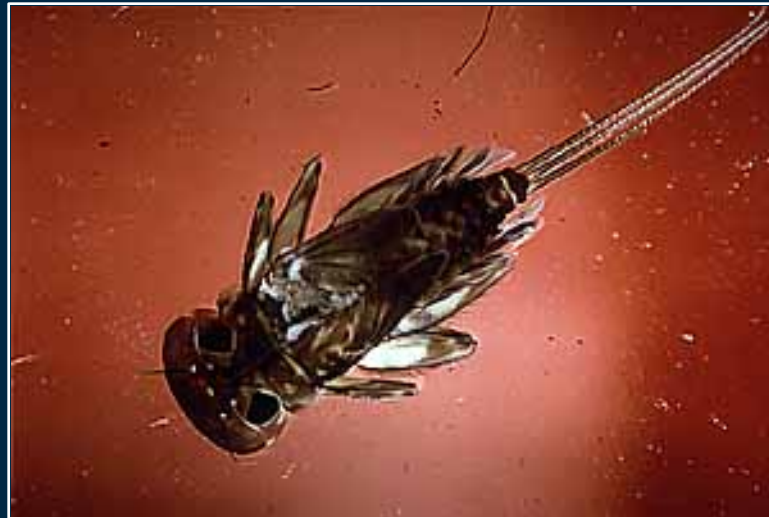


Pebble Project Macroinvertebrate and Periphyton Studies



Andra Love
October 13, 2011

Introduction/Discussion Topics

- Objectives
- Methodology and QA/QC
- Results Presented in EBD
- Summary

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Objectives

- Characterize existing macroinvertebrate and periphyton populations at select sites



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Macroinvertebrates

- Benthic Macroinvertebrates – substrate dwelling organisms that lack backbones and are visible with the naked eye
- Sensitive to WQ and habitat change
 - Cummins 1974; Karr 1981
 - Plafkin et al. 1989; Barbour et al. 1999



Diptera vs. EPT



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<http://www.usask.ca/biology/skabugs/flies/miscdip.html>

<http://ceratium.ietc.wvu.edu>

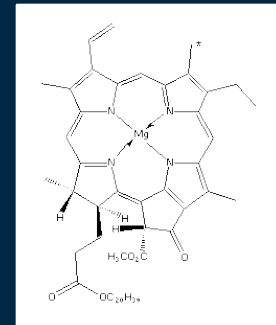
Periphyton

- Periphyton – algae attached to aquatic substrates
- Important indicator of WQ – responsive to changes
 - Stevenson 1998; Stevenson and Bahls 1999

Diatoms



Chlorophyll a



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Chlorophyll-a (C₅₅H₇₂MgN₄O₅)



<http://www.ansp.org/research/biodiv/diatompics/diatom.jpg>
<http://www.ch.ic.ac.uk/local/projects/steer/chloro.htm>

Methods

- Macroinvertebrates
 - Benthic - ASCI
 - Benthic - Surber
 - Drift
- Periphyton
 - Diatoms - RBP
 - Chlorophyll-a – ADF&G

BB Road Study Area

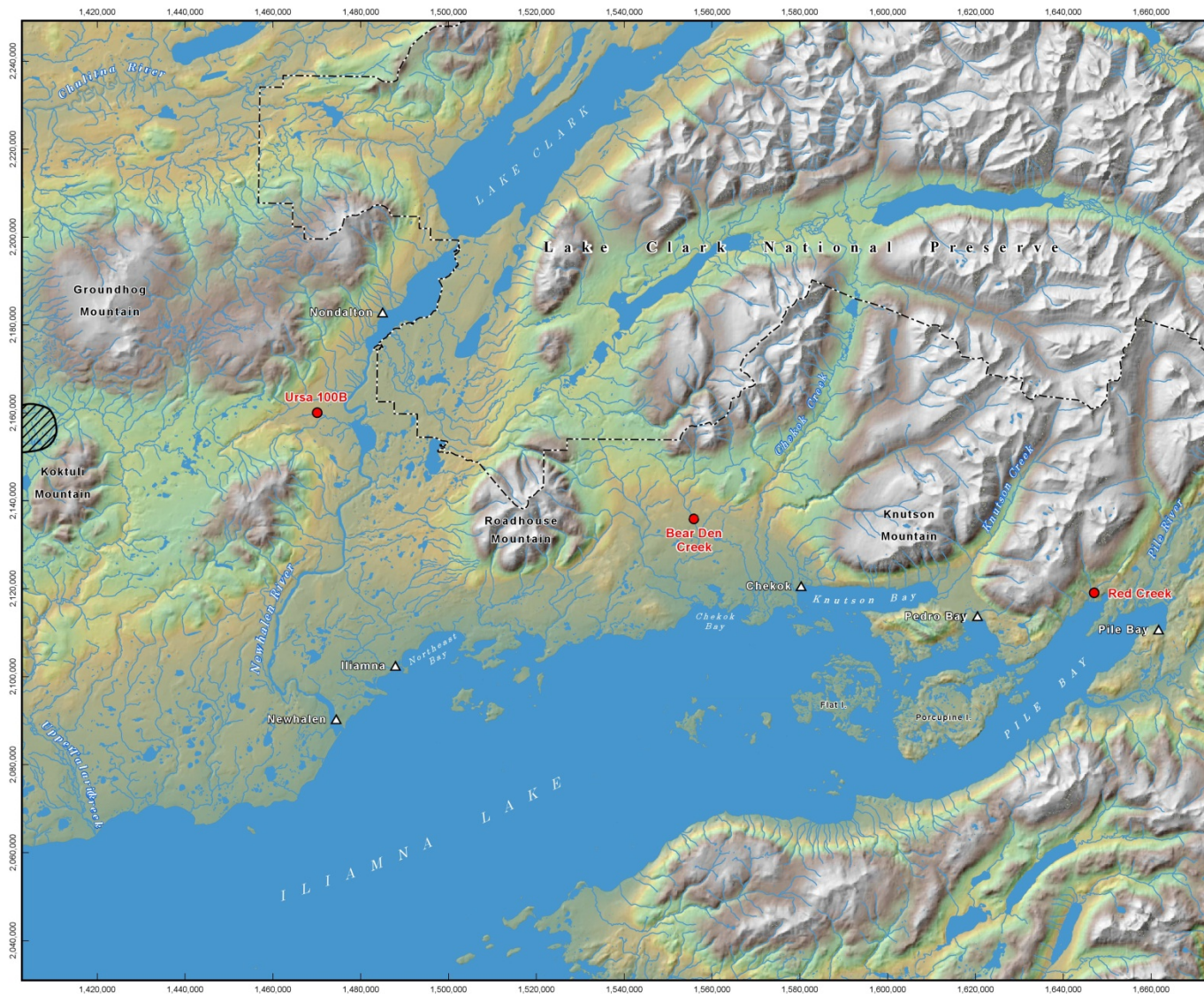
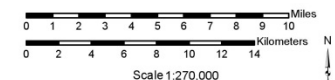


Figure 15.4-1.
Macroinvertebrate and
Periphyton Sampling Sites,
Transportation-corridor
Study Area,
Bristol Bay Drainages,
2004 and 2005

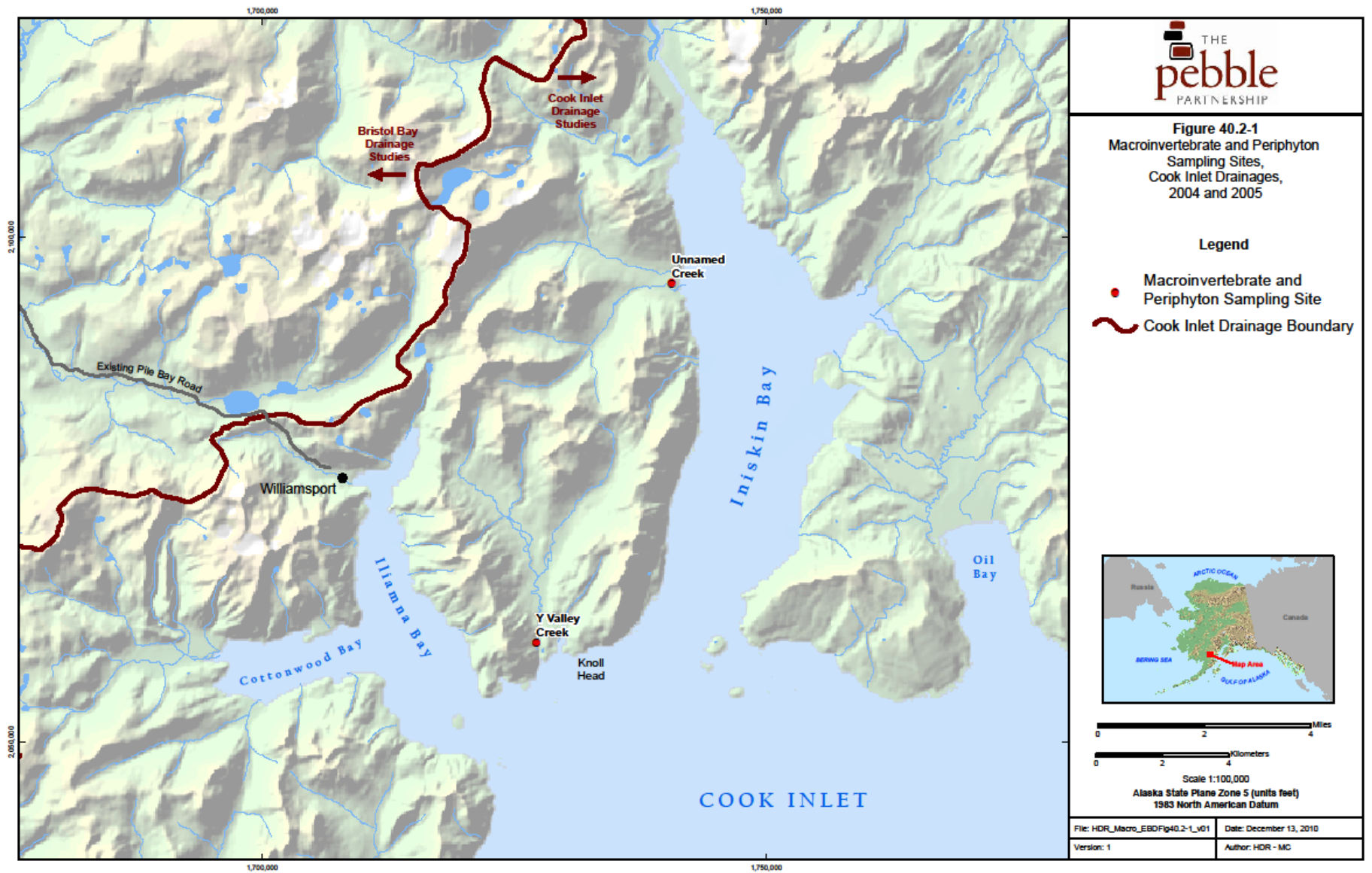
Legend

- Macroinvertebrate and Periphyton Sampling Site
- △ Communities
- ▨ General Deposit Location



Alaska State Plane Zone 5 (units feet)
 1983 North American Datum

CI Road Study Area



Macroinvertebrate Field Methodology

- ASCI (Major and Barbour 2001)
 - D-Frame Net, sample all habitats, 20 composited samples
- Surber sampling
 - Modified Surber sampler (or slack sampler), sample 5 times in one riffle, process all five individually
- Drift nets

Macroinvertebrate Laboratory Methods



- Sorting to Genus – 10% QA/QC
- ASCI subsampled to 300 count
- Most all Surber material sorted and identified

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Periphyton Field Methodology

- Diatoms
 - Rapid Bioassessment Protocols in 2004 (Barbour et al. 1999)
 - Sample all habitats, 20 composited samples
- Chlorophyll a
 - Sample 10 times in one riffle, 5 cm² sampling area, filter through 0.45 micron filter, extract water, Magnesium Carbonate (MgCO₃), process all 10 individually



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HDR

Periphyton Laboratory Methods

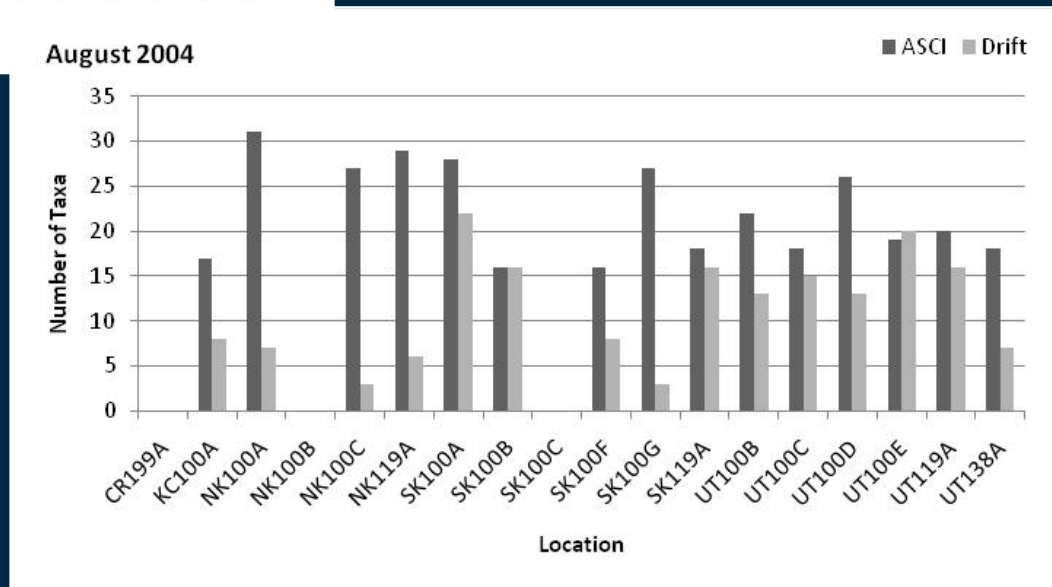
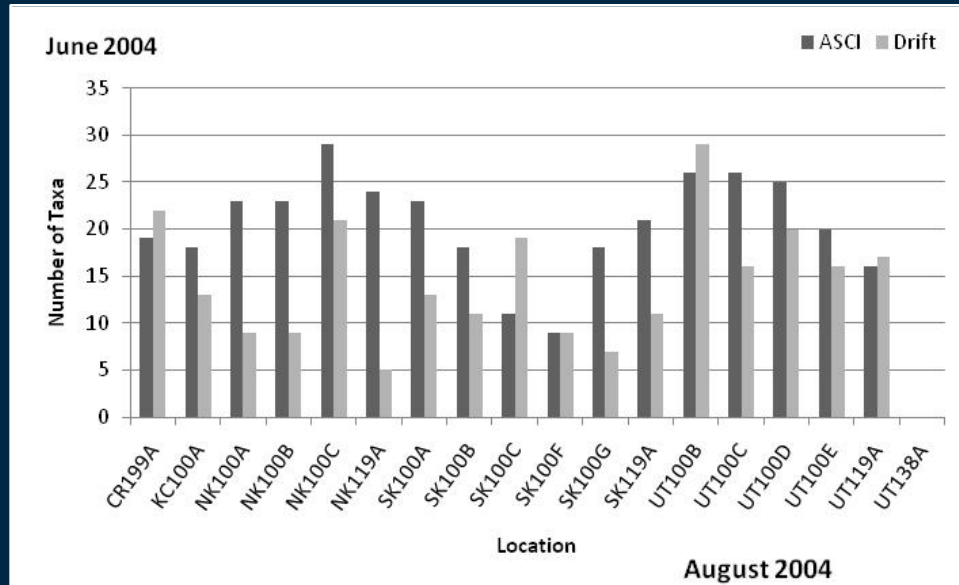
- Diatom samples were acid-digested and mounted by HDR scientists
- Diatom identification was performed by Scott Rollins (MSU Algal Ecology Laboratory)
- Chlorophyll a samples were examined by Bill Morris (ADF&G)



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HDR

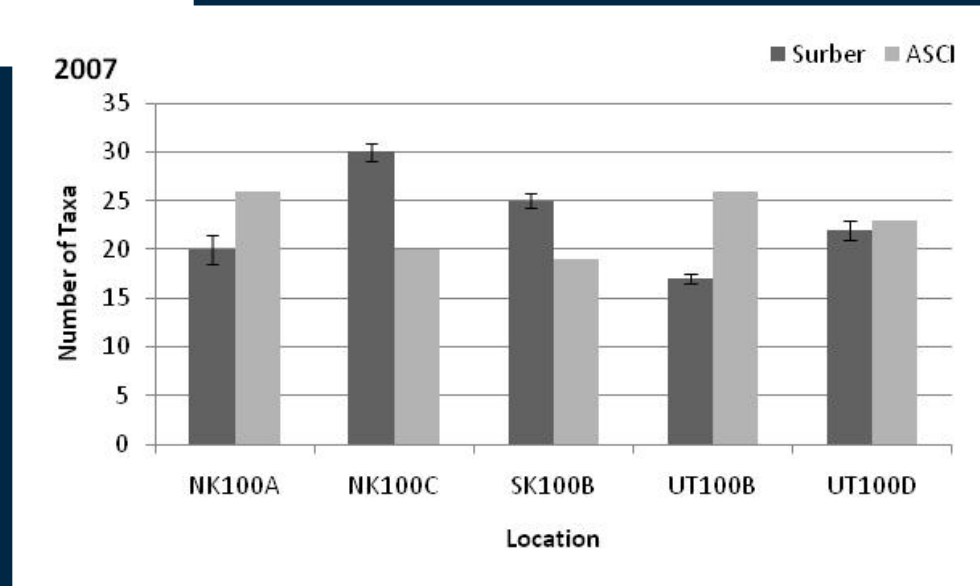
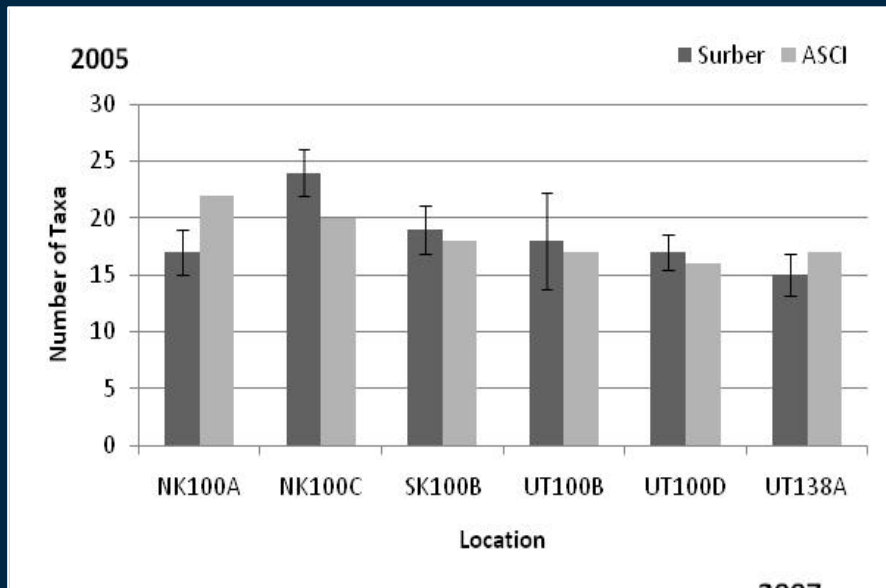
June vs. August 2004 Taxa Richness



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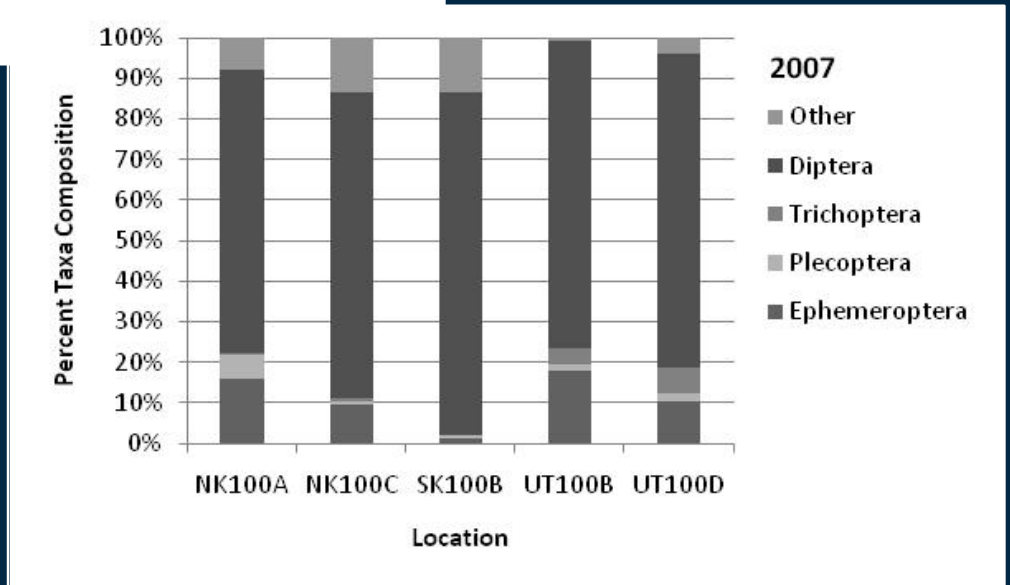
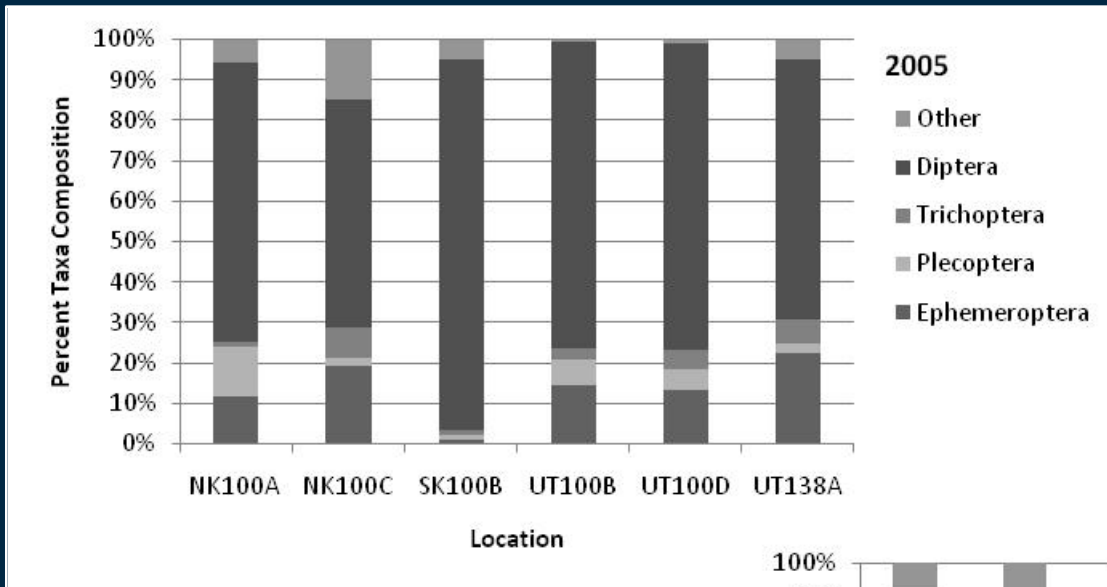
ASCI and Surber 2005, 2007 Taxa Richness



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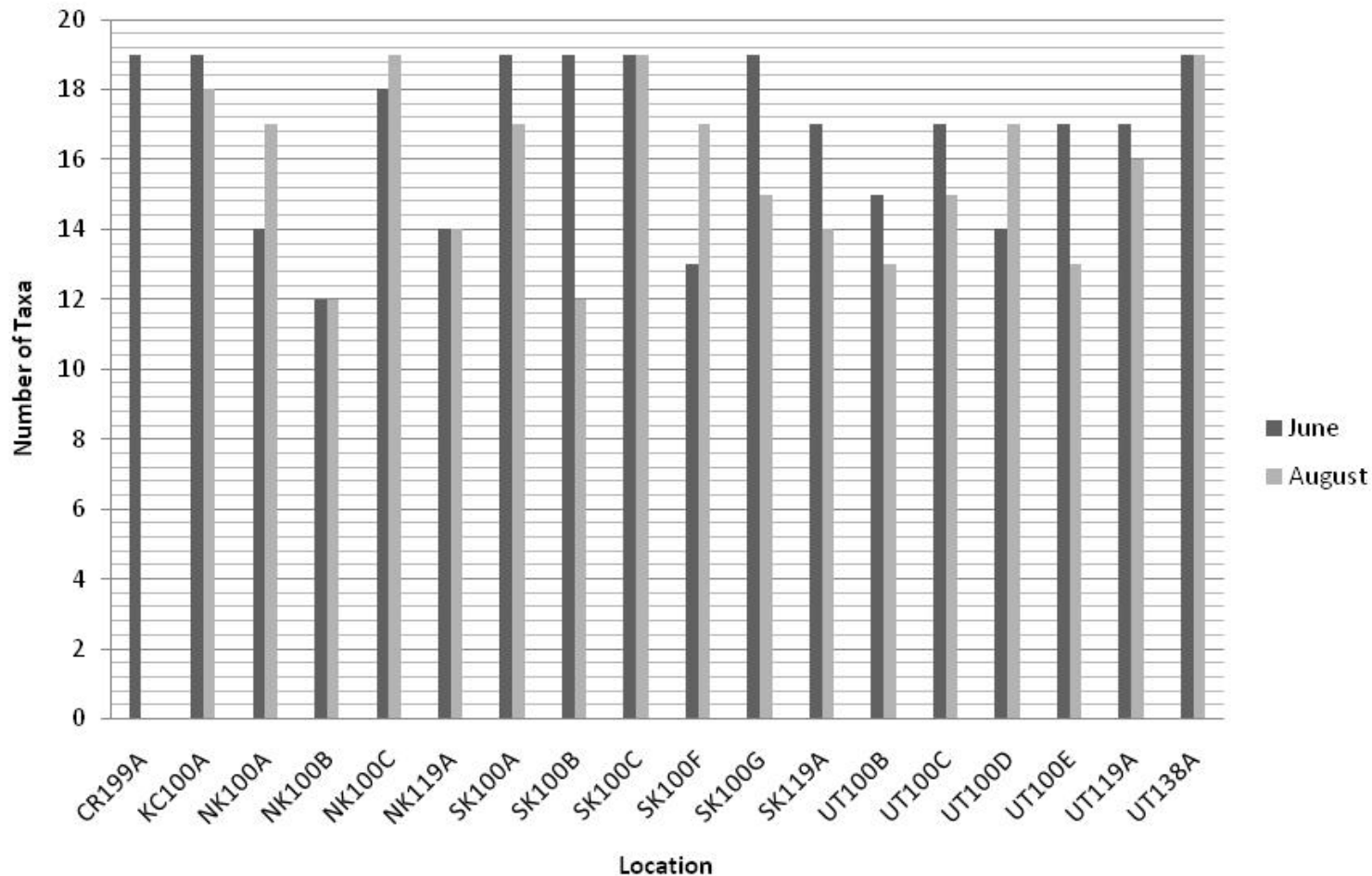
Surber 2005, 2007 Taxa Composition



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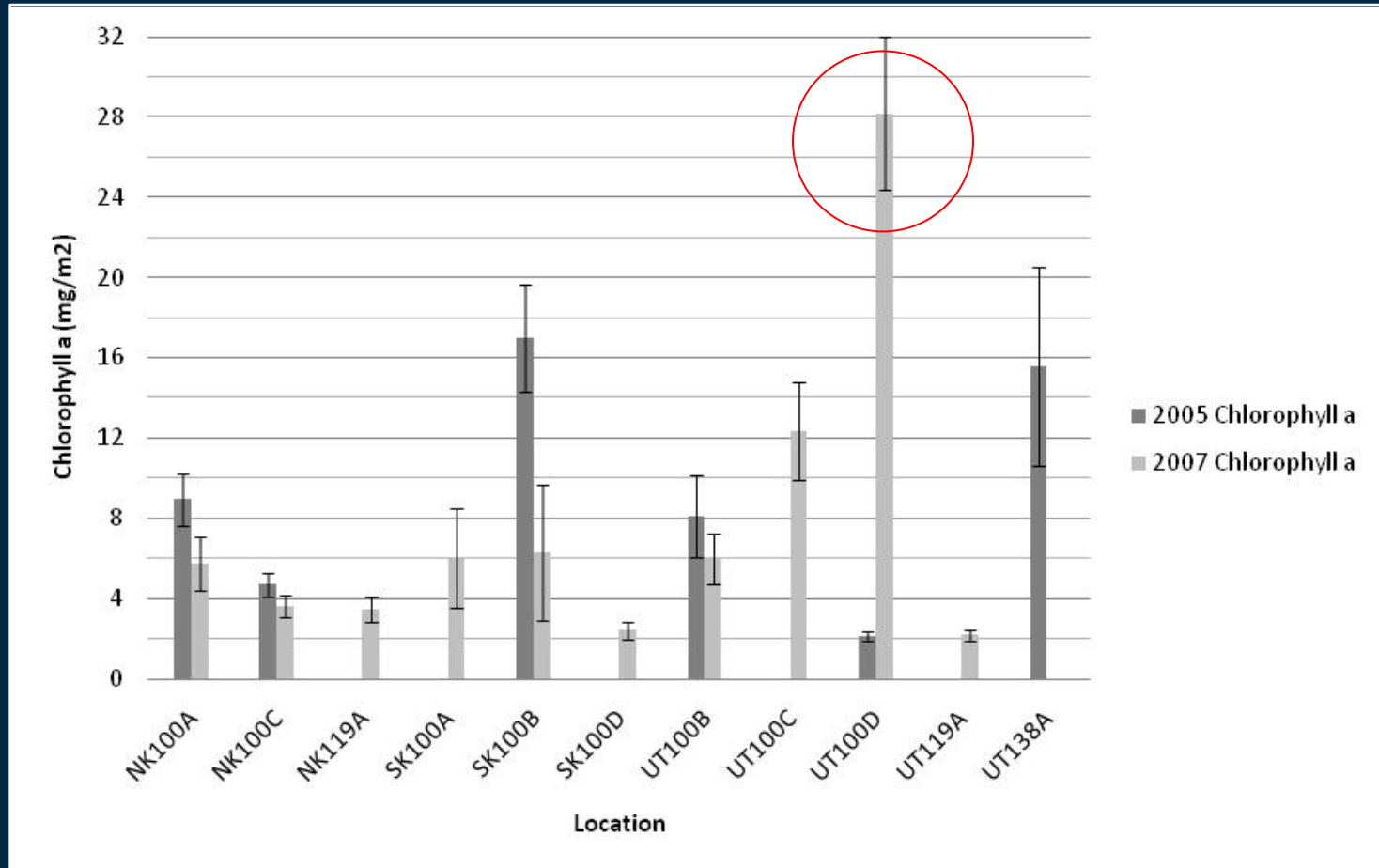


Diatom Taxa Richness 2004



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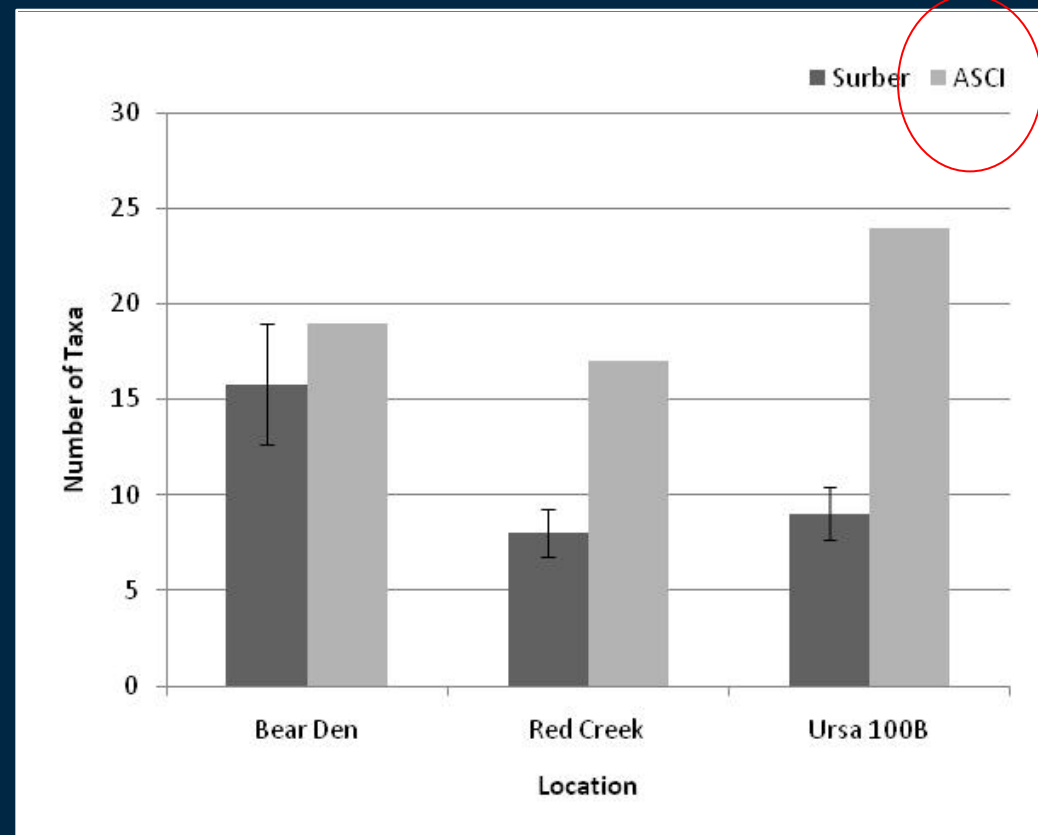
Chlorophyll a Concentrations 2005 to 2007



Pebble Project EBD

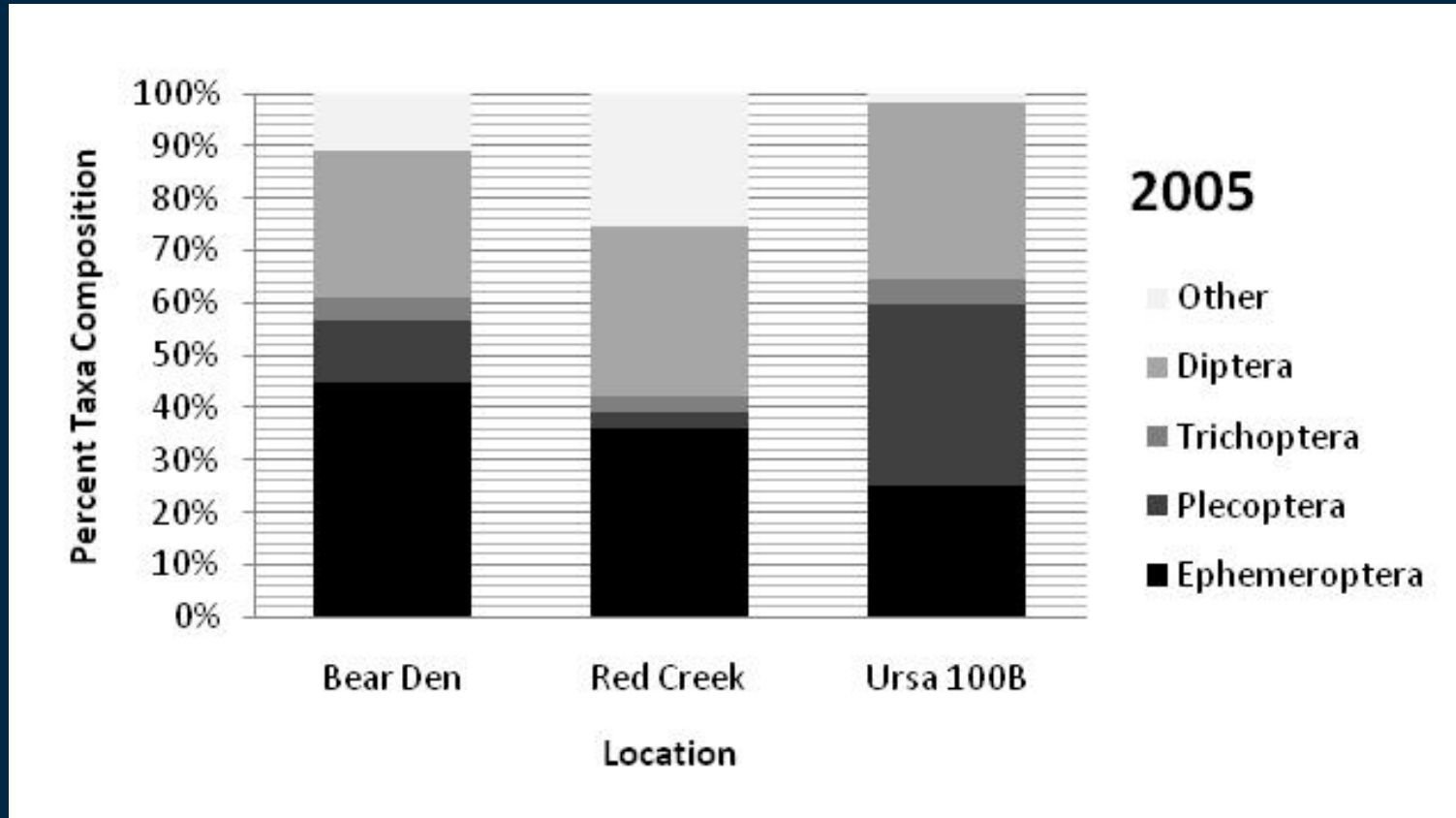
Macroinvertebrate Taxa Richness Road Corridor Sites 2005

Y-Valley Creek = 15 Taxa in ASCI samples; 5.4 in Surber samples



Pebble Project EBD

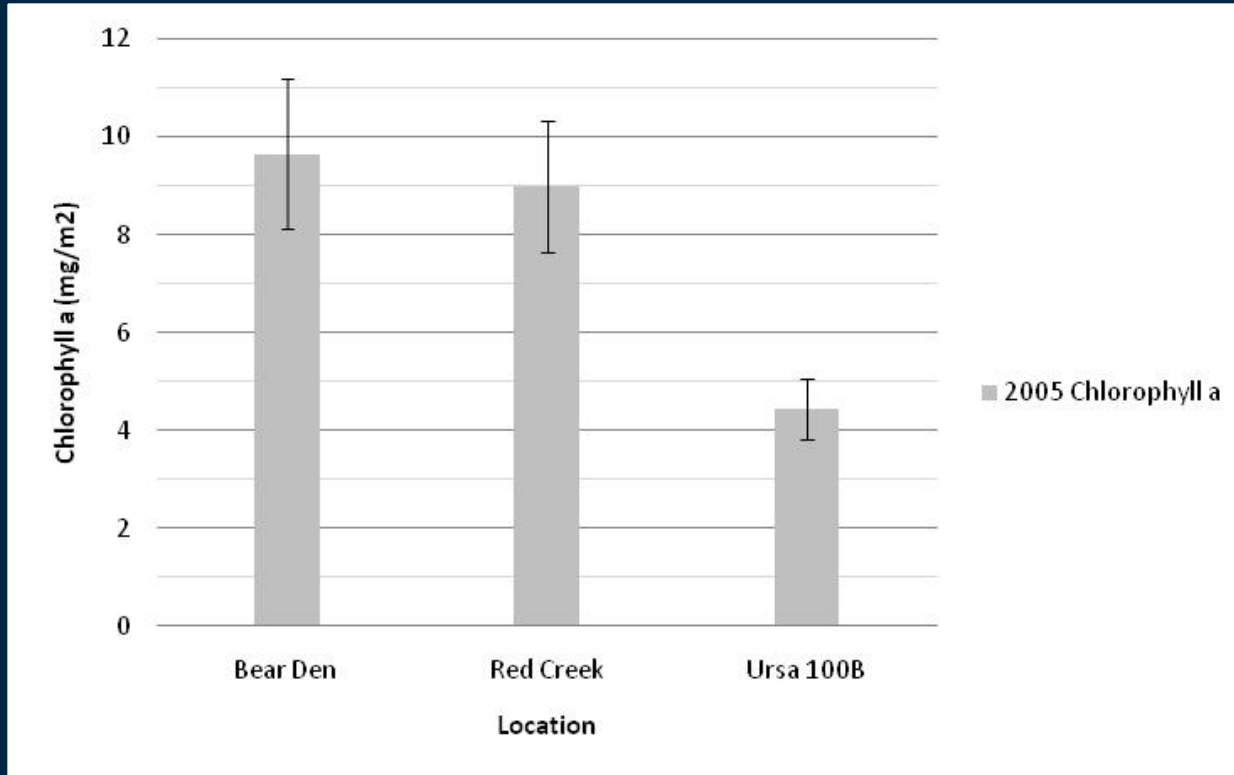
Surber Taxa Composition Road Corridor Sites 2005



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2005 Chlorophyll a Concentrations Road Corridor Sites

Y-Valley Creek = $2.4 \pm 0.83 \text{ mg/m}^2$



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Thank you!

HDR

Isaac Watkins

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Lynn Spencer

Josh Hedberg

Erin Cunningham

Jessica Manifold

Kelly Melillo

Dawn LoBaugh

Alic Boggs

Andra Love

Northern Ecological
Services – Sally Morsell



Michigan State University
Algal Ecology Laboratory
– Scott Rollins

Alaska Department of
Natural Resources
– Bill Morris

UAA Environment and
Natural Resources Institute

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