

# Report Series H: Aquatic Macroinvertebrates and Periphyton

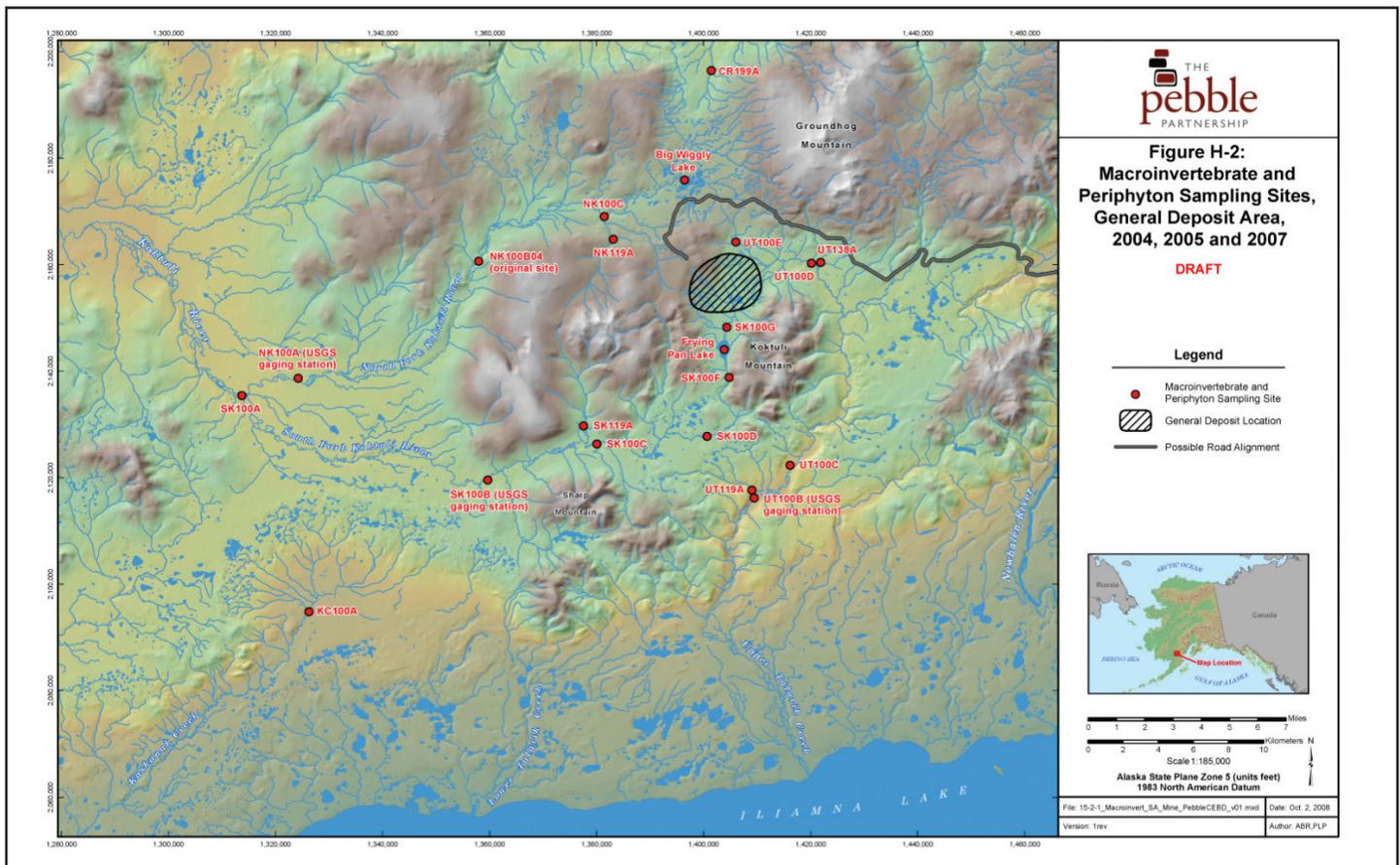
Since 2004, the Pebble Partnership has worked with Alaska-based consulting firms HDR, Northern Ecological Services, and recently ABR, to manage a program of aquatic macroinvertebrate and periphyton data collection and analysis at key locations throughout the Pebble Project area. Collection of this information is valued because macroinvertebrates and periphyton are important components of the aquatic food web and changes in these communities can indicate a response to changes in habitat and water quality.

The objective of the macroinvertebrate and periphyton field and laboratory program is to characterize diversity, relative abundance, and density of macroinvertebrates and periphyton within freshwater habitats in the Pebble Project area.

Studies were conducted throughout the deposit area and potential road corridor in 2004, 2005 and 2007. Study sites were selected to characterize populations upstream and downstream of the possible project facilities and infrastructure.

**Macroinvertebrates** are organisms lacking a backbone that are large enough to be seen without the aid of a microscope.

**Periphyton** are micro-algae attached to rocks or other solid surfaces, and are considered primary producers in the freshwater habitats studied.



## Methods

Macroinvertebrate sampling was conducted using several sampling methods, including:

- Alaska Stream Condition Index (ASCI) method;
- Drift net method;
- Dredge method; and
- Surber sampler method.

Periphyton were sampled using several methods as well, including:

- Rapid Bioassessment Protocol (RBP) method; and
- Alaska Department of Fish and Game (chlorophyll-a) method.

Detailed descriptions of the sampling methods used in this study are available in the *Draft Environmental Baseline Studies, 2005 Field Sampling Plan, Fish and Aquatic Habitat*. Ambient water quality measurements were also recorded at each sampling location.

The sampling sites included a range of stream sizes and habitats, as well as two lake sites. Methods used to sample macroinvertebrates and periphyton differed slightly between 2004 and subsequent sampling years of 2005 and 2007. Based on Department of Natural Resources comments, in 2005 the Surber method for sampling macroinvertebrates replaced drift-net sampling in streams. For collection of periphyton samples, chlorophyll-a concentrations replaced sampling by the modified RBP method. ASCI sampling was consistent throughout the 2004, 2005, and 2007 study program.

## Summary of Results

Data gathered from studies have been grouped into two sets; one for samples collected in Cook Inlet drainages, and one for samples collected in the Bristol Bay drainages. In the Bristol Bay drainages, a total of 235 macroinvertebrate taxa were identified, including 64 Chironomidae, or non-biting midges (small, two-winged flies). The Cook Inlet drainage studies resulted in identification of 36 taxa, including 11 Chironomidae. A complete breakdown of macroinvertebrate populations for both drainages can be found in the attached data tables.

Identified Macroinvertebrate Families		
	Bristol Bay Drainages	Cook Inlet Drainages
Total Identified Taxa	235	36
Chironomidae	64	11

In the Bristol Bay drainage 36 genera of periphyton were identified, representing 188 species. Eighteen genera of periphyton were identified in Cook Inlet drainages.

Aquatic-habitat surveys indicate that the sample sites were composed largely of riffle/cobble habitat, which is the preferred habitat of Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies) taxa. Together these taxa are referred to as EPT. EPT taxa are most likely to be used as indicators of the quality of aquatic habitats pre- and post-mine development because they are relatively sensitive to changes in water quality and habitat.

Results indicate that a large diversity of macroinvertebrates and periphytons exist in the deposit area. The results of the studies generally indicate low percent EPT, high percent Chironomidae, and high percent dominant taxon, which is typical of similar streams in Alaska.

**\*Preliminary data only. Do not cite or quote.**

**Aquatic Macroinvertebrates and Periphyton data reports, released as part of the Pebble Partnership's Pre-Permitting Environmental & Socio- Economic Data Report Series, are available online at [www.pebblepartnership.com](http://www.pebblepartnership.com).**