 x Week
- Harbormaster Office – 4 x Week
- Library – 6 x Week
- Police Department – 5x Week
- Port Maintenance – 2 x Week
- Port Maintenance Shop – 2 x Week
- Public Works Department – 5 x Week
- STP Ops Building – 2 x Week

Public Works expects that the RFP (including a detailed scope of work) would be made available July 31, 2015. A mandatory Pre-Bid walk through would be conducted by Building Maintenance August 13, 2015, with bids due to the City Clerk's Office by August 27, 2015 at 4:00 p.m.

VISITORS

ANNOUNCEMENTS
PRESENTATIONS
BOROUGH REPORT
COMMISSION REPORTS

CITY OF HOMER
HOMER, ALASKA

MAYOR'S PROCLAMATION

July as Parks and Recreation Month

WHEREAS, Parks and recreation programs are an integral part of communities throughout this country, including the City of Homer; and

WHEREAS, Our parks and recreation are vitally important to establishing and maintaining the quality of life in our communities, ensuring the health of all citizens, and contributing to the economic and environmental well-being of a community and region; and

WHEREAS, Parks and recreation programs build healthy, active communities that aid in the prevention of chronic disease, provide therapeutic recreation services for those who are mentally or physically disabled, and also improve the mental and emotional health of all citizens; and

WHEREAS, Parks and recreation programs increase a community's economic prosperity through increased property values, expansion of the local tax base, increased tourism, the attraction and retention of businesses, and crime reduction; and

WHEREAS, Parks and recreation areas are fundamental to the environmental well-being of our community; and

WHEREAS, Parks and natural recreation areas improve water quality, protect groundwater, prevent flooding, improve the quality of the air we breathe, provide vegetative buffers to development, and produce habitat for wildlife; and

WHEREAS, Our parks and natural recreation areas ensure the ecological beauty of our community and provide a place for children and adults to connect with nature and recreate outdoors; and

WHEREAS, The U.S. House of Representatives has designated July as Parks and Recreation Month; and

WHEREAS, The City of Homer recognizes the benefits derived from parks and recreation resources.

NOW, THEREFORE, I, MARY E. WYTHE, Mayor of the City of Homer, do hereby proclaim July as:

PARKS AND RECREATION MONTH

in the City of Homer, Alaska.

IN WITNESS WHEREOF, I have hereunto set my hand and cause to be affixed the official seal of the City of Homer, Alaska, on this 29th day of June, 2015.

CITY OF HOMER

_____
MARY E. WYTHE, MAYOR

ATTEST:

_____
JO JOHNSON, MMC, CITY CLERK

Session 15-09, a Regular Meeting of the Homer Advisory Planning Commission was called to order by Chair Don Stead at 6:34 p.m. on June 3, 2015 at the City Hall Cowles Council Chambers located at 491 E. Pioneer Avenue, Homer, Alaska.

PRESENT: COMMISSIONERS BOS, ERICKSON, HIGHLAND, BRADLEY, STEAD, STROOZAS, AND VENUTI

STAFF: CITY PLANNER ABBOUD
DEPUTY CITY CLERK KRAUSE

APPROVAL OF AGENDA

Chair Stead requested a motion to approve the agenda.

HIGHLAND/BRADLEY – SO MOVED.

There was no discussion.

VOTE. YES. NON-OBJECTION. UNANIMOUS CONSENT.

Motion carried.

PUBLIC COMMENT
The public may speak to the Planning Commission regarding matters on the agenda that are not scheduled for public hearing or plat consideration. (3 minute time limit).

There was no public comment.

RECONSIDERATION

No items were scheduled for reconsideration.

ADOPTION OF CONSENT AGENDA
All items on the consent agenda are considered routine and non-controversial by the Planning Commission and are approved in one motion. There will be no separate discussion of these items unless requested by a Planning Commissioner or someone from the public, in which case the item will be moved to the regular agenda and considered in normal sequence.

A. Approval of the minutes of May 20, 2015 meeting

Chair Stead requested a motion to approve the consent agenda.

HIGHLAND/BRADLEY – SO MOVED.

There was no discussion.

VOTE. YES. NON-OBJECTION. UNANIMOUS CONSENT.

Motion carried.

PRESENTATIONS

There were no presentations scheduled.

REPORTS

A. Staff Report PL 15-39, City Planner's Report

City Planner Abboud provided a summary of his report. He noted the following:

- City Council has introduced and scheduled for second reading on June 15th the ordinance to purchase the 40 acre parcel containing tributaries to Bridge Creek.
- Due to Quorum issues Council meetings for June were rescheduled to June 15th and 29th
- The 1 acre requirement was removed.
- Submittal of the Site Development Standards recommendations will be submitted to Council if the commission approves.
- Commissioner Stead and Highland have requested reappointment to the commission.
- The Hodnik Preliminary Plat was postponed at the May 26th Borough Plat meeting.
- The Lease Committee is recommending negotiations for a 120 foot tower on the spit there were two proposals received and until awarded the commission will have to wait to be advised who will be awarded the contract.
- City Council had requested the commission expand the GC1 land in the city. This will be before the commission at the June 17th meeting. Statistical analysis for review that included types of structures and uses, land vacancy and availability will be provided as well as activities that are unique to GC1. There is growth in trades, shop space, laydown yards. Commissioners were asked to review their current zoning maps and Comprehensive Plans.

PUBLIC HEARINGS

Testimony limited to 3 minutes per speaker. The Commission conducts Public Hearings by hearing a staff report, presentation by the applicant, hearing public testimony and then acting on the Public Hearing items. The Commission may question the public. Once the public hearing is closed the Commission cannot hear additional comments on the topic. The applicant is not held to the 3 minute time limit.

A. Staff Report PL 15-40, Petition to Vacate Willow Drive Right of Way at Mission Road

Chair Stead introduced the item into the record. City Planner Abboud provided his report. Chair Stead opened the Public Hearing for testimony.

Bonnie Boisvert, city resident, read a letter submitted by Attorney Michael Hough representing property owners within 500 feet of the action requested. Mr. Hough recommended against approval of the vacation of the subject right of way due for several reasons: the importance of being an alternate access for residents of Mission Road; water springs located under Willow Drive, location of utility easement and utility pedestals; there are covenants in place; there is not sufficient enough reason for eliminating the property rights of others including the public; the applicants are the only party benefitting from the action; this same action was before the commission and denied and there is no change in circumstances to warrant reconsideration of the denial; the appearance that the Borough may deny this second duplicative application since elimination of Willow Drive as a through street does not result or allow for equal or superior access being available.

Nickolas Botkin, petitioner/applicant, testified that the request to vacate the right of way was attempted last year and there were concerns based on the conditions of the road at that time. Since then the city has improved the road and now there is opposition based on the potential for it to be an escape route. Mr. Botkin stated that he was requesting the vacation based on the extreme safety factor regarding limited to no sight lines at the intersection, icy road conditions during the winter compounded by the steepness of the road. He stated that Willow Drive is not suitable and should not be used as a shortcut or escape route. He also stated that there are several young children in that area and he has only noticed a few students and others use Willow Drive. Mr. Botkin stated that the city cannot maintain the road because of the steepness.

Russ Humbyrd, resident, has lived on Willow Drive for 19 years stated that Mr. Botkin speeds down the road like a teenager and one of his neighbors is putting in a peony farm and there is talk about putting

in a B & B at the end of the road and if they are worried about traffic then you don't go adding more businesses. He added that there are kids and Mr. Botkin needs to slow down and he will gain a substantial amount of land if this goes through there are covenants in place and they have filled some of the land down there.

Irene Clark, resident, 26 years on Mission Road, she uses Willow Drive to walk to her mailbox safely. She has worked at the High School for 19 years and has had to use Willow Drive to get to work as she could not get up the hill to the intersection of East Hill and Mission, she recalled several times the school bus has had to use Willow Drive because the Mission Rd East Hill intersection was too icy and they could not get up there. Ms. Clark stated that Mission Road is a dead end and if they had a fire or earthquake and could not use the East Hill intersection they would be trapped, Willow Drive provides and alternate access to them.

Ray Sinclair, resident, Willow Drive, concerned about the steepness of Willow and Mission, you cannot see oncoming traffic, he recognized that they were leaving a 40 foot public use easement which is good but he suggested leaving it like it is and putting in posts that would allow for and 8 foot emergency egress. He viewed that there is more traffic that uses that road than should and that limiting the use if it was a good idea.

Malcolm Gaylord, resident, Willow Drive, owns several lots that would be in the proposed cul de sac and his concern is the safety, he cited concerns for the children and the limited sight distances for vehicles because of the steep intersection.

Christopher Pryor, resident, has lived on Mission Road, commented on the safety issues regarding the steep bank or grade and there is very limited sight for traffic turning onto Willow and onto Mission Road from East Hill. The roads were not maintained over the winter and he could not access the intersection of Willow and Mission because of ice and how steep the road was.

Kris Botkin, resident, has a son and expressed concern regarding the access and egress, safety for the kids, believed it to be a financially smart move since the city will not have to maintain this intersection.

Kristen Wertanan, resident, Willow Drive for the past year, she has viewed residents have difficulty with the intersection of Mission Rd and Willow Drive. She has viewed numerous vehicles speeding down Willow who do not live on the road.

Chair Stead closed the public hearing and requested a motion.

HIGHLAND/BOS - MOVED TO ADOPT STAFF REPORT PL 15-40 VACATION OF ROW AND DEDICATION OF A PUBLIC USE EASEMENT OF THE NORTHERN 200' OF WILLOW DRIVE.

Staff responded to Commissioner Highland that there was nothing in code to prohibit another application to request vacation of the right of way since it never made it to the Borough the first time.

Commissioner Bos informed the commission that he visited the area and reported the extreme steepness of the intersection and questioned how any vehicles without enough speed behind them would make it up that intersection and that it was extremely difficult to see approaching vehicles from East Hill.

Commissioner Stroozas stated that when looking at health, safety and welfare which is what this boils down to and Commissioner Bos' recent personal experience seems to substantiate those issues.

Chair Stead declared opinionated comments from the audience as out of order.

Chair Stead offered that the City has not provided a superior level of access and has denied access to this road by taking this action and has difficulty approving the vacation.

Commissioner Venuti agreed with the Chair and added a comment regarding the animosity displayed between the property owners present.

Commissioner Highland requested if they can ask questions of the applicant, it was determined by the Chair with input from Staff that it was appropriate.

Commissioner Highland asked if there was any way to make the intersection safer and remove the steepness to add visual sight lines and if that would be an option.

Carey Meyer, Public Works Director/City Engineer, responded that the quick answer is yes, you can throw enough money at any problem to correct it. The long answer is the road design criteria required filling approximately 40 feet to create a flatter approach and creating a landing zone at that intersection, road grades are to be limited to less than 10% which would make access to the adjacent properties very difficult. How far down Mission Road that would have to go to extend would be several hundred feet and be extremely costly.
Mr. Meyer stated that the grade is in excess of 15% on that road and the city tries to keep the grades at 6% noting it can go higher but still requires the landing zone at the intersection, he further added that Mission Road did not make the appropriate grade either on the approach to East Hill Road.
Mr. Meyer added that if the subdivision was brought before the commission today it would not be approved, it might have been the best designed at the time but not today. He further responded that the whole length of Mission Road has been improved and in his opinion was a really nice gravel road compared to last year. He will not certify it as bulletproof but believes that the approach to East Hill will be much more dependable.

City Planner Abboud answered that if this action is approved by commission the borough may approve it, but if the commission did not approve the action he did not feel that it would get approval at the Borough level.

Commissioner Highland inquired if Commissioner Stead and Venuti's minds were changed by the safety concerns and responses from Mr. Meyer. Commissioner Stead responded it had not changed his opinions. Commissioner Venuti indicated his had not changed either.

Mr. Meyer then answered questions from Commissioner Stroozas regarding:

- if the vacation was approved and the pedestrian and emergency access provided it would provide some redress to the apparent safety issues however it may not accommodate all the fire vehicles

Chair Stead reiterated that the intersection was still not superior access and he could not approve taking away a right of way for something that is not superior access even for an unsafe intersection, that the city has numerous unsafe intersections.

Mr. Meyer provided further testimony on the vacation will solve the problems for the city in having to maintain that intersection since they cannot safely use the grader to maintain that road.

Commissioner Erickson commented on the abnormal winters and recommended the property owners on Willow install signage stating Children at Play.

Commissioner Bradley reported that she visited that area today and cannot understand why anyone would want to live up there in the winter, even if they have four wheel drive, she cannot picture how a school bus navigates Willow Drive.

Commissioner Venuti reminded everyone that this leaves the commission and goes to City Council and if the party does not prevail they can appeal to the City Council too. So he believes that they are at a point they can take action on this now.

Chair Stead called for a roll call vote.

VOTE. YES. STROOZAS, BOS, BRADLEY, HIGHLAND
NO. VENUTI, STEAD, ERICKSON

Motion carried.

B. Staff Report PL 15-41, Towers Ordinance

Chair Stead introduced the item into the record. City Planner Abboud reviewed his report and commented on the appropriate sized area needed for a fall zone for a 120 foot tower, he noted technical issues that were provided in the laydown materials and advised the commission that it deserved consideration and review by the commission.

Commissioner Erickson recommended that they review the information with Staff comments at a worksession or next meeting.

Commissioner Highland asked about the tower that is to be placed on the end of the spit.

Commissioner Erickson left the table at 8:37 pm. Chair Stead called for a brief recess. The meeting was called back to order at 7:44 pm.

City Planner Abboud responding to Commissioner Highland that the City has made a recommendation for a proposal to construct a 120 foot tower on a lot but it is not 1:1, there are many issues, but there has to be some way to be prudent. City Planner Abboud stated that they may not find the lot that works. It is not often, it is more that something falls off the tower than the tower falling, not sure how they would accomplish their goals with this.

Commissioner Erickson noted that breaking points within the height of the tower to alleviate the need for the space can be incorporated into towers. City Planner Abboud stated that it would be good to talk with someone about that technology and there is a possibility that that may work.

Chair Stead opened the public hearing for testimony.

Josh Reynolds, Chief Information Officer for SpitwSpots, a fixed wireless provider located in Homer, our view after reading the submitted materials SpitwSpots comments and recommendations would be virtually the same. Mr. Reynolds stated that it was apparent that the commission's intent is to establish and make concrete guidelines and terminology definitions and it has kind of veered into safety and visual impact. If you look at what this ordinance is going to make happen though is instead of having one – three towers in large height that makes visual impact and what this ordinance will do is create more towers, because they are not allowed to have the appropriate height or location due to the 1:1 requirement. This ordinance will accomplish what the commission is actually trying to prevent. He stated that there is language that has already been brought down in Federal Court, SpitwSpots is not going to take it up with the City but if AT&T, Verizon or another larger company requires a tower they will take it up with the city and make it a legal battle. If you to make the limit 40 feet then you can only use the top of the tower therefore if you have 5 companies needing a tower instead of co-location you end up with 5 towers.

Chair Stead closed the public hearing and asked for a motion to adopt Staff Report PL 15-41

Commissioner Highland requested clarification on motion content. City Planner Abboud responded that she could move to adopt the Staff Report.

HIGHLAND/BOS - MOVED TO ADOPT STAFF REPORT PL 15-41, TOWERS ORDINANCE AND POSTPONE THE PUBLIC HEARING TO BRING IT BACK FOR REVISIONS.

Discussion on requesting information from professionals in the field for the next review of the commission so that the commission can make informed decisions on possible revisions to the draft ordinance. Discussion also included seeing more than two comments on this and input from the industry professionals would be added value, he further stated that most of Homer is a view shed and he would like to see some requirement for blending into nature.

Commissioner Highland asked about amending line 147-148 on page 33 of the packet to add "ice" since that would be a big deal here. Staff can add that note and make the motion at the next meeting.

VOTE. YES. NON-OBJECTION. UANIMOUS CONSENT.

Motion carried.

Chair Stead clarified that the Staff Report has been adopted and the commission will see the ordinance again with minor revisions at the next meeting, with more public comment.

C. Staff Report PL 15-42, Site Development Standards

Chair Stead read the title into the record. City Planner Abboud read his report.

Chair Stead opened the public hearing for comment. Seeing no public present the public hearing was closed.

BOS/ERICKSON - MOVED TO ADOPT DRAFT ORDINANCE 15-08, SITE DEVELOPMENT STANDARDS AND FORWARD TO CITY COUNCIL FOR PUBLIC HEARING.

Commissioner Highland noted line 11, space needed between words "BY" and "AUGUST" and a comma was needed in line 32 after the word "months".

Commissioner Venuti, questioned line 36, requesting clarification for "other means" once clarification was provided then it was discussed that it does not allow time for the developer to re-vegetate since the ordinance states that it must be re-vegetated by native or other means. Commissioner Erickson pointed out the use of the word "that" in line 34 before nine month period provides definition of the period allowed for a cleared area to be re-vegetated. There was a brief discussion on the enforcement of the area being re-vegetated in the 9 month time period.

VOTE. YES. NON-OBJECTION. UNAIMOUS CONSENT

Motion carried

PLAT CONSIDERATION

There were no plat considerations.

PENDING BUSINESS

A. Staff Report PL 15-43, Waddell Way

Chair Stead read the title into the record. City Planner Abboud reviewed his report and requested recommendations from the commission.

ERICKSON/BOS - MOVED TO ADOPT OPTION A

Staff did not feel that it was appropriate at this time without public input. The commission was concerned that they wanted to discuss the project.

Commissioner Erickson wished to withdraw her motion. Chair Stead did not think that was allowed at this point. The commission requested a assistance from Deputy City Clerk Krause who confirmed that the maker of the motion could withdraw the motion with consent.

The motion was withdrawn by consensus of the Commission. There was brief discussion by the commission on what they wished to do.

HIGHLAND/BOS - MOVED TO DISCUSS STAFF REPORT PL 15-43, WADDELL WAY ROAD PROJECT

Discussion by the commission ensued on how to best proceed with the project. Points noted were:
- Support for Option A with concern expressed on HEA access such as short distance from the intersection of the new road and Heath Street
- There is public support for the creation of this connecting roadway
- Reduced curves, well lit intersections, preference for wide shoulders on each side of the road and a sidewalk
- Incorporate right hand turn lanes at intersections with Lake Street
- Recommended placing HEA access off of the proposed new road not Heath Street offer driveway permit as incentive
- Naming of street to Goldmine Way or Lane or continue “Grubstake” across Heath Street
- Bike design Level 4 if first choice, then Level 2

VOTE. YES. NON-OBJECTION. UNANIMOUS CONSENT.

Motion carried.

NEW BUSINESS

There was none.

INFORMATIONAL MATERIALS
A. City Manager’s Report from May 26, 2015 City Council Meeting

There was no discussion.

COMMENTS OF THE AUDIENCE
Members of the audience may address the Commission on any subject. (3 minute time limit)

There was no audience present.

COMMENTS OF STAFF

City Planner Abboud commented on the dire financial condition of the city and that the planning staff will be reduced by one member, it is actually a position, based on seniority. The department can absorb quite a bit, there will be things that rise to the top and the department will focus on the most important things, the staff member luckily will be able to transfer over so they don’t get laid off.

Deputy City Clerk Krause had no comments.

COMMENTS OF THE COMMISSION

Commissioner Highland spoke about the wind energy discussion she would like the commission to have and has brought the issue up with Mr. Abboud, they should be seeing something, maybe in the future.

Commissioner Bradley thanked the commission.

Commissioner Erickson apologized for leaving the meeting abruptly, she is on call and will be getting another staff person and will not have to carry extra phones after this weekend. It was a good meeting, very interesting, hard to make those difficult decisions with two opposing viewpoints, lot of them friends, it was not easy.

Commissioner Bos thought it was a good meeting tonight thought Commissioner Venuti's comment to the audience was fantastic and perfect, he could not have said that; congratulations to Commissioner Highland and Chair Stead for signing up for a few more years. They seem to be cruising through things now and getting others done. He thanked the staff and all they do and will be doing short staffed. He noted that Fish and Games employees are being cut almost 60% and our state resources will have to manage with half the staff.

Commissioner Venuti good meeting and the other day he drove up to a project up in the Bridge Creek Watershed and all their efforts in that area he noticed that the roads had had calcium chloride spread all over them so it appears they are going in the opposite direction. He was sure how they could solve that. He was going to have Jim Hornaday stop by with his ukulele but he was booked. Happy Birthday Chair Stead.

Commissioner Stroozas wished Chair Stead Happy Birthday and announced the following items: the 4th of July parade will be on Saturday, July 4th, the Chamber is heading it up and the theme for this year is Pioneer Time - a Salute to Our Heritage. Rumor has it that Norman Lowell will be the Grand Marshal this year and he will have his family in the car. They are fully staffed at the Chamber now they hired Jan Knutsen as Chamber Visitor Information Center and Events Coordinator and the Garden Club of Homer will have their Annual Plant Sale on this Saturday, June 6th at 11:00 a.m. in the chamber parking lot.

Chair Stead announced the next meeting date and worksession, he thought they did well today, appreciated all the support and well wishes.

ADJOURN
There being no further business to come before the Commission, the meeting adjourned at 8:48 p.m. The next regular meeting is scheduled for WEDNESDAY, JUNE 17, 2015 at 6:30 p.m. in the City Hall Cowles Council Chambers. There is a worksession at 5:30 p.m. prior to the meeting.

_____
Renee Krause, CMC, Deputy City Clerk

Approved: _____

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Memorandum 15-097

TO: MAYOR WYTHE AND HOMER CITY COUNCIL

FROM: MELISSA JACOBSEN, CMC, DEPUTY CITY CLERK

DATE: JUNE 22, 2015

SUBJECT: ECONOMIC DEVELOPMENT ADVISORY COMMISSION RECOMMENDATION REGARDING AFFORDABLE HOUSING

On May 14, 2012 the City Council designated Community Economic Develop Strategy (CEDS) priorities and requested the Economic Development Advisory Commission review and provide recommendations regarding implementation strategies, including timetables, responsible parties, and funding.

In January 2015 the Commission followed up with Council via Memorandum 15-013 regarding an affordable housing incentive and at their June 9, 2015 regular meeting they took the following action which passed with four yes votes and one no vote:

BROWN/ARNO MOVED THAT THE RECOMMENDATION FOR THIS PROPOSAL TO GO FORWARD FOR CITY COUNCIL TO CONSIDER WITH THE OUTLINE SUGGESTED:

New Business and Housing Incentives on Homer Undeveloped Land

1) *7 year trial period*
2) *All new construction, (business and residential) on UNDEVELOPED LAND*
   Note: applies to new construction only, not additions
3) *Waive city taxes on improvements for a period of 10 years*

Benefits:

- *Promoting development on undeveloped land available in Homer*
- *Promoting and attracting new businesses*
- *Promoting Living Wage Jobs by local industries and increased support services*
- *Increasing use and service fee infrastructures of city; sewer, water, gas, electric*
- *Promoting new users to sales tax base, not just a target group of individuals*
- *Promoting and encouraging a base for construction which includes anticipating the LNG Pipeline benefits*

RECOMMENDATION: Consider the proposal from the Economic Development Advisory Commission, determine if the recommendation is feasible and whether to bring forward an ordinance or resolution to implement the tax incentive program.

Katie Koester

From: Patrick Brown <pbrown5@yahoo.com>
Sent: Wednesday, November 12, 2014 1:43 PM
To: Katie Koester
Subject: Commissioner Brown Update-Directives

Follow Up Flag: Follow up
Flag Status: Flagged

November 12, 2014

Katie Koester
Homer City Clerk
kkoester@ci.homer.ak.us

Katie:

I am submitting the following information to you seeking direction on several points.

I wanted to express my observations on our recent meeting concerning the concept of “Affordable Housing” and ask for some additional clarifications.

We reviewed “affordable housing” and it divides into two categories:

1) Subsidized Housing Requirements for residents
   Seniors and the vulnerable populations of disabilities, mentally and physically disabled, vets, homeless, low-income, abused at-risk adults and children, and the chronically ill.
2) Young families with children desiring to locate to Homer and plant roots hopefully for a generation or more. This group is motivated by economics to live and thrive in our community.

There are programs in place to address the first group and Homer EDC recommends pursuit of these programs for our residents. It is worth noting that seniors outside our area especially from Anchorage are seeking to retire and relocate here putting a strain on our limited resources for our current residents.

My focus is to address the “Young Families” category. Economic generators such as the hospital provide living wages as compared to survival wages. Investors may be enticed to accomplish projects in Homer by incentives offered by the City of Homer. Ultimately, purchase of homes will provide the infrastructure to build our economy and city budget.

I believe building industry in Homer is the higher priority to fulfill. I understand the Chamber is responsible for PR work concerning the city. At our last meeting we learned about 260 inquiries a month are requested to learn more about our great city.

Reviewing the website and available materials I feel we may improve our posture from passive marketing to active aggressive marketing. My recent submission for the slogan; “Put your HOME in HOMER” is just one example to support our home team. I realize our Chamber is challenged with an interim director awaiting selection of a new director, personnel and budget issues with performance benchmarks on our many activities to generate revenues.

I have worked with other Chambers, city governments, military and business applications which resulted in “Anchors” within communities to grow business and communities and lay true economic foundations. I have chosen to make Homer my Home and anticipate another 25 years here, Lord willing and the creek don’t rise!

One key concept is referred to as “Anchor Businesses” such as the main stores of attraction at a mall. Having worked in the Mall of America in Minnesota, other smaller lesser known stores benefit and thrive. I just love the Lego Store!

My question is simple, as a Commissioner in the City of Homer Economic Development and Advisory Commission, do you want me to pursue the options of businesses relocating to Homer according to the CEDS, Comprehensive Economic Development Strategy?

As an example the IEDC meets in Anchorage October 2015 comprised of several hundred businesses and industry representatives-decision makers. I

submit for consideration our joint efforts with our KPED and AEDC to showcase Homer and take advantage of these opportunities.

I ask for guidance from our Chair and City Council.

Respectfully,
Commissioner Patrick Brown
Homer Economic and Development Advisory Commission

Katie Koester

From: Thomas Klinkner <tklinkner@BHB.com>
Sent: Friday, November 14, 2014 5:23 PM
To: Katie Koester
Cc: Walt Wrede
Subject: RE: Tax question

Katie,

Such an exemption is authorized by AS 29.45.050(m). No state approval is required.

Here is the statutory language:

(m) A municipality may by ordinance partially or totally exempt all or some types of economic development property from taxation for up to five years. The municipality may provide for renewal of the exemption under conditions established in the ordinance. However, under a renewal, a municipality that is a school district may only exempt all or a portion of the amount of taxes that exceeds the amount levied on other property for the school district. A municipality may by ordinance permit deferral of payment of taxes on all or some types of economic development property for up to five years. The municipality may provide for renewal of the deferral under conditions established in the ordinance. A municipality may adopt an ordinance under this subsection only if, before it is adopted, copies of the proposed ordinance made available at a public hearing on it contain written notice that the ordinance, if adopted, may be repealed by the voters through referendum. An ordinance adopted under this subsection must include specific eligibility requirements and require a written application for each exemption or deferral. In this subsection "economic development property" means real or personal property, including developed property conveyed under 43 U.S.C. 1601 et seq. (Alaska Native Claims Settlement Act), that

(1) has not previously been taxed as real or personal property by the municipality;

(2) is used in a trade or business in a way that

(A) creates employment in the municipality;

(B) generates sales outside of the municipality of goods or services produced in the municipality; or

(C) materially reduces the importation of goods or services from outside the municipality; and

(3) has not been used in the same trade or business in another municipality for at least six months before the application for deferral or exemption is filed; this paragraph does not apply if the property was used in the same trade or business in an area that has been annexed to the municipality within six months before the application for deferral or exemption is filed; this paragraph does not apply to inventories.

* *

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From: Katie Koester [mailto:kkoester@ci.homer.ak.us]
Sent: Friday, November 14, 2014 4:10 PM
To: Thomas Klinkner
Cc: Walt Wrede
Subject: Tax question

Hi Tom,

I was hoping you could answer a quick question for the Economic Development Commission.

Can the City adopt certain incentives or deferrals on property taxes without prior approval by the State?

Thanks for your help.

Best,

Katie Koester
Community and Economic Development Coordinator
City of Homer
491 E. Pioneer Ave
Homer, AK 99603
Ph: (907)-435-3101
Fax: (907)-235-3148

A. Memorandum from Community and Economic Development Coordinator Koester Re: Updates since last regular meeting

Community & Economic Development Coordinator Koester introduced City Manager Yoder who has been appointed until a permanent City Manager is hired. Mr. Yoder was invited up to talk to the commission.

City Manager Yoder said he was pleased to learn that Homer has an Economic Development Commission; it is something a lot of communities like to get involved in. He posed the notion of increasing sales tax from the view of can you raise more sales tax by sales, rather than by just upping the rate. Homer is at the end of the road, so there aren't a lot of people driving through and there is a defined piece of pie here and how it is sliced up. Does more business bring in more dollars or does it just slice the pie thinner? He suggested it might be a question to ask of the business community. The port and all the things associated with it as one of the big economic drivers is another area to look at. Another thing to look at is studies that are already done that talk about how many of the dollars are exported to to Soldotna and Anchorage, and look at ways to keep those dollars here. Mr. Yoder said these are things he has brought up with Katie as things for the Commission to think about.

PUBLIC HEARINGS

PENDING BUSINESS

A. Affordable Housing
   i. Email from City Attorney Klinkner re: Municipal Authority for Tax Incentives and Deferrals

Chair Barth reported that he talk to Council at their November meeting and the feedback was encouraging regarding the thoughts the Commission had about a possible tax incentive to develop undeveloped lots. He would like the Commission to be able to get some thoughts on paper to submit to Council for them to respond to.

Chair Barth provided a brief overview of the Commission's work to date relating to affordable housing.

The Commission discussed ideas of what they could submit to Council for development in an effort to narrow down their approach. Comments included:

- Incentives for developing affordable housing may not necessarily be monetary, it may be process related. An ease of a process that might equate to less cash outlay by a developer. Improving the way developers deal with the city and land in the city that can make things easier for them and give the incentive to build here.
- Talking to builders about what their hurdles are for development and knowing what would make it easier for them to develop in the city limits would be helpful. Unless we know what the issues or disincentives are, we don't know what to address.
- Tax incentives don't necessarily help the builder unless they plan to continue to own the building.
- Tax deferral on the assessed value for the city after the home is built wouldn't have as much impact on the city.

- Natural Gas is an incentive. If developers are offered a choice of tax deferral or natural gas install, they may likely select natural gas.
- Incentive could be broken down into residential development owner occupied lots and the developer who wants to come in and build multi-family housing. Question one could be do you support a tax incentive for owner occupied development. Question two, do you support it for duplex and four-plex sized units. Question three could be on the larger scale. That would allow them to gauge Council support or interest. Outreach to developers is also important.
- Develop a reliable survey from construction organizations locally, regionally, statewide, and pacific northwest and use them as comparatives to find out why so much development is happening in some areas as opposed to others.
- It could be beneficial for Commission members to talk to a couple people over the next few weeks to get their opinions. Sometimes the public is reluctant to talk with staff or come to city meetings.
- There are details about tax incentives that need to be formulated before staff can get some educated information on what they may look like.
- The lending piece of the construction process can also be a deterrent. From a lending perspective construction is still high risk. Commercial construction is a bit easier because lenders are dealing with a business rather than an individual and the builders are more experienced.
- If someone is building a four-plex and running it themselves they have to have the money to invest and then want to have rental business. That's why you don't see that type of construction here from local builders. An incentive may make people want to build here.
- From an investment perspective, there has to be a breakeven point for the investment. When dealing with affordable or low income housing, it will be difficult to get to that breakeven point without a subsidy.

More specific incentive recommendations included:

- Property owners are already being taxed for the vacant land. An incentive could be to defer taxes on the added value on the property for three to five years once the improvements are complete. Perhaps residential improvements a five year deferral and multi-family a three year deferral, based on new construction. Increasing housing for the city means more revenue. More people who can come to the city is growing Homer and our economy. More building means more jobs and new development should be incentivized across the board.
- Rather than an across the board exemption, maybe it would work to define what kind of housing we want to promote and offer incentives for those types of improvements. The retirees and second home owners have increased, but it isn't just about growing the numbers of people but also have people who are here year round. People who live here year round will also need year round jobs. We need to look beyond just having people live here.

BROWN/ARNO MOVED THAT WE GO AHEAD AND SUBMIT TO CITY COUNCIL A MEMO STATING THAT WE BELIEVE THAT A TAX INCENTIVE MAY BE A VIABLE OPTION TO HELP PROMOTE RELIABLE HOUSING IN OUR CITY. WE CAN IDENTIFY THE DIFFERENT CATEGORIES OF BUILDINGS, AND WITH RESPECT TO THE CONCEPT THAT IT MAY IMPACT OUR BOTTOM LINE WITH THE CITY BUDGET; IT WOULD GIVE US OPPORTUNITY TO EXPLORE OPTIONS AND PERCENTAGES. THE GOAL IS THAT AS A RESULT OF THIS THERE WOULD BE MORE BUILDINGS TAKING PLACE IN HOMER AND THAT IT WOULD PROVIDE AN IMPETUS FOR OUR INFRASTRUCTURE TO DEVELOP AND THAT THE BENEFIT IS THAT WE'RE LOOKING AT LONG TERM RESIDENCY AND BUSINESSES ESTABLISHED AND THRIVING IN OUR CITY.

There was discussion that they should probably identify the categories for the memo. They identified the categories as single residence family homes, commercial properties, and multiple owner occupied residences, such as a four-plex, and perhaps apartment buildings.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

Commissioner Arno expressed interest in inviting Sheldon Beachy with Beachy Construction, Tim Steiner with Steiner Construction, and also Bruce Petska to talk them. Chair Barth also suggested it would also be helpful to know what we are potentially giving up and so a report from or inviting someone involved in making the financial predictions regarding the city budget.

BROWN/MARKS MOVED TO CONTACT CONSTRUCTION ORGANIZATIONS AND GATHER INFORMATION PERHAPS THROUGH SURVEY MONKEY OR PUBLISHED DATA THEY HAVE AS TO WHAT THEY CONSIDER THEIR GREATEST MOTIVATORS TO CAUSE THEM TO HAVE INCENTIVES TO WANT TO BUILD IN THE HOMER AREA.

Chair Barth expressed that their last work on a survey was painstaking thing to accomplish, even though it sounds relatively simple. The group has to decide what survey they want to conduct, and word questions and choices specifically. They can't just task staff with making a survey and sending it out.

Commissioner Brown suggested that from different trade organizations there should be consistently published data and from that we should be able to glean enough information to provide insight to their concerns might be.

Ms. Krant further suggested gather data from areas that have experienced a lot of building growth by contacting Mrs. Koester's peer in those communities and ask to what extent are builder incentives responsible for the growth they are experiencing.

Commissioner Brown said he would work to gather information from Bloomington, Indiana.

VOTE: NO: ARNO, MARKS, BROWN, BARTH

Motion failed.

NEW BUSINESS

INFORMATIONAL ITEMS

A. Email from Commissioner Brown re: Updates and Directives
B. City Manager's Report – December 8, 2014 and January 12, 2015
C. Industry Outlook Forum Agenda

No discussion.

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Memorandum

TO: Homer Advisory Economic Development Commission

FROM: Katie Koester, Community and Economic Development Coordinator

DATE: January 15, 2015

SUBJECT: Tax exemption information

The purpose of this memo is to both consolidate information that was provided in previous meetings and present new information on affordable housing after the direction the commission gave staff at the January 2015 meeting.

What Council had to say.
At the City Council February 26th meeting the memo form the EDC was discussed at the Committee of the Whole. The feedback from Council was they wanted to see incentives for multifamily homes, rentals and ways to work with the Coast Guard to provide housing options. Councilmember Lewis questioned the mechanics of an incentive program and if you would verify income eligibility. He also brought up the difficulty for people to put down both a security deposit and a first month's rent, if there was a way to help with deposits.

1. **What is affordable housing?**
   At previous meetings the Commission seemed to come to the consensus that they are looking at incentivizing 'starter homes' or homes for young families. The effort is not to provide low income housing, which would have different definition and threshold. What magic number is considered affordable in Homer? Alaska Housing Finance Corporation has a first time home buyer program that is aimed at the demographic the EDC wishes to target. This is a generous and inclusive number.

AHFC First Time Homebuyer Program Requirements	1-2 people	3 or more people
Maximum annual income to be eligible for a first time homebuyers loan	$78,800	$90,620
	New or existing single family home	Existing Duplex
Maximum cost of home first time homebuyers loan program will finance	$294,620	$377,174

American Community Survey 2009-2013 5-year data	
Average home value in Homer (assessed value)	$282,772
Median household income in Homer	$53,750
Mean household income in Homer	$72,703

2. **Tax Incentive Scenario**

Cost to the City

Julie Engebretsen with the Planning Department ran some numbers on how much in taxes current construction generates.

Total value of all construction in 2014: $15,545,822 (big construction projects included fire station, harbormaster office, O'Reilly's, snug harbor seafood on the spit, and retail/contractor space on east end road.)

Total value of all new residential construction including multifamily: $9,858,200. This breaks down to 31 single family homes, 3 duplexes creating 6 housing units, one 4-plex, and one development with four individual cabins. Total new housing units: 45. The 4-plex was built by KPHI, so they don't pay property tax.

The average permitted value of the single family homes is $260,574. The assessed value will probably be less than that, assume they will all be owner occupied by people under the age of 65. So the exemption is limited to $20,000 for Homer taxes. So $240,574 x.0045 = $1,082.583 in Homer taxes.

$1082.583*31 homes = **$34,000 (rounded up) in lost tax revenue.** Note: the KPB tax assessor does not necessarily know about and tax the house the first year it is built.

At the January meeting the commission asked if the City of Homer counts on new residential development when making budget projects. The answer is indirectly. The City bases future property tax projections on the projected assessed value of real property in Homer as a conglomerate. Because values rise and fall, any new construction would be considered as part of the tax value as a whole.

Benefit to the Homeowner

A household making the median household income in Homer, $53,750, would need to spend $896 or less a month in mortgage payment plus taxes to be considered affordable (20% of income mortgage, 10% utilities, equals 30% of household costs to housing). The following table explores a scenario for an $895 monthly payment with and without City of Homer property taxes. For the purposes of this example, the property gets an exemption on the first $20,000 as a primary residence.

	Mortgage/ mo.	Taxes/mo.	Total/mo.	Financed	20% down	Home cost
W/ COH taxes	$750	$145	$895	$148,000	$37,000	**$185,000**
No COH taxes	$813	$82	$895	$176,500	$44,125	**$220,625**

Assumes a 4.5% interest rate, does not take into consideration the cost of homeowners insurance. Eliminating the city of Homer property tax has the same effect as reducing the interest

rate by .6%. HOWEVER, keep in mind the tax incentive currently being discussed does not eliminate City of Homer property taxes indefinitely on the property.

3. **Is there a need?**

By the numbers:

A survey of Alaska MLS shows the following breakdown from Homes on the market in Homer City limits. Keep in mind what homes are listed for and sell for can vary greatly. No home was listed below $139,000 in City limits. Many of these homes need improvements and would not be eligible for a rigorous financing program (like AHFC).

	Number of Homes: 29	Average listing: $224,131
139,000-200,000	10	$169,302
200,001-245,000	9	$227,777
254,000-299,900	10	$273,430

(See email and sales data from Karen Marquart for more accurate information actual sales price)

According to American Community Survey 2009-2013 5-year data, 37% of owner-occupied units in Homer spend more than 30% of household income on housing expenses (mortgage, taxes, insurance and utilities). The same survey reports 46% of renters spend more than 30% of household income on housing expenses. Thirty percent is the threshold considered prudent. Essentially, over a third of Homer households are paying too much for household expenses. (note, margins of error on data are high).

4. **What is the City process/permitting hurdles for new development?**

According to the City of Homer Planning Department:

To build on a City of Homer lot (with utilities) you need a construction permit which can take as little as one day. The Planning Department estimates that the average new residential construction takes 7 days to process the permit and about one hour of the builder's time to fill out the paperwork/talk to Planning. There are no building inspection requirements in Homer, which simplifies the process greatly compared to other communities. If the lot is on wetlands, the builder has to apply for a permit with the Corps, which could take up to 30 days, however that is a federal requirement. If a builder is constructing a multifamily building with 4 unit or more, state laws and regulations apply that may take longer than the 7 day average. Again, this is not the City's process. If a builder wants to build multiple homes on one lot, they would need a conditional use permit and to go before the Planning Commission. This is where public sentiment can weigh in heavily as often neighbors do not want dense multiple structures (often rental units) in their backyard and can come out against the project at a Planning Commission meeting. The City recently simplified its process for constructing an accessory dwelling on a lot (mother in law cabin, apartment above the garage, etc), you no longer need a conditional use permit.

Average City of Homer permitting/set up expense for residential dwelling	
Construction Permit	$300
Driveway Permit	$300
Water/sewer hookup fee	$xx
Meter deposit	$1000

The issue of Special Assessment Districts

When an area wants an improvement, traditionally either water/sewer or roads, though most recently natural gas, they band together and form a special assessment district. Fifty percent or more of lot owners have to agree (by non-objection) to the improvement. In the case of water and sewer, the lot owner pays for 70% of the cost of the improvement and the City 30%. The70% is divided between the lots that are benefited (either by lot size, road frontage or evenly) and assessed to each property. According to current City code, when a lot subdivides after the SAD, the new lot created generates a separate assessment. The value of that assessment is then divided amount among all the lot owners, essentially refunding them for the investment. In a small Special Assessment District this is administratively doable. However in a large district, such as the Natural Gas HSAD, this could become administratively untenable. Water sewer assessments in particular can be very costly – one neighborhood the assessments are $30,000. Combined cost of land and assessment can make a lot prohibitively expensive.

Are smaller lots and zero lots lines the answer?

Currently Homer lots can be 10,000 square feet in areas zoned rural/residential zones and 7,500 feet in urban districts. That is still fairly large for a lot. A smaller lot, and zero lot lines, means much more affordable land. One type of development, cluster development, advocates for a combination of lot sizes and green space in a development to cluster utilities and create more affordable lots. A potential con of this option is the public opposition to smaller lot size. In Homer, neighbors want less dense neighborhoods. Even with the ability to subdivide to cheaper lots, developers may be able to realize more profit with larger lots and more expensive homes. Realtors asked about this issue commented that there is not a market for very small lots in Homer.

Things to Consider

At the EDC is considering ways to incentivize affordable housing and development in Homer, keep the following things in mind:

-The administrative burden of the program.
-A way to incentivize new construction on water and sewer. This would create more infill and cost sharing for the city water sewer system.
-Cluster development where smaller lots and combined with a few larger lots and green space. This is a way to consolidate development, make lots and infrastructure more affordable and still protect green space.
-What the population you want to target.

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(f) 907-235-3148

City of Homer

www.cityofhomer-ak.gov

Memorandum

TO: Mayor Wythe and Homer City Council

FROM: Advisory Economic Development Commission

THROUGH: Marvin Yoder, City Manger

DATE: January 20, 2015

SUBJECT: Affordable housing tax incentive

The purpose of this memo is to update the Council and request input on the Homer Economic Development Advisory Commission's work to date on affordable housing, one of the directives Council established for the EDC in Resolution 12-041.

The Commission plans to propose a tax incentive to Council as an option to promote housing in Homer. The proposed incentive would consist of a tax exemption for 3-5 years for new construction in the categories of single family homes, multiple owner occupied residences (such as four-plexus), apartment buildings, and commercial buildings. Additional development in these categories will further goals of the City: water and sewer infill and a larger long-term property tax base. As a reference point, the total value of all construction in 2014 was $15,545,822, however some of that included projects that do not produce tax revenue (city and nonprofit construction, for example). There were 45 new housing units constructed last year with an estimated value of $9,858,200. The average new single family home in 2014 would generate approximately $1,000 in city of Homer property taxes. The goal of the Commission is to increase the amount of new construction in Homer with an emphasis on affordable residential construction.

The Commission will continue to work with housing professionals and city staff to refine this proposed tax incentive. However, before proceeding the Commission would like to gauge the Council's appetite for a tax incentive on new construction and welcomes suggestions as the proposal moves forward.

The Economic Development Advisory Commission thanks you in advance for your participation and feedback.

ECONOMIC DEVELOPMENT ADVISORY COMMISSION
REGULAR MEETING
FEBRUARY 10, 2015

Session 15-02 a Regular Meeting of the Economic Development Advisory Commission was called to order by Chair Barth at 6:00 p.m. on February 10, 2015 at the City Hall Cowles Council Chambers located at 491 E. Pioneer Avenue, Homer, Alaska.

PRESENT: COMMISSIONER ARNO, BARTH, BROWN, STANISLAW
Cinda Martin, Marine Trades Association Representative

ABSENT: MARKS, FRIEDLANDER

STAFF: DEPUTY CITY CLERK JACOBSEN
DEPUTY CITY PLANNER ENGEBRETSEN

AGENDA APPROVAL

BROWN/ARNO MOVED TO APPROVE THE AGENDA.

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

PUBLIC COMMENTS REGARDING ITEMS ON THE AGENDA

None

RECONSIDERATION

None

APPROVAL OF MINUTES

A. Regular Meeting Minutes January 13, 2015

ARNO/BROWN MOVED TO APPROVE THE MINUTES.

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

VISITORS

A. City Planning Staff – Affordable Housing

Deputy City Planner Engebretsen commented about starter housing for working families. Something that helps in talking about that is to put a dollar amount on it, for example is it people who make the average income in our community? She reported construction is picking up in the community and we have a lot more rentals in the form of small cabins being constructed, however they accommodate singles, couples, or parent and a child, not family housing. She also acknowledged Council's suggestions of incentives for multi-family housing, rentals, and increased Coast Guard housing.

Regarding incentives, easy things for the city to do would be things like waiving fees, such as zoning fees and water/sewer hookup fees. A tax incentive is more difficult to make happen. Property improvements aren't always recognized and assessed within the first year. Cost of land also drives our housing market. Land costs are high and one thing that could be looked at is the special assessment districts. She explained situation with the Hillside Acres subdivision that had a costly water and sewer assessment about 10 years ago. The cost to subdivide an acre lot and pay the assessments on the newly created lots makes it cost prohibitive for the land owner. It's a long term issue.

There was discussion of the process for Special Assessment Districts, water/sewer hookup fees, subdividing, and potential challenges of working with the Borough on tax incentives.

STAFF & COUNCIL REPORT/CHAMBER OF COMMERCE & MARINE TRADES ASSOCIATION REPORT/ COMMITTEE REPORTS/BOROUGH REPORT

Mrs. Martin reported that there is a Round Haul, a social get together, on February 27th from 5 to 7 pm at Redden Marine. She also said the Association is working with the City to produce a Marine Trades Promotional Video and an RFP is being prepared for advertisement.

PUBLIC HEARINGS

PENDING BUSINESS

A. Affordable Housing
   i. Staff Report on tax exemptions and other affordable housing measures
      a. Average Sales Price/Days on Market
      b. Residential Sales Comparison 2013-2014
      c. Land Sales Comparison 2013-2014
      d. 10 Year Comparison Report
      e. Real Estate Market Review
      f. What can the City do?

The Commission continued to discuss the notion of a tax incentive. They acknowledged that there may be some hurdles in working through it but also feel the benefits make it worth pursuing. Comments of support include:

- There is more savings with a tax incentive over time.
- The savings from offsetting taxes in the first few years could increase buying/building power.
- It incentivizes businesses to come to town resulting in more business, and more jobs.

- Tax credits for developers and buyers while interest rates are low.
- Property tax on new improvements wouldn't be a direct loss in revenue because the City isn't receiving the income yet. It would be a delay in the property tax income, but the sales taxes collected by the development and the new home owner would be recognized.
- Waiving property tax for the first year for the purchaser.

Other incentives addressed were:
- Waiving city fees for permitting.
- Educating the public, with the low interest rate the incentive is there now.
- Looking at smaller lots than 10,000 square feet rural residential and 7500 square feet in urban areas could make lots more affordable.
- Waiving hookup fees for two years for water and sewer and other costs incurred to the city for developing property.
- Allowing developers of subdivisions to bring in infrastructure improvements like curb, gutter, and paving after selling a certain number of lots, rather than developing it all off the top.

Other comments included:
- Based on past discussions, the Coast Guard generally prefers regular housing over formal Coast Guard housing as they prefer to be in a regular neighborhood in the community.
- Consider addressing the incentives in phases, starting with waiving some fees for the first two years. It's simple and in City's control and they can see if it made a difference. Then decide whether to move on to a second phase of implementing some tax incentives or something like that.
- Construction loans are more difficult to obtain than a regular mortgage loan. It is questionable whether these temporary incentives would have any impact in qualifying for a loan; lenders have a pretty specific review process that likely won't be deviated from.
- The Senior Center is planning to construct more housing and inviting Keren Kelley to a meeting would give them a chance to ask if the incentives discussed could benefit their project. Also extending another invitation to Steve Rouse with KPHI.

Chair Barth summarized their intent to recommend waiving city fees to develop a property and continue to pursue the options for a tax incentive. Information they would like for their next meeting is:
- They would like to receive feedback from the Borough Assessor's office to find out what is involved in establishing a tax deferment on new development to see if it is a feasible undertaking.
- They would like more information from planning regarding reducing lot sizes in the residential districts.
- Information about the assessments issued to newly created lots through subdivision.

NEW BUSINESS

A. Election of Chair and Vice Chair

BROWN/ARNO MOVED TO NOMINATE MIKE BARTH AS CHAIR AGAIN.

Chari Barth accepted the nomination and no other nominations were proposed.

City of Homer
www.cityofhomer-ak.gov

Administration
491 East Pioneer Avenue
Homer, Alaska 99603
(p) 907-235-8121 x2222
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Memorandum

TO: Advisory Economic Development Commission

FROM: Katie Koester, Community and Economic Development Coordinator

DATE: March 5, 2015

SUBJECT: Affordable Housing Follow up from February 10, 2015 Meeting

This memo is in response to questions the Commission proposed at their February 10 meeting. At that meeting the Commission requested:

1. Feedback from the Borough Assessor on what is involved in establishing a tax deferment on new development to see if it is a feasible undertaking

   I spoke with the Borough Assessing office. They administer a series of Borough- wide tax exemptions (see the attachment listing available exemptions). The do not (and won't) administer an exemption for just one municipality. The City of Homer would have to establish the parameters of the program, collect applications, verify eligibility and generally run the program. The City would provide a list of parcel numbers that are eligible to the Borough annually. A onetime cost would be charged to the City for having to re-program their software and they would need plenty of lead time to accomplish this. Proving that there is new construction may be difficult – a piece of raw land with a building on it can be inspected fairly easily. However, if there is an addition or remodel to an existing facility they borough cannot only exempt the value of that improvement.

   RECOMMENDATION: If the Commission wishes to purse a tax exemption program, I recommend you develop specific parameters and details to move this item forward.

2. More information from Planning regarding reducing lot sizes in the residential district

   I spoke in more detail with City Planner Abboud and Deputy Planner Engebretsen. They both emphasized that there is little demand for small lots in Homer. The smallest lot size you can have in the urban residential district is 6,000 (some lots on Klondike, Grubstake and Bonanza are this small). Town Houses, where a house shares a common wall, are allowed, but there are a number of restrictions on them (such as dimensional requirements) that prove to be impractical for Homer builders. Further work could also be put into defining and encouraging cluster development. See the Land Use Plan section of the Comprehensive Plan attached.

3. More information about the assessments issued to newly created lots through subdivision

To recap how special assessment districts work in the City of Homer:

> When a neighborhood wants an improvement, traditionally either water/sewer or roads, though most recently natural gas, they band together and form a special assessment district. Fifty percent or more of lot owners have to agree (by non-objection) to the improvement. In the case of water and sewer, the lot owner pays for 70% of the cost of the improvement and the City 30%. The70% is divided between the lots that are benefited (either by lot size, road frontage or evenly) and assessed to each property. According to current City code, when a lot subdivides after the SAD, the new lot created generates a separate assessment. The value of that assessment is then divided among all the lot owners, essentially refunding them for the investment. In a small Special Assessment District this is administratively doable. However in a large district, such as the Natural Gas HSAD, this could become administratively untenable. Water sewer assessments in particular can be very costly – one neighborhood the assessments are $30,000. Combined cost of land and assessment can make a lot prohibitively expensive.

I have attached current City Code on how assessments are levied. There is also a list of the current assessments, when they were created, when they will be paid off, and for some of the special assessment districts the average cost of the assessment per lot.

Session 15-03 a Regular Meeting of the Economic Development Advisory Commission was called to order by Chair Barth at 6:00 p.m. on March 10, 2015 at the City Hall Cowles Council Chambers located at 491 E. Pioneer Avenue, Homer, Alaska.

PRESENT: COMMISSIONER ARNO, BARTH, BROWN, FRIEDLANDER, MARKS

EX-OFFICIO: BRYAN ZAK, COUNCILMEMBER; KAREN ZAK, CHAMBER DIRECTOR, MATT ALWARD, MARINE TRADES REPRESENTATIVE

ABSENT: STANISLAW

STAFF: COMMUNITY & ECONOMIC DEVELOPMENT COORDINATOR KOESTER
DEPUTY CITY CLERK JACOBSEN

AGENDA APPROVAL

BROWN/MARKS MOVED TO APPROVE THE AGENDA AS WRITTEN.

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

PUBLIC COMMENTS REGARDING ITEMS ON THE AGENDA

None

RECONSIDERATION

APPROVAL OF MINUTES

A. Regular Meeting Minutes January 13, 2015

BROWN/MARKS MOVED TO APPROVE THE MINUTES.

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

VISITORS

A. Steven Rouse, Executive Director, Kenai Peninsula Housing Initiatives

Mr. Rouse explained they are a Kenai Peninsula area community housing development organization whose mission is to provide a variety of affordable housing options to special needs, low income, very low income, and senior population so they can take a more active role in their own lives and the community at large. The community housing development organization is a federally identified moniker and its chief benefit is to allow them to access federal funds set aside for these organizations to gain subsidy funding for low income and special needs housing projects. He provided history on the establishment of the Kenai Peninsula Housing Initiatives (KPHI) which was founded in 1997. Today they have an inventory of $20 million in property, approximately 138 units of affordable housing, special needs housing, or senior housing. Another 42 units have been developed for other organizations. He reviewed reviewed the properties that have been developed in Homer.

He explained as a not for profit developer, they cannot distribute their profit to their board of directors; it goes back into their program of work. They are closely monitored by the state and federal government on how they develop, who they rent to, what they charge, and how their properties are maintained. He added that all of their properties carry debt. They approach it as other developers would in looking at what the potential income would be, factor in a vacancy rate, and subtract anticipated expenses to come up with net operating income. The debt coverage ratio is applied to the net operating income to determine how much term loan debt can be obtain to help fund a project. Term loan debt doesn't cover a project and that is where the grants, state, and federal funding come in. Most developers don't get in to low income housing is because they can't charge enough rent to cover their investment. The not for profit community housing development organization comes in and invests their own proceeds, works with donors, communities, boroughs, and the state to try to get contribution to a project and applies for competitive grants. He reviewed the percentages that are used in determining what is low income and very low income, ranging from 60% down to 30% of the area median income.

Regarding challenges for developing in Homer, Mr. Rouse cited the cost and limited availability of land suitable for development and the water costs. The water cost for his projects in Soldotna are 1/6th of Homer's cost. The addition of natural gas made it feasible to do their most recent development of a four-plex on Mattox.

Mr. Rouse expressed that the commission's work on a tax abatement won't benefit him or other not for profit development entities, like the senior center, because they are exempt from property tax and he isn't sure what the EDC can do to effect resolve in the low income and homeless population issue. What he has learned through training and experience is the need to stimulate economic development. He thinks the City of Homer has a great opportunity to look at itself and decide what kind of economic development it wants to pursue to benefit all of its citizens, provide work for people who will no longer be low income, and lessen the need for low income housing.

In response to questions from the Commission Mr. Rouse commented regarding independent market analysis that is completed on all projects that are done and that he would provide some studies on KPHI's most recent projects. He noted that Homer has the fastest growing population of seniors on on the southern peninsula and addressed the differences in requirement for senior housing than low income housing.

Mr. Rouse also touched on the subjectivity of the notion of affordable housing. From his perspective the economic benefits of having low income housing outweigh the societal cost for not providing adequate housing, especially for low income families. In this community KPHI primarily rents to low income single mothers, most who are victims of domestic violence. He encouraged them to determine if there is the political will to serve that population, because you get the "not in my back yard" feedback from community members, but KPHI has made it work well, because of good oversight and management. There are so many societal benefits for housing and how it impacts children, you give a child a decent place to live and enough food to eat, and they will flourish. The largest issue on the Kenai Peninsula that's unaddressed is homeless teens, the hidden homeless. There are hundreds of homeless teens couch surfing on the peninsula.

Lastly, in response about economics for the community, Mr. Rouse commented that in attempting to develop the community and attract good jobs, there will always be an end of the road population that wants to get away. He encouraged they look at the city's assets and capitalize on those. Homer is diverse with the harbor, tourism, a tremendous arts community, and a passionate population relating to community involvement. A challenge he sees for Homer is that it's spread out with the spit and no real downtown business district. Transportation connectivity would be a place to look at and also expanding the port, harbor, and facilities on the spit will serve the community well.

Chair Barth called for a recess at 6:53 and the meeting reconvened at 6:59.

STAFF & COUNCIL REPORT/CHAMBER OF COMMERCE & MARINE TRADES ASSOCIATION REPORT/ COMMITTEE REPORTS/BOROUGH REPORT

Councilmember Zak reported about Council's recent action on re-appropriating state grant funds from the Waddell Way improvement project to the Public Safety Building project to get to the design phase. He said they also got information about the LNG line, which could be a big impact to the harbor if the line goes through.

Karen Zak, new Chamber of Commerce Executive Director, introduced herself and commended the chamber staff, board, and volunteers. She said the phones are ringing with people looking for information about Homer; visitors are steadily increasing, and they are getting a lot of information requests about winter time jobs and housing. She also said that chamber membership is increasing with new members and two new gold members.

Matt Alward, Vice President of the Marine Trades Association, reported that they are working with the City on a Marine Trades Promotional Video and they should be reviewing proposals soon. It will be a three minute video showcasing the marine trade services in Homer that can be shown at trade shows, and also on YouTube. He said they just finished a series of Focus on Learning classes at the High School on Friday afternoons for six weeks, to help introduce students to the marine trades, the type of work available and wages to let the kids know there are good jobs in town. 32 kids participated, and the association is already planning on how to expand the program next year and working with the school board to establish some actual classes. FFA has a new state rep that was in town and wanting to get it going again, which could bring federal funds. Part of FFA is marine tech, so they are hoping to get a partnership going. They are also holding college classes about commercial fishing and work

boats. This is a starting point on educating, but without giving the young people the skills to work, we are failing the big picture.

They discussed the challenges of training an up and coming workforce. Mr. Alward said that he and another board member are on the industry advisory committee for the Alaska Maritime Workforce development plan that came out last fall. The committee is trying to guide the plan and work on how to implement it.

PUBLIC HEARINGS

PENDING BUSINESS

A. Affordable Housing
   i. Staff Report affordable housing follow up from February 10, 2015

Community and Economic Development Coordinator Koester and the Commission worked through the three concepts that were addressed in the staff report.

Regarding the tax deferment some commissioners were inclined to put the idea on hold. Because of comments from Mr. Rouse and other staff feedback on the process, it doesn't seem like this is the best direction right now. Other commissioners felt it is still an idea worth pursuing. Commissioner Brown said he would work with Commissioner Arno to put together a tax incentive recommendation to discuss at the next meeting.

Regarding reducing lot sizes in the residential districts, the group reviewed the zoning map spoke briefly and made no recommendation for future discussion on the concept

Regarding assessments issued to newly created lots through subdivision, the commission recognized that it could be beneficial to look at options to reduce the cost of water and sewer assessment to property owners who may want to subdivide. They also acknowledged that other property owners in the assessment district may not be responsive to the idea of newly created lots not paying their share in the cost of assessment. Chair Barth said he would work to gather some information on this topic for the next meeting.

NEW BUSINESS

None

INFORMATIONAL ITEMS

A. City Manager's Report March 9, 2015

COMMENTS OF THE AUDIENCE

Larry Slone, city resident, commented that it's a fact of life in Homer that there is a significant portion of the populous that does not want economic development or want the town to grow. He touched on

Homer Affordable Housing Recommendations

The Homer Economic Development Advisory Commission was directed and tasked by the Homer City Council to consider options for “Affordable Housing”. The goal was to provide practical and cost effective recommendations to our City Council. These recommendations would enable our Council to craft a proactive agenda of incentives with the goal of motivating an increase of new housing construction.

The results of Homer “Affordable Housing” would yield:

1. Increased construction; jobs and economic stimulus
2. Increased residency; new, long-term, stable and year round
3. Increased school enrollment; especially new young families to area
4. Increased general community prosperity; usage of goods and services
5. Generate increased tax revenues; balance budgets and fund projects

Many months of discussions included the review of historical housing data including testimony by government, financial, business, construction entities and residents. The emphasis was originally on new residential single housing units but we expanded our overview to include considering new businesses and new rental housing construction.

The topic of “Affordable Housing” encompasses a broad range of applications. The commission decided a further distinction was needed as we dissected this housing issue. Dedicated domiciles for vulnerable communities including special needs residency, low income dwellings and elderly housing along with the topic of upgrades and expansions to existing structures of housing and commercial businesses would be excluded. These items may be addressed as separate topics with different and distinct goals if the Homer City Council should direct the commission to pursue these issues.

As for “Affordable Housing” within our city, the greatest challenge is simple economics. “Build it and they will come!” is not a practical cost-effective solution in Homer.

The following reference quotes will provide an overview of Property Tax Incentives.

Rethinking Property Tax Incentives for Business / Policy Focus Report
Lincoln Institute of Land Policy / Daphne Kenyon, Adam Langley, Bethany Paquin

After the Great Recession, many local governments now have two major goals:

1) To spur economic growth to address high unemployment and stagnant or declining incomes, and
2) To protect their tax base in the wake of cuts in state aid to local governments and the collapse of the housing market.

In hopes of attracting new manufacturing plants, corporate headquarters, or research and development centers, many localities have offered property tax incentives. But are local governments giving away more of their tax base than can be justified by the economic benefits received?

One New England example illustrates how costly Property Tax Incentives may be. In Connecticut for fiscal year 2009, property-tax exemptions for machinery and equipment reduced potential local revenues by $57.3 million while enterprise zone property tax abatements cost the state and its local governments $14.5 million. The combined cost of these two incentives could have paid salaries for 1,000 Connecticut teachers.

The average manufacturing plant, for example,
SPENDS NEARLY 75 TIMES MORE ON LABOR THAN ON PROPERTY TAXES

TOTAL BUSINESS COSTS ARE SLIGHTLY IMPACTED BY PROPERTY TAXES
SINCE IT IS A SMALL PERCENTAGE AND SHARE OF TOTAL BUSINESS COSTS

WHY DO BUSINESSES PAY PROPERTY TAXES?
TO FUND SERVICES RECEIVED!

In order to put Property Tax Incentives in the proper context, it is important to consider reasons for requiring property taxes. Communities generally believe that commercial and industrial properties pay more in taxes than it costs to provide services to them.

Property Tax Payments in 3 State Comparisons

State	Residential %	Commercial/Industrial %	Other %
• Alaska	59.7	22.4	17.9
• Oregon	52.5	19.0	28.5
• Washington	75.4	16.6	8.0

As viewed by this chart, Alaska residents bear the great share of Property Taxes

HOMER - ART CAPTIAL OF ALASKA

It is worth noting at this point that my research led to studying Silicon Valley. Since Homer is the ARTS Capital of ALASKA, we may glean the historic confluence of factors which created such a dynamic “Silicon” economy. If we implement similar development practices, foster appropriate laws especially intellectual property and gather our pool of artists and venture capitalists locally, I believe a vibrant and profitable economy may be nurtured, nourished and mentored.

Trying To Replicate Silicon Valley

While there have been many efforts to foster high-tech development, replicating Silicon Valley is highly unlikely. Currid-Halkett and Stolarick (2011, 151) found 70 cases of “Siliconias” in a survey of economic development practices, but little evidence of success. Silicon Valley emerged under a unique set of circumstances—including a highly entrepreneurial culture, laws regarding intellectual property, and a critical mass of scientists, engineers, and venture capitalists —that does not exist in most parts of the world (Lehrer 2012).

My observations, recommendations and conclusions:

I do not believe Property Tax Incentives are sufficient catalysts to motivate commitment for new construction of family residential housing, new business buildings or new additional rental units in Homer.

Demand for these options depends solely upon an owner, tenant, or resident with the economics and income to willingly justify locating, building, residing and doing business in Homer rather than other locations vs. not at all.
(Note: Homer utilities are extremely high operation costs)

The amount of financial consideration for tax incentive relief is not sufficient to IMPACT DECISIONS TO MOTIVATE NEW CONSTRUCTION FOR TWO REASONS:
1) Percentage of savings within a construction budget is not adequate or
2) Homer City concessions would become too great for budget justification.

There simply is not sufficient ROI, (Return-On-Investment) by this plan to justify and implement Property Tax Incentives.

CONCLUSION: HOMER ECONOMIC DEVELOPMENT ADVISORY COMMISSION SHOULD NOT RECOMMEND PROPERTY TAX INCENTIVES FOR NEW RESIDENTIAL OR COMMERCIAL BUILDING TO CREATE “AFFORDABLE HOUSING”.

Suggested recommendations:

Recommend to the Homer City Council with Strategic-Logistics: a proactive action plan for seeking, promoting and securing new businesses within Homer according to the Homer Comprehensive Economic Development Strategy.

I acknowledge our Homer Chamber of Commerce is tasked with this endeavor of attracting new businesses to our region. Yet the Chamber is overburdened by the responsibilities of day-to-day operations and accountable for all seasonal activities with limited budget and personnel.

NOW is the ideal time to INVEST in attracting and securing new Homer businesses.

Past practices and previous plans have not accomplished the goals of our Homer Comprehensive Plan which is to be prosperous:

- Business - New and thriving businesses supporting our economic base
- Housing - New and ongoing housing construction for relocating families
- Tax Base - Sufficient budget revenues from a thriving tax base

Seizing opportunities with strategic planning is: “Putting your HOME in HOMER!”

Respectfully,
---Patrick Brown Vice-Chair Homer Economic Development Advisory Commission

STAFF & COUNCIL REPORT/CHAMBER OF COMMERCE & MARINE TRADES ASSOCIATION REPORT/ COMMITTEE REPORTS/BOROUGH REPORT

Kate Mitchell, Marine Trades Representative, provided the group with a synopsis of the Marine Trades Association Meeting. She explained they are a self-funded group of about 65 to 70 business owners. They partner with the Port of Homer in development and manning a booth at Pacific Marine Expo. She commented about the workforce development program and the classes they are doing at the high school and college that are sponsored by Marine Trades. They hope to have more activities scheduled for next year. They have been marketing Homer as a place to get boat work done and advertised in Pacific Marine Magazine, Workboat Magazine, Pacific Fishing, and a few others. They are working to find trained people and get training available for people to fill those work place jobs. She addressed challenges of getting funding to make programs available to train in the industry and commented that the Marine Trades promotional video should be ready in the fall, in time for the Marine Trades Expo.

PUBLIC HEARINGS

PENDING BUSINESS

A. Affordable Housing
   i. Memo from Deputy City Clerk re: Special Assessment Districts
   ii. Tax incentive recommendation from Commissioner Brow
   iii. Public comment from Larry Slone

The Commission briefly discussed the memo regarding Special Assessment Districts that was included in the packet. City Manager Koester and City Planner Abboud provided feedback to the Commission about other options such as sun-setting the assessment after a number of years or tiered option of assessing lots that are created through subdivision. There was some general discussion about zoning, density, and lot sizes in the residential districts.

The Commission agreed that they would like to have a staff report that includes the suggestions raised by the City Planner for consideration at their next meeting. They also acknowledged the need to receive input from property owners currently involved in assessment districts.

Vice Chair Brown reviewed his tax incentive recommendation that was included in the packet. He added that after he submitted the recommendation he received some input from Commissioner Arno and deferred to him to share his recommendation.

Commissioner Arno suggested a seven year trial period on all new construction on undeveloped property whether residential or commercial, to waive city taxes on improvement to the property for a period of ten years. This would not apply to additions on homes or businesses, only new construction.

Benefits addressed included promoting development, increasing housing, creating jobs, attracting new business, increased water and sewer customers, and attracting new users to the sales tax base. It opens the door to Homer, not just targeting a certain group.

Concern was expressed that incentivizing someone to build a $300,000 home or a second seasonal home isn't going to address the affordable housing need. It was also suggested that an open ended incentive like this doesn't necessarily promote affordable year round opportunities. Seasonal home owners increase the sales tax base for just a few months. The larger portion of the months they aren't here finds a lot of businesses struggling to stay open, leaving fewer choices for those who do live here year round. It also impacts business owners who are able to provide jobs to meet a higher demand in the busy months and struggle to have those jobs available when the seasonal people leave.

The Commission agreed that after a lot of consideration over many meetings they are at an impasse with what would be most beneficial regarding a tax incentive. They recognized that the possibility of LNG development in our area may have a positive impact on the job and housing market that would negate the potential benefits of a tax incentive. It was the consensus of the Commission to remove tax incentives from the Commissions business.

The Commission acknowledged the public comments from Mr. Slone included in their packet.

NEW BUSINESS

A. Land Allocation Plan

The Commission reviewed information in the Land Allocation Plan and talked with City Planner Abboud about parcels the city owns that could possibly be sold. They specifically addressed the parcel on Main Street listed on page D-3 and the potential of the lot for a developer who may want to remove some fill to develop or that it would lend well to a two story building with an upper and lower access similar to the Kachemak Bay Title building. They also talked about the lots in the Lillian Walli Subdivision area including efforts toward resolving restrictions in the subdivision agreement that have been in place for many years.

ARNO/FRIEDLANDER MOVED TO RECOMMEND THE SALE OF THE PARCEL ON MAIN STREET, PARCEL NUMBER 175-144-16, AND ALSO SELL THE LOTS IN LILLIAN WALLI ESTATES SUBDIVISION, LOTS 60, 65, 66, 67, 70, 57, 58, AND 59, WITH THE EXCEPTION OF POSSIBLY KEEPING ONE OF THOSE LOTS FOR A PARK.

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

INFORMATIONAL ITEMS

A. City Managers Report
B. LNG Info

Commissioner Marks said she would like to have new business items to discuss more specifics about the potential of LNG and what it would do economically for the harbor and the rest of the community.

From: Patrick Brown <pbrown5@yahoo.com>
Sent: Tuesday, April 28, 2015 4:10 PM
To: Melissa Jacobsen
Cc: Mike Barth
Subject: Homer Economic Development Advisory Board Proposal
Attachments: Homer Econ Incentive Proposal.doc

Homer Economic Development Advisory Board Proposal

I am asking this recommendation be included in our next meeting as new business.
Respectfully,
Patrick Brown
Vice-Chair
Homer Economic Development Advisory Board

New Business and Housing Incentives on Homer Undeveloped Land

1) 7 year trial period
2) All new construction, (business and residential) on UNDEVELOPED LAND
   Note: applies to new construction only, not additions
3) Waive city taxes on improvements for a period of 10 years

Benefits:

- Promoting development on undeveloped land available in Homer
- Promoting and attracting new businesses
- Promoting Living Wage Jobs by local industries and increased support services
- Increasing use and service fee infrastructures of city; sewer, water, gas, electric
- Promoting new users to sales tax base, not just a target group of individuals
- Promoting and encouraging a base for construction which includes anticipating the LNG Pipeline benefits

Assistant City Manager. He has a great back ground in economic development research and public relations, and he will be working with the commission.

Karen Zak, Chamber Director, reported chamber staff is busy planning for the 4th of July parade. Clem Tillion will be the Grand Marshall and this year's theme is "Pioneer Times, a Salute to our Heritage". They are working to locate pioneers in the area to come join in. They also want to put together a display at the senior center for people to learn about our heritage and also book signings at the book store, to make it a full festival for pioneer times and educate the community as well as our visitors. She also reported they will be hosting the Irish Ambassador at the Chamber and she will send an invitation. The second cruise ship was in port today and they have 8 volunteers meet the ship and give information to passengers about walking through town and chamber members. They feel like the largest contingency of visitors in the next 2 to 5 years will be from cruise ship passengers who return. Lastly she reported they are getting ready for the new visitor guide, the photo contest is going on and they have sent out renewals for advertisers and members.

In response to questions she noted that there are nine cruise ships anticipated for this season and gave some more details about the parade schedule.

PUBLIC HEARINGS

PENDING BUSINESS

A. Affordable Housing
   i. Tax Incentive Recommendation from Commissioner Brown
   ii. Memo from City Planner Abboud re: Special Assessment Districts

Commissioner Brown addressed his recommendation relating to tax incentives that was provided in the packet. He talked about research he has done relating to tax incentives done for businesses in cities such as Chicago and which brought in more infrastructure for development. His proposal is that there would be an incentive with builders so they would be motivated to build in Homer and be able to help the city develop its infrastructure that it isn't going to do currently through any other means or way. He touched on issues relating to development of infrastructure and recouping development costs when new development occurs and challenges to developers.

Chair Barth noted his understanding that this is tailored to undeveloped land. Commissioner Brown concurred that it's targeted at undeveloped land that would be creating new business, single family housing, or multi family dwelling. The incentive is to motivate builders to put the infrastructure in for gas and water/sewer lines. His definition of undeveloped would be land where there is no infrastructure, and if they already have infrastructure running through the street and putting a house on a lot, he wouldn't necessarily consider that undeveloped land.

Commissioner Arno countered that his idea of undeveloped is a vacant lot even if there is water and sewer to the property. His original idea was blanket policy that if there isn't a structure on the property then taxes would be waived for a new structure. He thought it may be reasonable to offer an incentive to someone developing a subdivision who is putting in the infrastructure. Commissioner Brown concurred.

Chair Barth expressed his concerns relating to the broadness of the recommendation having negative impacts as well as positive. It's too broad in the aspects that the city doesn't have enough control over incentivizing some of these things and he isn't comfortable with problems it could raise. Also the additional logistics of working out the tax rolls can be a complicated problem, especially when staff is working hard with what they have and state budget issues that will pass down to our city. He has concerns with burdening city administration with having to develop something that could be costly initially, albeit there could be a future return.

Commissioner Friedlander supports the Commissioner Brown's recommendations because this will help the long term growth of the city. He also supports a sunset clause for the incentive.

Commissioner Marks commented if this is part of a package that has proactive information to provide to businesses that may be interested in coming into the community it could be beneficial. It would be really important to get the information out and be proactive in showing there are other types of economic development that would make people want to put a business or homes here. She also questioned that if in the short term there is less money, how do you get the community on top of less spending to be able to provide these incentives to create more of a business or building boom, so it can get to a point where money is coming back into the community.

There was discussion about the importance of marketing and promotion to showcase the advantages of Homer. Commissioner Brown commented it isn't that costly or extensive to extend that as a part of marketing Homer as a choice of place to live and work. Mr. Brown commented in the models he studied is that the first three years there is next to no activity at all, so minimal impact. In year's three to seven is when things pick up. No one else in the state is doing anything like this and the advantage is it will encourage people who are thinking of a place to develop new businesses and residences that this would be the location.

There were further comments concerning not having a cap on the type of development because there is little control over what can be built; keeping it open ended to promote development and increasing infrastructure; and what other communities in the lower 48 have been doing.

BROWN/ARNO MOVED THAT THE RECOMMENDATION FOR THIS PROPOSAL TO GO FORWARD FOR CITY COUNCIL TO CONSIDER WITH THE OUTLINE HE HAS SUGGESTED:

New Business and Housing Incentives on Homer Undeveloped Land

1) *7 year trial period*
2) *All new construction, (business and residential) on UNDEVELOPED LAND*
   Note: applies to new construction only, not additions
3) *Waive city taxes on improvements for a period of 10 years*

Benefits:

- *Promoting development on undeveloped land available in Homer*
- *Promoting and attracting new businesses*
- *Promoting Living Wage Jobs by local industries and increased support services*
- *Increasing use and service fee infrastructures of city; sewer, water, gas, electric*

- *Promoting new users to sales tax base, not just a target group of individuals*
- *Promoting and encouraging a base for construction which includes anticipating the LNG Pipeline benefits*

There was discussion confirming that undeveloped land includes land without infrastructure and also land that has services available but no structure.

City Manager Koester notes she isn't sure this gives Council enough direction for an action, but it can go forward and council can send it back to the commission if they need more information or send it to the attorney if they choose to move forward with it.

Chamber Director Zak commented that she has lived in a city where they have done development incentives and a caveat the city had was the business had to employ a certain number of people in order for it to be an economic development project. She raised the question that if a company comes and receives an incentive and then goes out of business would they be required to pay back the tax that was exempted? If they went out of business after five years and we gave them a tax break, we get nothing out of it. She understands the need to put a little more structure into the recommendation to protect the city. Mrs. Zak also touched on a suggestion to incentivize using the abandoned and empty buildings in town.

VOTE: YES: ARNO, MARKS, FRIEDLANDER, BROWN
NO: BARTH

Motion carried.

Chair Barth opened the floor to discussion of the memorandum regarding special assessment districts.

The commission addressed the recommendations and thought option one or two would be acceptable.
1. That the district stops collecting at the payoff date or other date specific;
2. That a formula be considered for a decreasing amount to be be collected until zeroing out at the payoff or other specific date.
3. Do nothing.

City Manager Koester gave an overview of the current assessment policy in place for special assessment districts and noted that for the natural gas line special assessment district council adopted a two year termination date. That is a unique district however, in that the city doesn't own the infrastructure.

The commission discussed that the city doesn't benefit from the assessments to newly created lots, but the property owners do to some degree. They acknowledged that some property owners may not agree with doing away with assessments to newly created lots but agreed it is worth putting forward to council for consideration. They also addressed a five year sunset in conjunction with option one to where people are making an investment and are committed to development.

BROWN/ FRIEDLANDER RECOMMENDED THE NUMBER ONE SOLUTION AS PART OF A FAIRNESS DOCTRINE WITH A FIVE YEAR SUNSET CLAUSE FOR THE PAY OFF DATE TO ASSIST THOSE OWNERS.

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

NEW BUSINESS

INFORMATIONAL ITEMS

A. City Manager's Report May 26, 2015
B. Resolution 15-030(A) Adopting the Land Allocation Plan
C. Resolution 15-032 Partially Releasing the Development Covenant of the Lillian Walli Estates Subdivision

There was discussion regarding the float debris referenced in the City Manager's report and City Manager Koester commented that the city working with the contractor and also creating language for upcoming contracts to help ensure this doesn't continue to be a problem with future projects.

City Manager Koester also commented about the Blue Crest project near Anchor Point for an on shore rig drilling directionally off shore. There are public meetings scheduled. The bigger LNG project is a big push to bring North Slope natural gas to Nikiski to a liquefication plant and then export it. The state and producers have invested a lot of money into the feasibility stage of it. It's an important project for the state and would benefit Homer in that our port would be used for constructing line and support. This is more on the five year horizon, where Blue Crest is happening this summer.

COMMENTS OF THE AUDIENCE

COMMENTS OF CITY STAFF

City Manager Koester congratulated the Commission on their motions tonight. Although she will no longer be the Commission's staff person, she will still be around.

COMMENTS OF THE COUNCILMEMBER

COMMENTS OF THE CHAIR

Chair Barth thanked the group for their work.

COMMENTS OF THE COMMISSION

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Memorandum 15-099

TO: MAYOR WYTHE AND HOMER CITY COUNCIL

FROM: MELISSA JACOBSEN, CMC, DEPUTY CITY CLERK

DATE: JUNE 22, 2015

SUBJECT: ECONOMIC DEVELOPMENT COMMISSION RECOMMENDATION REGARDING SPECIAL ASSESSMENT DISTRICTS LEVY OF ASSESSMENT AFTER SUBDIVISION

Throughout the course of discussion by the Economic Development Advisory Commission related to affordable housing, the Commission considered the impact of the Special Assessment District process, specifically related to the assessment of newly created lots within a district. It was the consensus of the Commission that the current methodology of levying an assessment on a newly created lot is a deterrent for property owners to subdivide larger lots. The Commission believes adding the full cost of the assessment along with the subdivision costs drives up the cost of the smaller lots making them more difficult to sell. The Commission also finds this inhibits a developer's opportunity to build affordable homes within the city.

At the June 9, 2015 regular meeting the Commission considered the following three options:

1. That the district stops collecting at the payoff date or other date specific;
2. That a formula be considered for a decreasing amount to be be collected until zeroing out at the payoff or other specific date.
3. Do nothing.

They agreed unanimously to recommend option 1, that the district stops collecting at the payoff date, or other date specific, adding that it have a 5 year sunset for collections.

BROWN/ FRIEDLANDER RECOMMENDED THE NUMBER ONE SOLUTION AS PART OF A FAIRNESS DOCTRINE WITH A FIVE YEAR SUNSET CLAUSE FOR THE PAY OFF DATE TO ASSIST THOSE OWNERS.

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

RECOMMENDATION: Consider the proposal from the Economic Development Advisory Commission and determine whether to bring forward an ordinance to amend Title 17 relating to subdivision after levy of assessments.

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Memorandum

TO: CHAIR BARTH AND THE ECONOMIC DEVELOPMENT ADVISORY COMMISSION

FROM: MELISSA JACOBSEN, CMC, DEPUTY CITY CLERK

DATE: MARCH 16, 2015

SUBJECT: SPECIAL ASSESSMENT DISTRICTS

In 1999, City of Homer voters approved dedicating ¾ of one percent of city sales tax to the Homer Accelerated Water Sewer Program (HAWSP) to be used to pay off sewer debt. Upon satisfaction of the sewer debt, the ¾ of one percent of city sales tax would continue and be used for water and/or sewer system improvements. At that time property owners who successfully initiated an assessment district for water and/or sewer paid 50% and the city paid 50% of the cost of the improvement. In 2001, Resolution 01-21 amended the payment to where it currently stands today, the city paying 25% and the property owner paying 75%. The monies collected through the HAWSP fund are used toward the city's portion of the improvements.

Homer City Code chapter 17 outlines the process for property owners to initiate a Special Assessment District (SAD). HCC 17.04.100 states that upon the subdivision of a property assessed as a single parcel, the amount of the assessment shall be allocated among the resulting lots that benefit from the improvement on the same basis that the assessment originally was allocated. Some of the property owner costs for more recent water/sewer assessments are as follows:

- Hillside Acres: $16,795.18 water & $11,464.29 sewer
- East End Road: $15,689.97 water & $20,721.26 sewer
- Kachemak Drive Phase I $18,566.79 water & $17,317.71 sewer
- Kachemak Drive Phase II $34,140.80 combined water & sewer

I reviewed the codes for other cities in the Kenai Peninsula Borough, as well as the Borough's code relating to assessment districts.

The City of Soldotna has the discretion to match funds for special assessment districts and attached is a copy of their Resolution 2013-011 that outlines their matching funds policy.

The City of Kenai typically does a split of 50% paid by the property owner and 50% paid by the city.

Regarding subdivision after assessment, the City of Soldotna and the City of Kenai will prorate the the amount of principal and interest due between or among the subdivided or resubdivided lots in proportion to the benefitted area contained in each. (*Soldotna City Code 3.18.140 and Kenai City Code 16.20.070*)

The City of Seward assesses benefitted property owners the cost of the improvement and their Council may determine upon and use any method for spreading the assessment among the properties within the district, which bears a reasonable relationship to the benefit received by the properties. (*Seward Code of Ordinances 5.20.035*)
It doesn't address subdivision after the assessment is levied.

The Kenai Peninsula Borough assesses properties at 100% of the cost of the improvement per lot and if a property subdivides, the cost stays with the original lot and the newly created lot has no additional assessment.

With regard to City of Homer road improvements, in 1987 voters approved dedication ¾% for partially funding street improvements for a term of 20 years through the Homer Accelerated Roads Program (HARP). In 2006 the voters approved an extension of the dedication for up to 20 years and amended the program to the Homer Accelerated Roads & Trails Program (HART) and expanded the use of funds to upgrade streets, new city streets, and new city non-motorized trails.

Property owners can also initiate road improvements through the Special Assessment District process. The costs of the improvements are assessed by the front footage of property being benefited. The cost is set at $30 per front foot for road reconstruction and $17 per front foot for paving. Corner lots are exempt from a double front footage assessment and are charged on the longest side of the lot. Because road are are not assessed on a per lot basis, but on a dimension of the lot size, no additional assessment occurs if a property is subdivided.

A recently completed project was Crittenden, Waddell Street and Waddell Road. One of the Ocean Shores Motel's properties has the longest front footage in that district at 387.90' and was assessed $18,231.30. Most of the residential lots have 60' of front footage and were assessed $2,820.00. The Waddell Street was already constructed to city standards and those property owners only participated in the paving portion ($17 per front foot) of the improvement being assessed and costs ranging from 166.2' being assessed $2,825.40 down to 72.8' being assessed $1,237.60.

RECOMMENDATION: Discuss and determine whether or not the Commission wants to draft a recommendation to amend the requirement that upon the subdivision of a property assessed as a single parcel, the amount of the assessment being allocated among the resulting lots that benefit from the improvement on the same basis that the assessment originally was allocated. Provide direction to staff accordingly.

STAFF & COUNCIL REPORT/CHAMBER OF COMMERCE & MARINE TRADES ASSOCIATION REPORT/ COMMITTEE REPORTS/BOROUGH REPORT

Kate Mitchell, Marine Trades Representative, provided the group with a synopsis of the Marine Trades Association Meeting. She explained they are a self-funded group of about 65 to 70 business owners. They partner with the Port of Homer in development and manning a booth at Pacific Marine Expo. She commented about the workforce development program and the classes they are doing at the high school and college that are sponsored by Marine Trades. They hope to have more activities scheduled for next year. They have been marketing Homer as a place to get boat work done and advertised in Pacific Marine Magazine, Workboat Magazine, Pacific Fishing, and a few others. They are working to find trained people and get training available for people to fill those work place jobs. She addressed challenges of getting funding to make programs available to train in the industry and commented that the Marine Trades promotional video should be ready in the fall, in time for the Marine Trades Expo.

PUBLIC HEARINGS

PENDING BUSINESS

A. Affordable Housing
   i. Memo from Deputy City Clerk re: Special Assessment Districts
   ii. Tax incentive recommendation from Commissioner Brow
   iii. Public comment from Larry Slone

The Commission briefly discussed the memo regarding Special Assessment Districts that was included in the packet. City Manager Koester and City Planner Abboud provided feedback to the Commission about other options such as sun-setting the assessment after a number of years or tiered option of assessing lots that are created through subdivision. There was some general discussion about zoning, density, and lot sizes in the residential districts.

The Commission agreed that they would like to have a staff report that includes the suggestions raised by the City Planner for consideration at their next meeting. They also acknowledged the need to receive input from property owners currently involved in assessment districts.

Vice Chair Brown reviewed his tax incentive recommendation that was included in the packet. He added that after he submitted the recommendation he received some input from Commissioner Arno and deferred to him to share his recommendation.

Commissioner Arno suggested a seven year trial period on all new construction on undeveloped property whether residential or commercial, to waive city taxes on improvement to the property for a period of ten years. This would not apply to additions on homes or businesses, only new construction.

Benefits addressed included promoting development, increasing housing, creating jobs, attracting new business, increased water and sewer customers, and attracting new users to the sales tax base. It opens the door to Homer, not just targeting a certain group.

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M E M O R A N D U M 15-

TO: ECONOMIC DEVELOPMENT COMMISSION

THROUGH KATIE KOESTER, CITY MANAGER

FROM: RICK ABBOUD, CITY PLANNER

DATE: MAY 5, 2015

SUBJECT: LID/SAD ASSESSMENTS

After discussion of assessments at the April 14th meeting of the Commission, The Commission still wished to review options that might encourage subdivision and the greater utilization of built infrastructure where current projects have been completed. It was my understanding that this subject was brought up under the discussion of affordable housing as a policy that might contribute to bringing down the cost.

I have researched how changing the current policy of charging a new assessment might play out in a representative example. The Hillside Acres LID is a relatively expensive and has good opportunity for subdivision. The original costs were $15,745 for water and $11,103 for sewer (for the following example I have made assumptions for discussion only and the real numbers and scenario may not be entirely accurate). The payoff year is 2027, so the original lots in the district have been paying for 8 years, if financed, and have 12 years to go. The creation of one more lot would require the payment of $26,848 that would be distributed to the remaining 39 customer that would receive $671 each. This is an example of what those in the district might forego if the policy changes.

I propose the consideration of three options. 1.) Recommend that the district stop collecting at the payoff date or other date specific. 2.) Recommend that a formula be considered for a decreasing amount to be collected until zeroing out at the payoff date or other specific date. 3.) Do nothing.

Discussion

1.) A provision is not spelled out in code right now stating exactly when this policy of collecting for new subdivisions ends. Ideally it should be clearly stated in the enacting policy for each LID. I am unaware that this was ever done. It is my understanding that this policy has come onboard retroactively for LID's established before 2005. Recommending this option would require the City Attorney to review the policy and make an analysis as to how it might work on current LID's. One recommendation that should be made regardless is that the policy be clearly documented in all future LID/SAD's.

2.) This is just the first recommendation with some additional requirements. My suggestion for the start of conversation would be to consider collection of the full amount for 10 years and then amortize the rest of the assessment to a value of zero at the end of the payoff year. This would give members of the original district a reasonable amount of time to benefit while increasing the benefits of subdividing as time goes on.
3.) Do nothing is always an option. This should still come with the review of the attorney as to what exactly is the status of the policy. It may be that we should not be collecting this money past a specific date right now. A documented opinion from the attorney could clear up some contentions.

Staff Recommendation: Pick and option with a motion for the consideration of the City Council, make amending motions if appropriate.

- *Promoting new users to sales tax base, not just a target group of individuals*
- *Promoting and encouraging a base for construction which includes anticipating the LNG Pipeline benefits*

There was discussion confirming that undeveloped land includes land without infrastructure and also land that has services available but no structure.

City Manager Koester notes she isn't sure this gives Council enough direction for an action, but it can go forward and council can send it back to the commission if they need more information or send it to the attorney if they choose to move forward with it.

Chamber Director Zak commented that she has lived in a city where they have done development incentives and a caveat the city had was the business had to employ a certain number of people in order for it to be an economic development project. She raised the question that if a company comes and receives an incentive and then goes out of business would they be required to pay back the tax that was exempted? If they went out of business after five years and we gave them a tax break, we get nothing out of it. She understands the need to put a little more structure into the recommendation to protect the city. Mrs. Zak also touched on a suggestion to incentivize using the abandoned and empty buildings in town.

VOTE: YES: ARNO, MARKS, FRIEDLANDER, BROWN
NO: BARTH

Motion carried.

Chair Barth opened the floor to discussion of the memorandum regarding special assessment districts.

The commission addressed the recommendations and thought option one or two would be acceptable.
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BROWN/ FRIEDLANDER RECOMMENDED THE NUMBER ONE SOLUTION AS PART OF A FAIRNESS DOCTRINE WITH A FIVE YEAR SUNSET CLAUSE FOR THE PAY OFF DATE TO ASSIST THOSE OWNERS.

There was no discussion.

VOTE: NON OBJECTION: UNANIMOUS CONSENT

Motion carried.

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