

Pebble Project Macroinvertebrate and Periphyton Studies



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Introduction/Discussion Topics

- Objectives
- Program Overview
- Methodology and QA/QC
- Mine and Road Corridor Results
- Summary

Objectives

- Characterize existing macroinvertebrate and periphyton populations
- Obtain data that may be used during project permitting



Macroinvertebrates

- Benthic Macroinvertebrates – substrate dwelling organisms that lack backbones and are visible with the naked eye
- Sensitive to WQ and habitat change



Diptera vs. EPT



Periphyton

- Periphyton – algae attached to aquatic substrates
- Important indicator of WQ – responsive to changes

Diatoms



Chlorophyll a



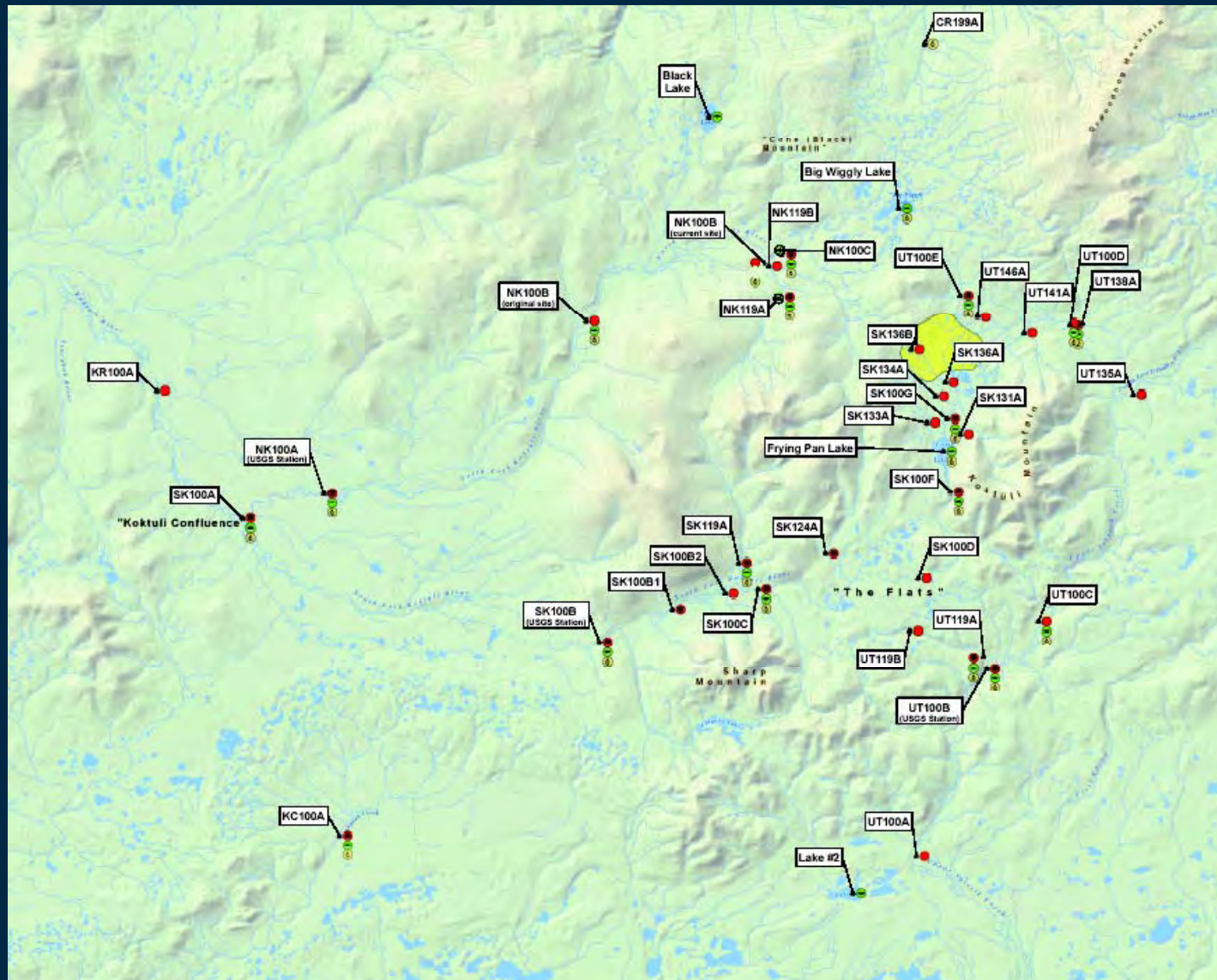
Program Overview

- **Three Primary Macroinvertebrate Methods**
 - ASCI
 - Drift
 - Surber
- **Two Primary Periphyton Methods**
 - Diatoms - EPA
 - Chlorophyll-a – ADNR

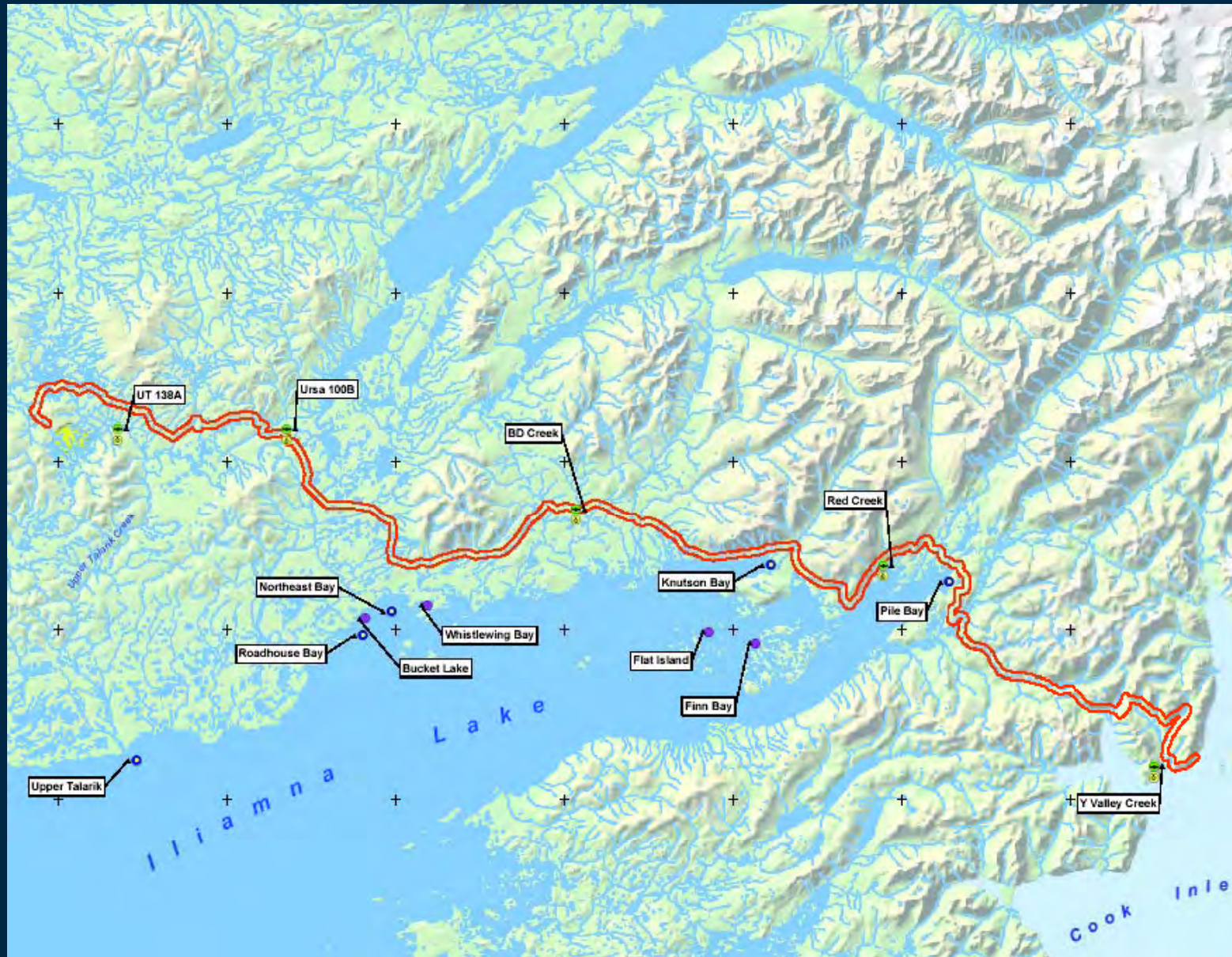
Program Overview

- **2004**
 - Macroinvertebrates with ASCI and Drift (2x)
 - Periphyton with RBP (diatoms) (2x)
 - 17 sites in mine area; 4 sites on road corridor
- **2005**
 - Macroinvertebrates with ASCI and Surber (1x)
 - Periphyton with chlorophyll-a (1x)
 - 5 sites in mine area
- **2006 – zooplankton in lakes**
- **2007**
 - ASCI and Surber
 - Chlorophyll-a
 - 10 sites in mine area

Mine Site Study Area



Proposed Road Corridor Study Area



Macroinvertebrate Field Methodology

- ASCI sampling
 - 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
 - Set five nets in one riffle
- Plankton tows

Macroinvertebrate Laboratory Methods



- All samples sorted and identified to genus by HDR biologists – 10% QA/QC
- ASCI subsampled to 300 count
- Most all Surber material sorted and identified

Periphyton Field Methodology

- Diatoms
 - Rapid Bioassessment Protocols
 - 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



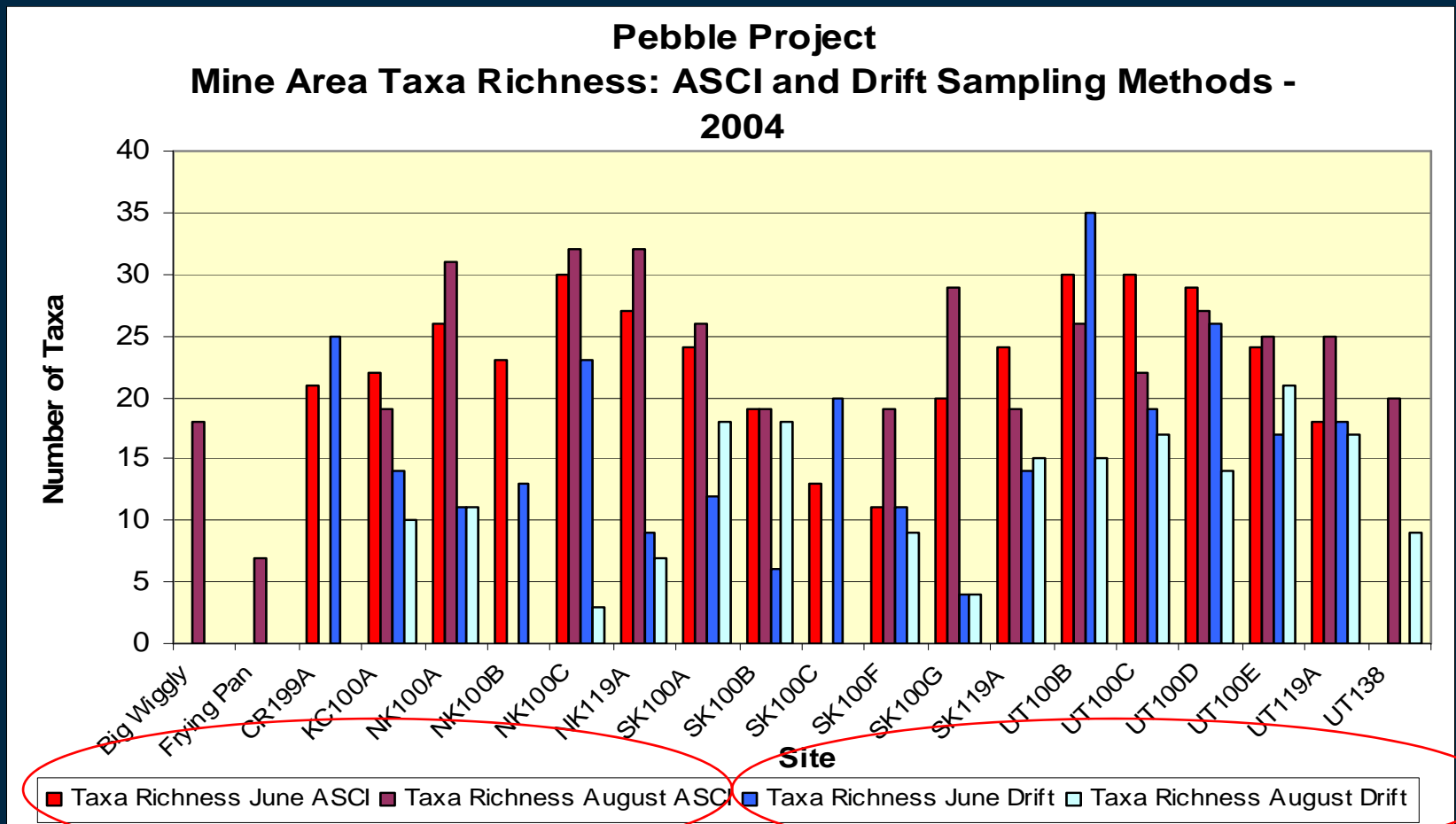
Periphyton Laboratory Methods

- 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)



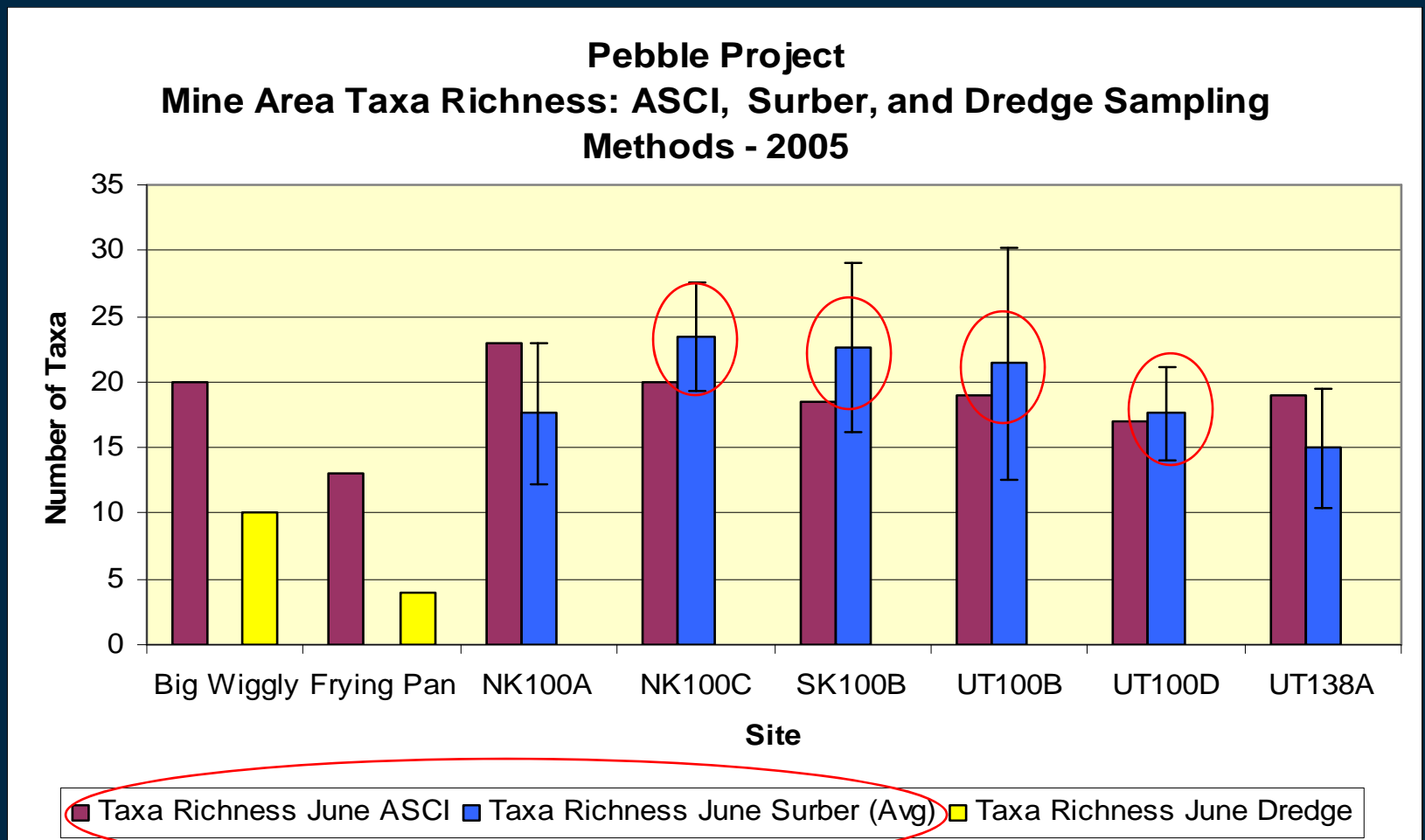
Mine Site 2004 ASCI and Drift Taxa Richness

- ASCI collects more taxa than Drift



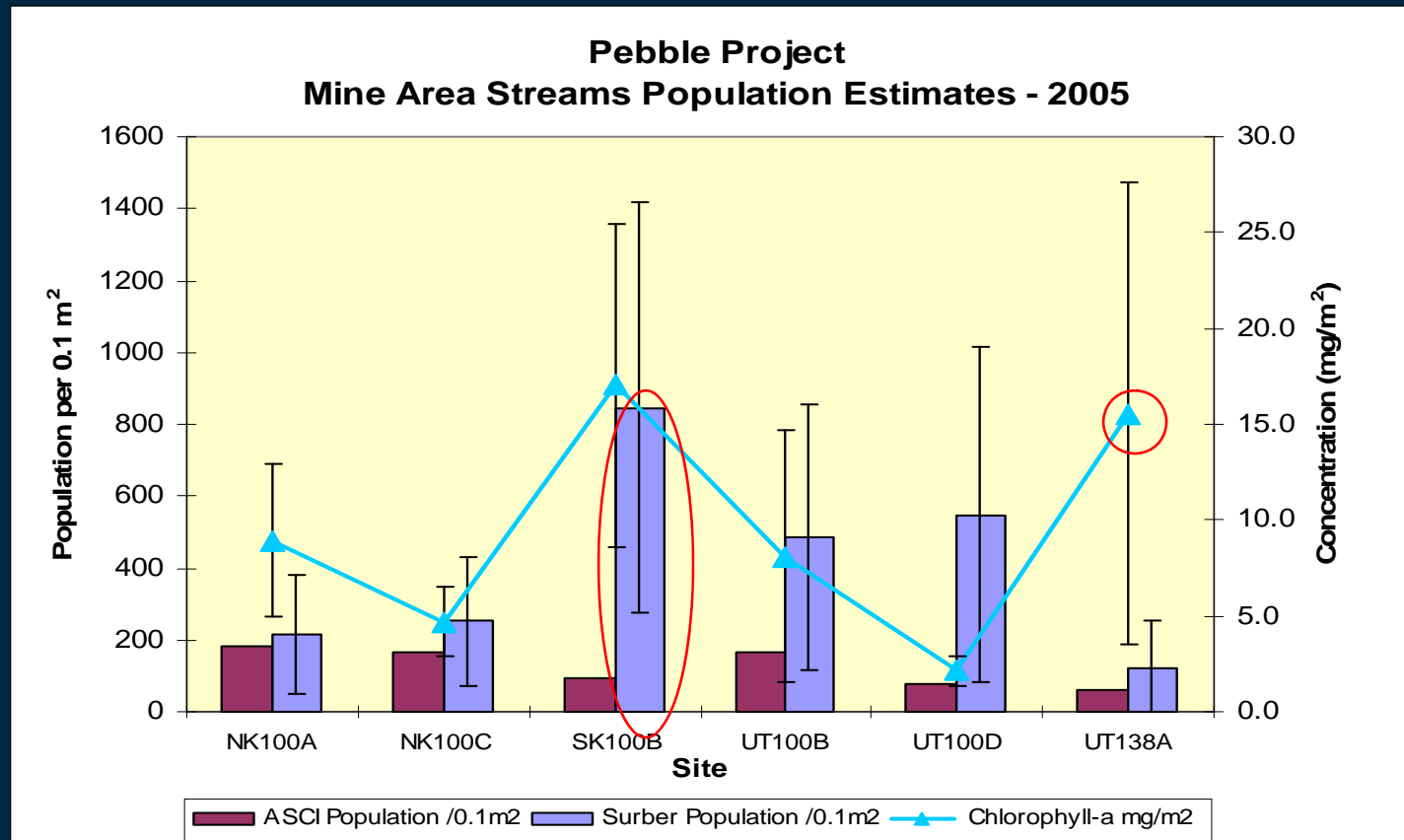
Mine Site 2005 ASCI and Surber Taxa Richness

- Surber collects more taxa than ASCI



Mine Site Macroinvertebrate Densities and Periphyton Results 2005

- SK100B biologically productive
- Chlorophyll-a is highest at sites SK100B and UT138A
- Surber produces more quantitative population estimates

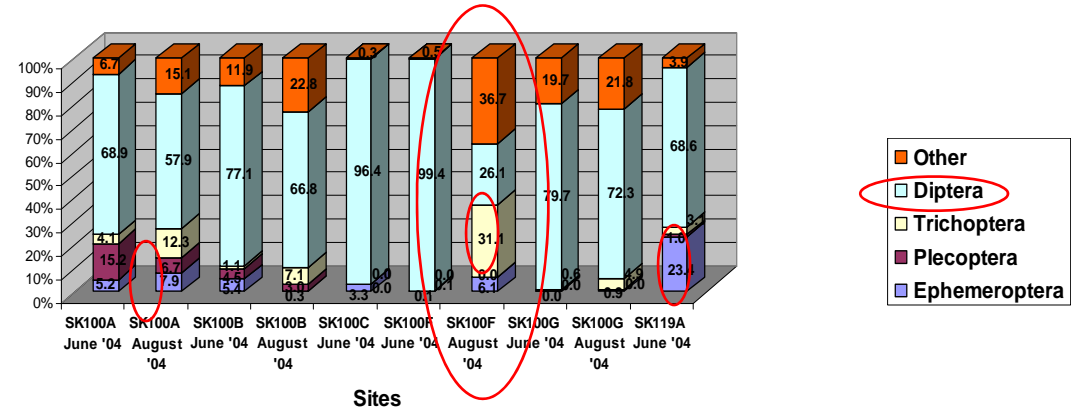


Mine Area Taxa Composition

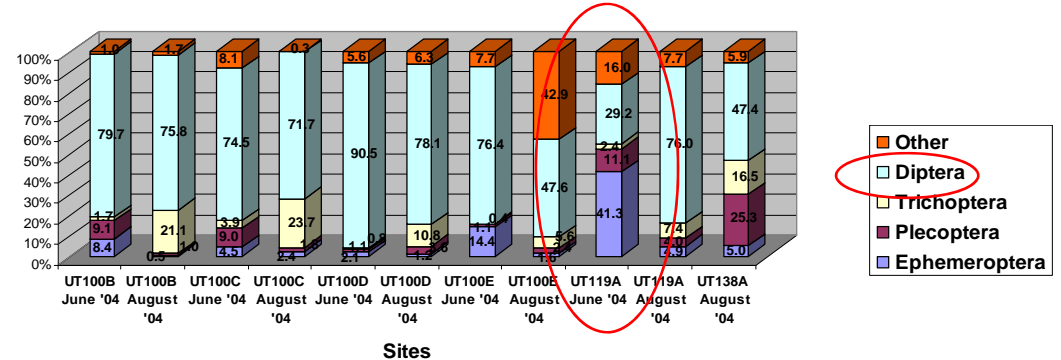
ASCI Method

- Diptera is prominent taxon
- Plecoptera and Ephemeroptera and Trichoptera increase seasonally

South Fork Kaktuli June & August 2004

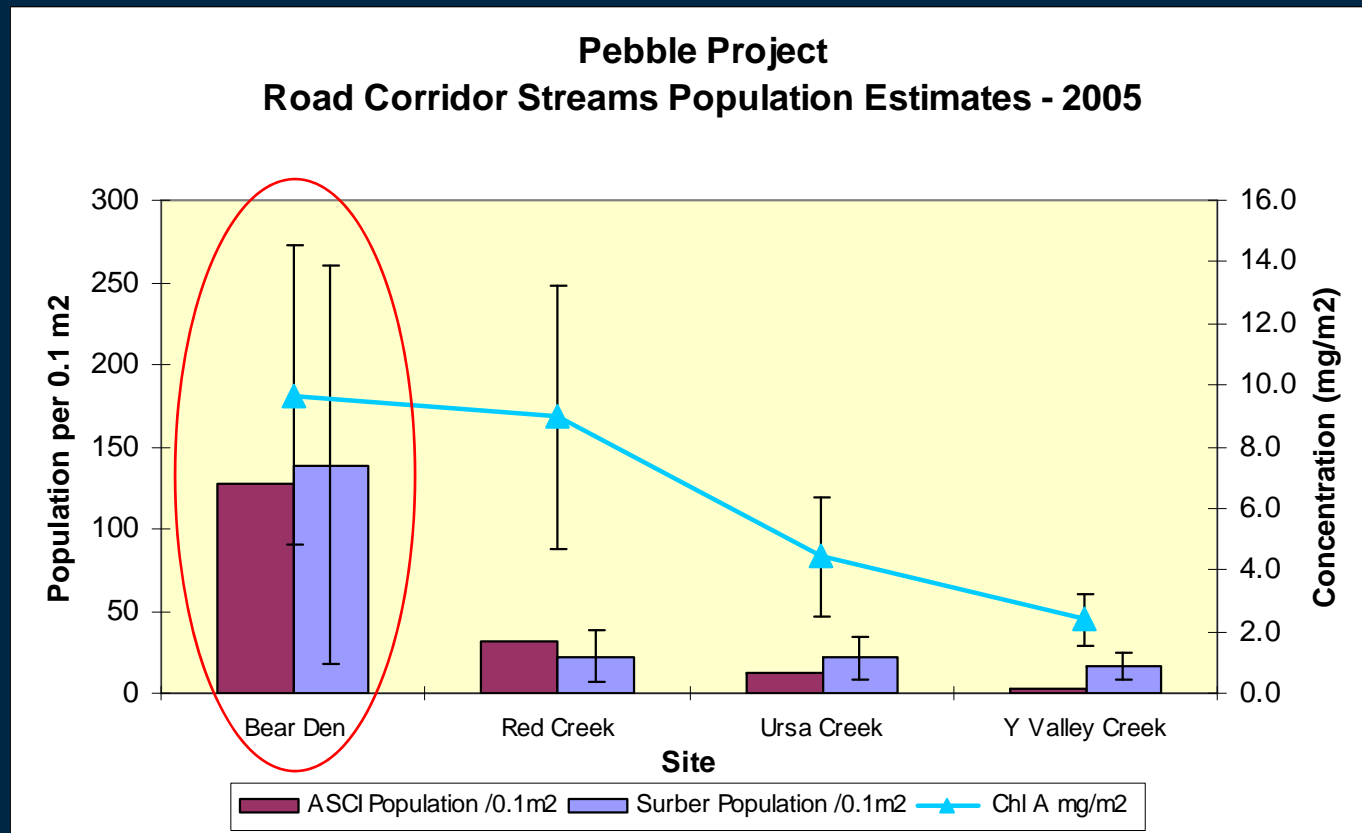


Upper Talarik June & August 2004



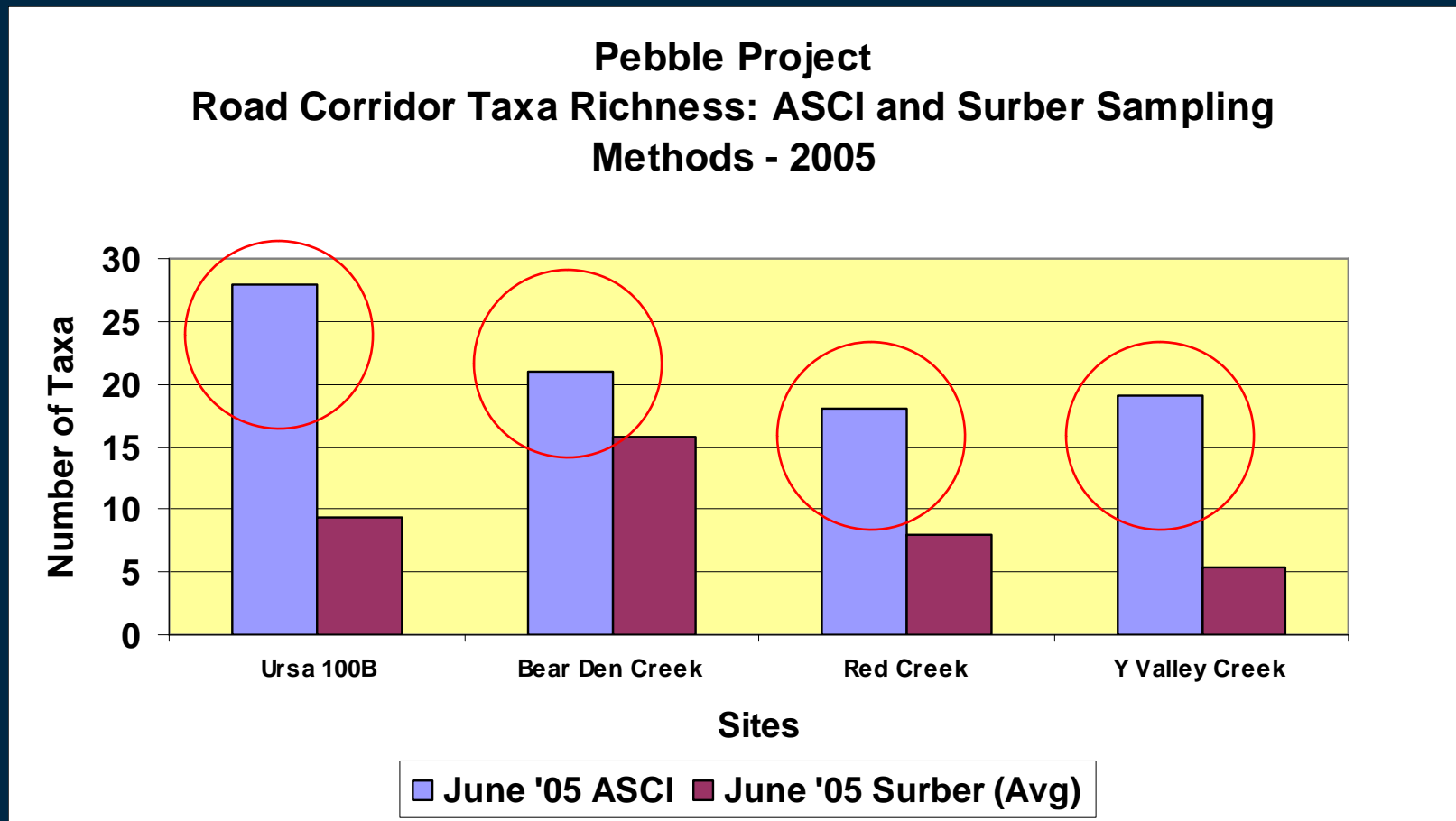
Road Corridor Macroinvertebrate Densities and Periphyton Results

- ASCI, Surber and Chlorophyll-a concentrations are most dense at Bear Den



Road Corridor ASCI and Surber Taxa Richness

- ASCI collects greater taxa richness than Surber

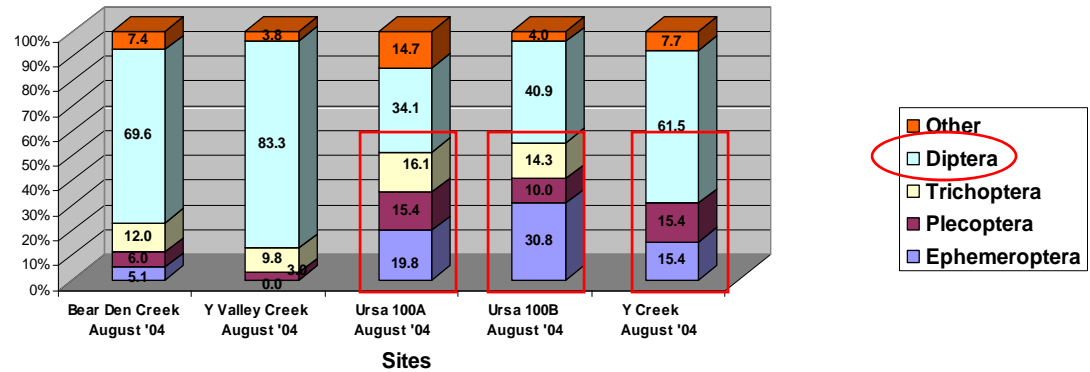


Road Corridor Macroinvertebrates

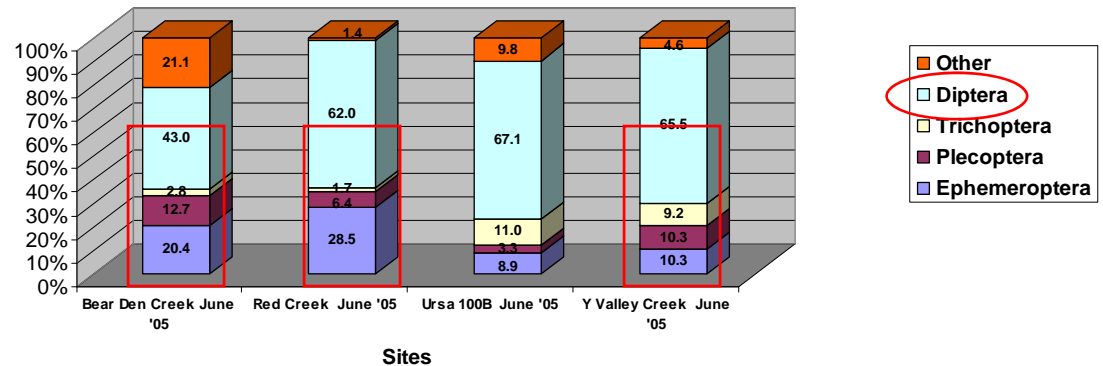
ASCI Method

- Diptera is prominent taxon

Proposed Road Corridor August 2004



Proposed Road Corridor June 2005



Presentation Summary

- ASCI collect more taxa than Drift
- Surber collects more taxa than ASCI in proposed mine area; opposite trend along road
- Diptera is generally the dominant taxa
- SK100B appears to be quite productive
- Upper Talarik may be more diverse than other drainages
- Samples collected in 2007 will further define results

Thank you!

HDR

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