

40. FISH AND AQUATIC INVERTEBRATES

40.1 Fish

40.1.1 Introduction

Fish and aquatic habitat surveys were conducted in the Cook Inlet drainages study area from July through October in 2004, 2005, 2007, and 2008 to characterize channel conditions, water quality, fish assemblages, and habitat use at possible stream-crossing locations along a representative road alignment. The representative road alignment crosses three creeks that drain into Cook Inlet: Williams Creek (four crossings), Y Valley Creek (one crossing), and a tributary to Iniskin Bay (one crossing). These six primary survey sites (stream-crossing sites located on the representative road alignment) and two support survey sites (located upstream or downstream of primary survey sites or on nearby tributaries) were surveyed during the study period. (Figure 40-1)

40.1.2 Results and Discussion

Overall, the surveyed stream channels were moderately wide, with widths ranging from 6 to 18 meters, and shallow. In Williams Creek and Iniskin Bay Tributary 1, stream gradients were high and variable, ranging from 1 to 12.5 percent. In contrast, with a 1 percent documented gradient, Y Valley Creek is relatively flat at the location of the crossing. One of the four crossing sites in Williams Creek was dry at the time of the survey, although flow was present at Williams Creek sites both upstream and downstream of this location.

Fast-water habitats dominated the survey areas. The habitat at the site on Y Valley Creek was almost all glide habitat, while the sites on Williams Creek and the Iniskin Bay Tributary 1 were dominated by steep cascades. Not surprisingly, streambed materials in the cascades were large cobbles and boulders, whereas the Y Valley Creek bottom was primarily sand/silt and gravels.

Documented water quality was generally good, with seasonable stream temperatures, saturated levels of dissolved oxygen, and generally neutral pH. Specific conductivity of the water was low and was similar to sites in the transportation-corridor study area in the Bristol Bay drainages and mine study area sites.

Fish presence was documented only in Y Valley Creek and at one support survey site in Williams Creek. The species observed in Y Valley Creek included adult chum, pink, and sockeye salmon; juvenile coho and Chinook salmon; and both adult and juvenile Dolly Varden. Although arctic char were not observed during sampling, the 2009 anadromous waters catalog (ADF&G, 2010) indicates that arctic char are present in Y Valley Creek. Only juvenile and adult Dolly Varden were documented at the Williams Creek support survey site. No fish were found at the Iniskin Bay tributary sites.

40.1.3 References

Alaska Department of Fish and Game (ADF&G). 2010. Catalog of Waters Important for the Spawning, Rearing or Migration of Anadromous Fishes.
<http://www.adfg.alaska.gov/sf/SARR/AWC/>

40.2 Aquatic Invertebrates

40.2.1 Introduction

The objective of the macroinvertebrate and periphyton study was to characterize populations of macroinvertebrates and periphyton and their habitat conditions in the Cook Inlet study area. Baseline information on macroinvertebrate and periphyton community assemblages is valued because these creatures are essential components of the aquatic food web and their community structure, particularly with respect to the more sensitive taxa, is an indicator of habitat and water quality. The objective of the macroinvertebrate and periphyton field and laboratory program was to characterize the diversity, abundance, and density of macroinvertebrates and periphyton within freshwater habitats in the study area.

Macroinvertebrates are organisms without a backbone that are large enough to be seen without the aid of a microscope. Sampling of macroinvertebrates typically targets those organisms that live in or on the substrate of streams and lakes (usually in larval and pupal life stages). Periphyton, defined as micro-algae attached to rocks or other solid surfaces, has been sampled in order to describe the primary producers within freshwater habitats in the study area. As with macroinvertebrates, periphyton is also sensitive to changes in the aquatic environment and can be used as a monitoring tool for in situ primary productivity.

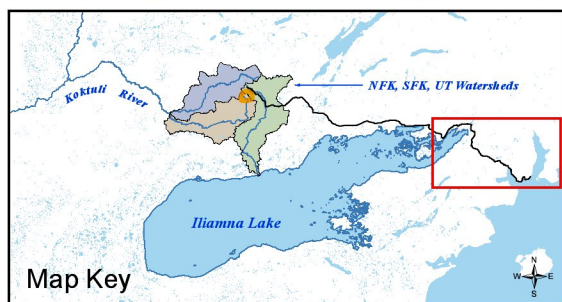
Two sites, Y Valley Creek and an unnamed creek, were selected for sampling in 2004. Y Valley Creek was sampled again in 2005. Sampling methods were modified after the 2004 field sampling. Drift-net sampling for macroinvertebrates resulted in very low densities and was replaced in 2005 with Surber sampling, with the objective of gathering more quantitative information. For similar reasons, diatom identification of periphyton samples in 2004 was replaced in 2005 with analysis of chlorophyll-a concentrations. Chlorophyll-a concentrations from multiple samples per site provide a more quantitative measure of periphyton productivity.

40.2.2 Results and Discussion

Thirty-six macroinvertebrate taxa, including 11 Chironomidae taxa, have been identified in the Cook Inlet drainages study area. Of these 36 taxa, 14 were identified only in samples from 2004, 11 were identified only in samples from 2005, and 11 occurred in both years. Samples were collected in different months in 2004 and in 2005, which may account for the differences in taxa collected.

Results of the diatom identifications of periphyton samples indicate that 19 diatom genera were present in samples collected in 2004 in the Cook Inlet drainages study area. Taxa richness was greater for Y Valley Creek (17 taxa) than for the unnamed creek (eight taxa). Conversely, the percent dominant taxon was much higher for the unnamed creek (79 percent) than for Y Valley Creek (35 percent). These results suggest that, in 2004, Y Valley Creek provided better periphyton habitat than the unnamed creek.

The concentration of chlorophyll-*a* (corrected for phaeophyton) was calculated from analysis of samples collected from Y Valley Creek in 2005, and the result was 2.4 ±0.83 milligrams per square meter.



Legend

- Stream Crossing Sites
- Supporting Data Sites
- Williams Creek
- Y-Valley Creek
- Iniskin Bay T1

- Representative Road Alignment
- Bristol Bay/Cook Inlet Basin Divide

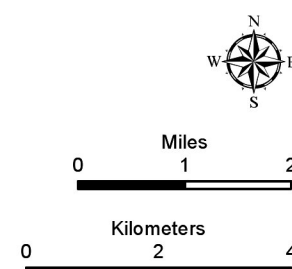


Figure 40-1
Primary and Support Survey Sites for
the Representative Road Alignment
by Cook Inlet Watershed

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

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