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# Inventory of Fish Distribution in Matanuska-Susitna Basin Streams, Southcentral Alaska 2008

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# Inventory of Fish Distribution in Matanuska-Sustitna Basin Streams, Southcentral Alaska, 2008

**Theresa L. Tanner and Jeffry L. Anderson**

## Abstract

Residential and commercial development in the Matanuska-Susitna (Mat-Su) Borough in southcentral Alaska is a threat to fish habitat. Fish habitat protection authorities and planning processes in Alaska are constrained by the extent of current knowledge of fish distributions and their habitats. Some protections provided under the Anadromous Fish Act (AS 41.14.871) only apply to waters specified in the *Catalog of Waters Important for the Spawning, Rearing or Migration of Anadromous Fishes* (AWC). The Anchorage Fish and Wildlife Field Office initiated this project to increase coverage of the AWC for Mat-Su basin water bodies with some preliminary sampling in 2007. We sampled 83 reaches in 36 different streams in 2008, resulting in 20 nominations to update the AWC. Coho salmon *Oncorhynchus kisutch* and Dolly Varden *Salvelinus malma* were the most common salmonid species sampled in 2008. Other species captured in 2008 included Chinook salmon *O. tshawytscha*, Alaska blackfish *Dallia pectoralis*, threespine stickleback *Gasterosteus aculeatus*, and sculpin *Cottus* spp. Most streams sampled in 2008 were small (< 5 m width) 1st order streams. This project continues to support goals and objectives of the Mat-Su Basin Salmon Habitat Conservation Partnership and the National Fish Habitat Action Plan.

## Introduction

The human population of the Matanuska-Susitna (Mat-Su) Borough is one of the fastest growing in the U.S., with a growth rate of 49% from 1990 to 2000. Population growth and associated development continue to challenge the ability of fisheries and land managers to balance fish habitat conservation with these changes over time. Maintaining healthy fish habitat, including water quality and quantity, is critical to maintain healthy fish populations in the Mat-Su basin.

Concerns for how to effectively protect and restore salmon production in the face of rapid development led to the formation of the Mat-Su Basin Salmon Habitat Partnership (Partnership). The Partnership is one of only six fish habitat partnerships approved nationwide under the National Fish Habitat Action Plan (NFHAP), a national effort to protect and restore the nation's waterways and fisheries through science-based partnerships of affected stakeholders. The Partnership has developed a Strategic Action Plan, which identifies objectives, actions, and research necessary to protect salmon and salmon habitat in the Mat-Su basin.

Fish habitat protection authorities and planning processes in Alaska are constrained by the extent of current knowledge of fish distributions and their habitats. Some protections provided under AS 41.14.870 only apply to waters specified in the *Catalog of Waters Important for the Spawning, Rearing or Migration of Anadromous Fishes* (Anadromous Waters Catalog, AWC; Johnson and Weiss 2007). In 2002, the Alaska Department of Fish and Game (ADF&G) conducted a coarse-scale survey of Southcentral Alaska rivers (Rich and Buckwalter 2003). Currently, the AWC contains 4,142 miles of the more than 23,900 miles of streams that have

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been mapped in the Mat-Su basin. Management and regulatory tools cannot be applied to their full extent until the remainder of likely anadromous fish habitat in the basin is surveyed.

The Anchorage Fish and Wildlife Field Office initiated this project in 2007 to support the Partnership's Strategic Action Plan and the NFHAP by increasing coverage of the AWC for Mat-Su basin water bodies. The overall goal of this project is to provide information needed for protection and management of the freshwater habitats that support Alaska's anadromous and freshwater fish. The specific objectives of the project are to

1. Maximize the spatial extent of mapped anadromous fish habitat depicted in the AWC within the Mat-Su basin; and
2. Record characteristics of aquatic habitats at each sampling location.

## Study Area

Watersheds of the Matanuska and Susitna river watersheds encompass about 24,500 square miles in southcentral Alaska, ranging in elevation from near the highest point in North America (Mount McKinley) to sea level at Cook Inlet. The watersheds meet all freshwater life history needs for Chinook *Oncorhynchus tshawytscha*, chum *O. keta*, coho *O. kisutch*, pink *O. gorbuscha*, and sockeye *O. nerka* salmon. Other fishes common to Mat-Su water bodies include Arctic grayling *Thymallus arcticus*, rainbow trout *O. mykiss*, Dolly Varden *Salvelinus malma*, burbot *Lota lota*, eulachon *Thaleichthys pacificus*, longnose sucker *Catostomus catostomus*, threespine *Gasterosteus aculeatus* and ninespine *Pungitius puntitius* stickleback, as well as several species of whitefish (*Coregonus* spp. and *Prosopium* spp), lamprey *Lampetra* spp., and sculpin *Cottus* spp. Northern pike *Esox lucius* are also common in numerous lakes and streams, although they are not native to Mat-Su basin water bodies.

## Methods

Sampling methods were adapted from Buckwalter (2007) and targeted rearing salmonids at their maximum upstream distribution in late summer and early fall. Streams were selected for sampling based on consultations with the Habitat Restoration Branch of the U. S. Fish and Wildlife Service (USFWS) and the ADF&G (Palmer Sport Fish Division and Habitat Division). Criteria for stream selection included on-going and expected development, key data gaps, and opportunities to verify or evaluate culvert passage. Prioritization efforts led to two sampling areas within the Mat-Su, including the Petersville Road area and the developed core of the borough around the cities of Wasilla and Palmer (Figure 1).

Sample reaches within a stream were chosen based on observations of stream size, water flow, and channel slope such that selected reaches were at or near the apparent upstream limit of anadromous fish distribution. Streams were accessed using the most direct route possible and permission from landowners was secured in advance when accessing private property. Sampling at each reach involved collection of fish and aquatic habitat parameters.

The spatial coordinates of the upstream terminus of each sampling reach were recorded in decimal degrees with a handheld global positioning system (GPS) using the North American Datum of 1927 (NAD 27) geographic coordinate system. Reach length (m) was estimated by measuring along the thalweg using a tape measure or by pacing. Wetted channel width (m) was measured perpendicular to the thalweg at a representative transect. Reach lengths were set at 40

wetted channel widths for streams ≥ 3.75 m wide and at 150 m for streams < 3.75 m wide (Reynolds et al. 2003); maximum reach length was capped at 300 m for streams > 7.5 m wide.

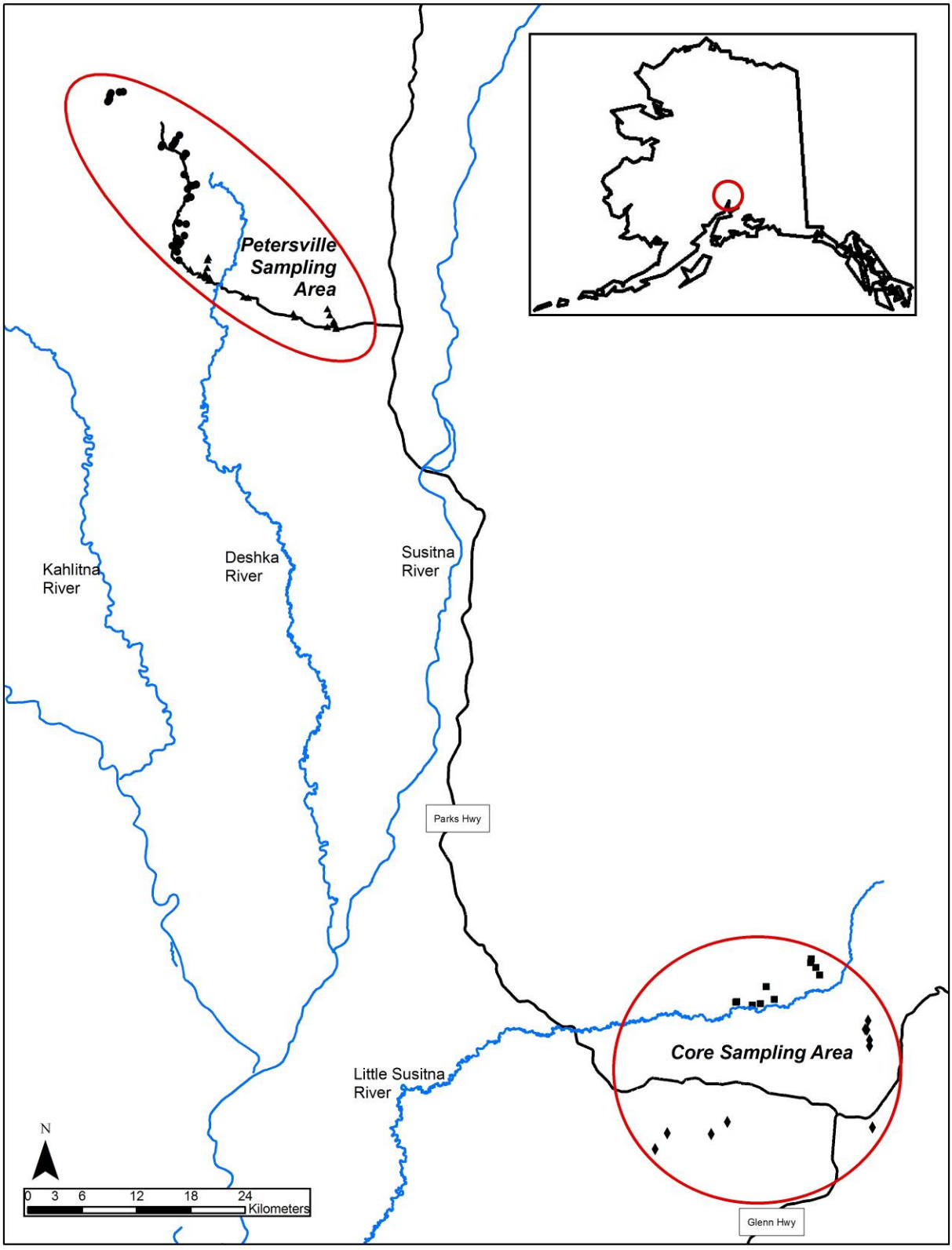


Figure 1. Sampling areas in the Mat-Su basin, 2008.

Sample reaches were classified following Rosgen (1994) including visual estimates of substrate type. Channel slope (%) was estimated with a hand-held clinometer following Gordon et al. (1992). Stream order (Strahler 1952) was determined from topographic maps. Water temperature (°C), conductivity (µmho/cm), and stream pH was measured using a Sper Scientific Model 850081 water quality multimeter.

Fish sampling was conducted using a Smith-Root Model LR-24 backpack electrofisher following the safety guidelines outlined in Reynolds (1996) and USFWS (2004). Output voltage was adjusted to the minimum level necessary to achieve electrotaxis (forced swimming). A pulsed DC waveform with a 30 Hz frequency and 25% duty cycle was used to minimize fish injury (Dalbey et al. 1996) while maintaining fishing efficiency and effectivness. Output voltage parameters were recorded along with conductivity (µmho/cm) at each reach. A single electrofishing pass at each sample reach was completed starting at the downstream end and working upstream. The reach was sampled using a zigzag pattern in each encountered habitat unit, alternating between left bank, thalweg, and right bank, with an emphasis on cover types. Electrofishing was aborted in reaches containing adult salmonids (USFWS 2004). Minnow traps baited with commercial cured roe were used to supplement fishing efforts in areas where electrofishing was less effective. Captured fish were placed in a 12-L bucket less than one half full with stream water. At the end of each reach, all fish were counted and identified to species, and length (total length, mm) was recorded for all juvenile salmon. All fish were released into a slack-water area within the sample reach and allowed to recover.

## Results

We sampled 83 reaches within 36 different streams in 2008. Within the Petersville sampling area, 12 streams are within the Kahiltna River watershed and nine streams are within the Deshka River watershed (Table 1). Within the core area of the Mat-Su, seven streams are within the Little Susitna River watershed and eight streams drain through the Palmer Hay Flats (Table 2). Sampling in 2008 resulted in 20 nominations to update the AWC.

Coho salmon and Dolly Varden were the most common salmonid species sampled in 2008 (Tables 3 and 4). Juvenile coho salmon were captured in 38 of the 83 sample reaches, and Dolly Varden were present in 12 of the 83 reaches. Length was measured for 435 of the 450 coho salmon captured and ranged from 28 to 146 mm (Figure 2). Most coho salmon were probably age 0 and 1 fish based on length, but we did not collect age data in 2008. Other species captured in 2008 included Chinook salmon, Alaska blackfish *Dallia pectoralis*, threespine stickleback, and sculpin. Electrical output necessary to achieve electrotaxis varied with conductivity, and minnow traps were allowed to soak for an average of 135 minutes (Tables 5 and 6).

### *Habitat*

Stream habitat data are summarized in Tables 5 and 6. Most streams sampled in 2008 were small (< 5 m wide) 1$^{st}$ order streams. Most reaches were Rosgen type B or E channels, and observed substrates were predominantly gravel and cobble. Beaver complexes formed multiple ponds within some streams, and reach lengths were not recorded for these sample sites. Observed water temperatures ranged from 3 to 16.4°C.

Table 1. Sampling dates and site locations for selected streams within the Petersville sampling area in the Mat-Su basin, 2008. Latitude and longitude coordinates are in decimal degrees, NAD 27. *Stream nominated for addition to AWC. †Unpublished waterbody.

| Date | Site number | Watershed | Latitude | Longitude |
|---|---|---|---|---|
| 7/15/2008 | A01 | Kahiltna | 62.39115 | -150.72061 |
| 7/15/2008 | A02 | Kahiltna | 62.39011 | -150.72119 |
| 7/16/2008 | A03 | Kahiltna | 62.47212 | -150.71742 |
| 7/17/2008 | A04 | Kahiltna | 62.38361 | -150.73035 |
| 7/17/2008 | A05 | Kahiltna | 62.38444 | -150.71828 |
| 7/17/2008 | A06 | Kahiltna | 62.38534 | -150.71640 |
| 7/17/2008 | A07 | Kahiltna | 62.38762 | -150.71252 |
| 7/18/2008 | A08 | Kahiltna | 62.44370 | -150.69910 |
| 7/18/2008 | A09 | Kahiltna | 62.44559 | -150.68665 |
| 7/18/2008 | A10 | Kahiltna | 62.44056 | -150.70444 |
| 7/18/2008 | A11* | Kahiltna | 62.44439 | -150.69348 |
| 7/19/2008 | A12 | Kahiltna | 62.39426 | -150.70546 |
| 7/19/2008 | A13* | Kahiltna | 62.40591 | -150.70329 |
| 7/22/2008 | A14 | Kahiltna | 62.40637 | -150.71796 |
| 7/22/2008 | A15 | Kahiltna | 62.44567 | -150.68629 |
| 7/24/2008 | A16 | Kahiltna | 62.47562 | -150.71182 |
| 7/25/2008 | A17* | Kahiltna | 62.36974 | -150.71423 |
| 7/25/2008 | A18 | Kahiltna | 62.37804 | -150.71896 |
| 7/25/2008 | A19† | Kahiltna | 62.45467 | -150.71356 |
| 7/28/2008 | A20† | Deshka | 62.35201 | -150.64810 |
| 7/28/2008 | A21† | Kahiltna | 62.43125 | -150.70428 |
| 7/28/2008 | A22 | Kahiltna | 62.43275 | -150.70058 |
| 7/29/2008 | A23* | Kahiltna | 62.43272 | -150.69681 |
| 7/30/2008 | A24 | Deshka | 62.36199 | -150.68939 |
| 7/30/2008 | A25† | Deshka | 62.35684 | -150.66704 |
| 7/30/2008 | A26 | Kahiltna | 62.47568 | -150.71326 |
| 7/30/2008 | A27 | Kahiltna | 62.47564 | -150.71182 |
| 7/30/2008 | A28 | Deshka | 62.35501 | -150.64670 |
| 7/31/2008 | A29 | Deshka | 62.35788 | -150.65671 |

Table 1. continued.

| Date | Site number | Watershed | Latitude | Longitude |
|---|---|---|---|---|
| 7/31/2008 | A30 | Deshka | 62.35923 | -150.65691 |
| 7/31/2008 | A31 | Deshka | 62.36445 | -150.65323 |
| 8/1/2008 | A32* | Deshka | 62.37218 | -150.65343 |
| 8/1/2008 | A33 | Deshka | 62.37473 | -150.65184 |
| 8/8/2008 | A34 | Deshka | 62.31288 | -150.37056 |
| 8/8/2008 | A35 | Deshka | 62.31652 | -150.37677 |
| 8/8/2008 | A36 | Deshka | 62.31857 | -150.37709 |
| 8/13/2008 | A37 | Deshka | 62.33026 | -150.39177 |
| 8/13/2008 | A38* | Deshka | 62.32456 | -150.38622 |
| 8/14/2008 | A39* | Deshka | 62.32399 | -150.46399 |
| 8/16/2008 | A40 | Kahiltna | 62.53310 | -150.85477 |
| 8/16/2008 | A41 | Kahiltna | 62.53275 | -150.86290 |
| 8/19/2008 | A42† | Kahiltna | 62.53121 | -150.88062 |
| 8/19/2008 | A43† | Kahiltna | 62.52855 | -150.88237 |
| 8/19/2008 | A44† | Kahiltna | 62.52497 | -150.88298 |
| 8/19/2008 | A45† | Kahiltna | 62.52414 | -150.88361 |
| 8/19/2008 | A46† | Kahiltna | 62.52323 | -150.88489 |
| 8/20/2008 | A47 | Kahiltna | 62.49348 | -150.72807 |
| 8/20/2008 | A48 | Kahiltna | 62.48839 | -150.73564 |
| 8/20/2008 | A49 | Kahiltna | 62.48605 | -150.73711 |
| 8/20/2008 | A50 | Kahiltna | 62.48272 | -150.74257 |
| 8/21/2008 | A51* | Kahiltna | 62.48286 | -150.74242 |
| 8/21/2008 | A52 | Kahiltna | 62.48402 | -150.73990 |
| 8/23/2008 | A53† | Kahiltna | 62.48106 | -150.76573 |
| 8/23/2008 | A54*† | Kahiltna | 62.48283 | -150.76308 |
| 8/23/2008 | A55† | Kahiltna | 62.48316 | -150.76376 |
| 8/26/2008 | A56* | Kahiltna | 62.38957 | -150.72194 |
| 8/2/2008 | A57† | Deshka | 62.32046 | -150.46056 |
| 8/2/2008 | A58† | Deshka | 62.31247 | -150.38992 |
| 8/2/2008 | A59 | Deshka | 62.31128 | -150.37120 |

Table 1. continued.

| Date | Site number | Watershed | Latitude | Longitude |
|---|---|---|---|---|
| 6/24/2008 | A60 | Deshka | 62.33731 | -150.56184 |
| 6/25/2008 | A61* | Kahiltna | 62.52236 | -150.88637 |
| 6/25/2008 | A62 | Deshka | 62.33791 | -150.57196 |

Table 2. Sampling dates and site locations for selected streams within the core sampling area in the Mat-Su basin, 2008. Latitude and longitude coordinates are in decimal degrees, NAD 27. *Stream nominated for addition to AWC. †Unpublished waterbody.

| Date | Site number | Watershed | Latitude | Longitude |
|---|---|---|---|---|
| 7/25/2008 | B1* | Palmer Hay Flats | 61.54255 | -149.17110 |
| 8/8/2008 | B2 | Little Susitna | 61.70401 | -149.31178 |
| 8/8/2008 | B3* | Little Susitna | 61.70778 | -149.31094 |
| 8/13/2008 | B4† | Palmer Hay Flats | 61.62289 | -149.18250 |
| 8/20/2008 | B5† | Palmer Hay Flats | 61.62289 | -149.18250 |
| 8/27/2008 | B6 | Palmer Hay Flats | 61.54268 | -149.47281 |
| 8/27/2008 | B7* | Palmer Hay Flats | 61.53022 | -149.50531 |
| 9/4/2008 | B8 | Palmer Hay Flats | 61.62906 | -149.18315 |
| 9/4/2008 | B9* | Palmer Hay Flats | 61.63878 | -149.18892 |
| 9/4/2008 | B10* | Palmer Hay Flats | 61.63937 | -149.19296 |
| 9/4/2008 | B11*† | Palmer Hay Flats | 61.64807 | -149.18712 |
| 9/8/2008 | B12 | Little Susitna | 61.69931 | -149.30032 |
| 9/8/2008 | B13*† | Little Susitna | 61.69214 | -149.29201 |
| 9/8/2008 | B14 | Palmer Hay Flats | 61.51288 | -149.62043 |
| 9/16/2008 | B15* | Palmer Hay Flats | 61.52925 | -149.59702 |
| 9/18/2008 | B16 | Little Susitna | 61.67875 | -149.40259 |
| 9/18/2008 | B17† | Little Susitna | 61.66646 | -149.38481 |
| 9/18/2008 | B18 | Little Susitna | 61.66142 | -149.41356 |
| 9/18/2008 | B19 | Little Susitna | 61.65981 | -149.42999 |
| 9/20/2008 | B20 | Little Susitna | 61.66262 | -149.46324 |
| 9/20/2008 | B21* | Little Susitna | 61.66209 | -149.46490 |

Table 3. Summary of fish sampling by site number for selected streams within the Petersville sampling area in the Mat-Su basin, 2008. Total lengths are reported in mm.

| Species | Number sampled | Minimum length | Maximum length |
|---|---|---|---|
| | *Site A01, Unnamed Tributary to Peters Creek* | | |
| Sculpin spp. | 1 | -- | -- |
| | *Site A02, Unnamed Tributary to Peters Creek* | | |
| Dolly Varden | 1 | -- | -- |
| | *Site A03, Unnamed Tributary to Peters Creek* | | |
| Sculpin spp. | 14 | -- | -- |
| Coho salmon | 31 | 32 | 56 |
| | *Site A04, Unnamed Tributary to Peters Creek* | | |
| Coho salmon | 5 | 41 | 55 |
| | *Site A05, Unnamed Tributary to Peters Creek* | | |
| Coho salmon | 1 | -- | -- |
| | *Site A06, Unnamed Tributary to Peters Creek* | | |
| Coho salmon | 10 | 41 | 79 |
| | *Site A07, Unnamed Tributary to Peters Creek* | | |
| No fish collected | -- | -- | -- |
| | *Site A08, Deep Creek* | | |
| Sculpin spp. | 3 | -- | -- |
| | *Site A09, Deep Creek* | | |
| Sculpin spp. | 3 | -- | -- |
| | *Site A10, Deep Creek* | | |
| Coho salmon | 6 | 113 | 136 |
| | *Site A11, Deep Creek* | | |
| Coho salmon | 3 | 125 | 137 |
| | *Site A12, Unnamed Tributary to Peters Creek* | | |
| Coho salmon | 42 | 71 | 146 |
| | *Site A13, Unnamed Tributary to Peters Creek* | | |
| Coho salmon | 5 | 84 | 120 |
| | *Site A14, Unnamed Tributary to Peters Creek* | | |
| No fish collected | -- | -- | -- |
| | *Site A15, Deep Creek* | | |
| No fish collected | -- | -- | -- |
| | *Site A16, Unnamed Tributary to Peters Creek* | | |
| Coho salmon | 5 | 89 | 124 |

Table 3. continued.

| Species | Number sampled | Minimum length | Maximum length |
|---|---|---|---|
| | *Site A17, Crowberry Creek* | | |
| Coho salmon | 7 | 86 | 117 |
| | *Site A18, Crowberry Creek* | | |
| No fish collected | -- | -- | -- |
| | *Site A19, Unnamed Tributary to Peters Creek* | | |
| No fish collected | -- | -- | -- |
| | *Site A20, Unnamed Tributary to Kroto Creek* | | |
| No fish collected | -- | -- | -- |
| | *Site A21, Unpublished Creek* | | |
| No fish collected | -- | -- | -- |
| | *Site A22, Unnamed Tributary to Deep Creek* | | |
| No fish collected | -- | -- | -- |
| | *Site A23, Unnamed Tributary to Deep Creek* | | |
| Coho salmon | 4 | 85 | 111 |
| | *Site A24, Unnamed Tributary to Jake Lake* | | |
| No fish collected | -- | -- | -- |
| | *Site A25, Unpublished Creek* | | |
| No fish collected | -- | -- | -- |
| | *Site A26, Unnamed Tributary to Peters Creek* | | |
| Sculpin spp. | 10 | -- | -- |
| | *Site A27, Unnamed Tributary to Peters Creek* | | |
| Sculpin spp. | 3 | -- | -- |
| | *Site A28, Unnamed Tributary to Kroto Creek* | | |
| No fish collected | -- | -- | -- |
| | *Site A29, Twentymile Creek* | | |
| Sculpin spp. | 23 | -- | -- |
| | *Site A30, Twentymile Creek* | | |
| Sculpin spp. | 31 | -- | -- |
| | *Site A31, Twentymile Creek* | | |
| Sculpin spp. | 31 | -- | -- |
| Coho salmon | 3 | 28 | 30 |
| | *Site A32, Twentymile Creek* | | |
| Coho salmon | 4 | 94 | 143 |

Table 3. continued.

| Species | Number sampled | Minimum length | Maximum length |
|---|---|---|---|
| | *Site A33, Twentymile Creek* | | |
| No fish collected | -- | -- | -- |
| | *Site A34, Unnamed Tributary to Ninemile Creek* | | |
| Sculpin spp. | 4 | -- | -- |
| Coho salmon | 2 | -- | 63 |
| | *Site A35, Unnamed Tributary to Ninemile Creek* | | |
| Coho salmon | 2 | -- | 69 |
| | *Site A36, Unnamed Tributary to Ninemile Creek* | | |
| Coho salmon | 2 | 68 | 74 |
| | *Site A37, Unnamed Tributary to Ninemile Creek* | | |
| Threespine stickleback | 3 | -- | -- |
| | *Site A38, Unnamed Tributary to Ninemile Creek* | | |
| Coho salmon | 2 | 60 | 70 |
| | *Site A39, Unnamed Tributary to Moose Creek* | | |
| Coho salmon | 11 | 45 | 69 |
| | *Site A40, Long Creek* | | |
| Dolly Varden | 2 | -- | -- |
| | *Site A41, Long Creek* | | |
| Dolly Varden | 1 | -- | -- |
| | *Site A42, Unnamed Tributary to Long Creek* | | |
| No fish collected | -- | -- | -- |
| | *Site A43, Unnamed Tributary to Long Creek* | | |
| No fish collected | -- | -- | -- |
| | *Site A44, Unnamed Tributary to Long Creek* | | |
| No fish collected | -- | -- | -- |
| | *Site A45, Unnamed Tributary to Long Creek* | | |
| No fish collected | -- | -- | -- |
| | *Site A46, Unnamed Tributary to Long Creek* | | |
| Dolly Varden | 3 | -- | -- |
| | *Site A47, Unnamed Tributary to Peters Creek* | | |
| Coho salmon | 24 | 50 | 119 |
| | *Site A48, Unnamed Tributary to Peters Creek* | | |
| No fish collected | -- | -- | -- |

Table 3. continued.

| Species | Number sampled | Minimum length | Maximum length |
|---|---|---|---|
| | *Site A49, Unnamed Tributary to Peters Creek* | | |
| No fish collected | -- | -- | -- |
| | *Site A50, Unnamed Tributary to Peters Creek* | | |
| No fish collected | -- | -- | -- |
| | *Site A51, Unnamed Tributary to Peters Creek* | | |
| Coho salmon | 39 | 66 | 138 |
| | *Site A52, Unnamed Tributary to Peters Creek* | | |
| Sculpin spp. | 4 | -- | -- |
| | *Site A53, Unnamed Tributary to Peters Creek* | | |
| Coho salmon | 38 | 34 | 58 |
| Chinook salmon | 2 | 45 | 51 |
| Sculpin spp. | 1 | -- | -- |
| | *Site A54, Unnamed Tributary to Peters Creek* | | |
| Coho salmon | 25 | 39 | 119 |
| | *Site A55, Unnamed Tributary to Peters Creek* | | |
| Dolly Varden | 3 | -- | -- |
| Sculpin spp. | 1 | -- | -- |
| | *Site A56, Unnamed Tributary to Peters Creek* | | |
| Coho salmon | 3 | 99 | 102 |
| | *Site A57, Unnamed Tributary to Peters Creek* | | |
| Coho salmon | 33 | 82 | 122 |
| | *Site A58, Unknown* | | |
| No fish collected | -- | -- | -- |
| | *Site A59, Unnamed Tributary to Ninemile Creek* | | |
| Coho salmon | 13 | 51 | 104 |
| | *Site A60, Unnamed Tributary to Seventeenmile Creek* | | |
| No fish collected | -- | -- | -- |
| | *Site A61, Unnamed Tributary to Long Creek* | | |
| No fish collected | -- | -- | -- |
| | *Site A62, Seventeenmile Creek* | | |
| No fish collected | -- | -- | -- |

Table 4. Summary of fish sampling by site number for selected streams within the core sampling area in the Mat-Su basin, 2008. Total lengths are reported in mm. *Visual count of adult spawning fish.

| Species | Number sampled | Minimum length | Maximum length |
|---|---|---|---|
| | *Site B1, Rabbit Slough* | | |
| Coho salmon | 12 | 41 | 119 |
| Alaska blackfish | 2 | -- | -- |
| | *Site B2, Government Creek* | | |
| Dolly Varden | 12 | -- | -- |
| | *Site B3, Government Creek* | | |
| Dolly Varden | 9 | -- | -- |
| | *Site B4, "Snowgoose Pond"* | | |
| Threespine stickleback | 75 | -- | -- |
| | *Site B5, "Snowgoose Pond"* | | |
| Threespine stickleback | 233 | -- | -- |
| Coho salmon | 2 | -- | 110 |
| | *Site B6, Cottonwood Slough* | | |
| No fish collected | -- | -- | -- |
| | *Site B7, Cottonwood Slough* | | |
| Coho salmon | 9 | 60 | 121 |
| Sculpin spp. | 1 | -- | -- |
| | *Site B8, Snowgoose Creek* | | |
| Threespine stickleback | 1 | -- | -- |
| Sculpin spp. | 3 | -- | -- |
| | *Site B9, Carnagie Creek* | | |
| Coho salmon | 7 | 59 | 85 |
| | *Site B10, Unnamed Tributary to Carnagie Creek* | | |
| Coho salmon | 17 | 43 | 100 |
| | *Site B11, Unnamed Tributary toWasilla Creek* | | |
| Coho salmon | 2 | -- | 92 |
| Dolly Varden | 2 | -- | -- |
| | *Site B12, "Moose Lick Creek"* | | |
| Coho salmon | 8 | 42 | 52 |
| Dolly Varden | 12 | -- | -- |
| | *Site B13, Unnamed Tributary to "Moose Lick Creek"* | | |
| Coho salmon | 4 | 42 | 54 |

Table 4. continued.

| Species | Number sampled | Minimum length | Maximum length |
|---|---|---|---|
| | *Site B14, Crocker Creek* | | |
| Threespine stickleback | 46 | -- | -- |
| Sockeye salmon* | 6 | -- | -- |
| | *Site B15, Crocker Creek* | | |
| Coho salmon* | 5 | -- | -- |
| Sockeye salmon* | 4 | -- | -- |
| Dolly Varden | 22 | -- | -- |
| | *Site B16, Unnamed Tributary to Little Susitna River* | | |
| Dolly Varden | 23 | -- | -- |
| Sculpin spp. | 10 | -- | -- |
| | *Site B17, Unnamed Tributary to Little Susitna River* | | |
| Coho salmon* | 2 | -- | -- |
| Coho salmon | 6 | 36 | 48 |
| | *Site B18, Unnamed Tributary to Little Susitna River* | | |
| Coho salmon* | 5 | -- | -- |
| Coho salmon | 4 | 48 | 56 |
| Dolly Varden | 1 | -- | -- |
| | *Site B19, Unnamed Tributary to Little Susitna River* | | |
| Coho salmon | 12 | 39 | 73 |
| | *Site B20,Coal Creek* | | |
| Dolly Varden | 5 | -- | -- |
| | *Site B21,Coal Creek* | | |
| Coho salmon* | 5 | -- | -- |

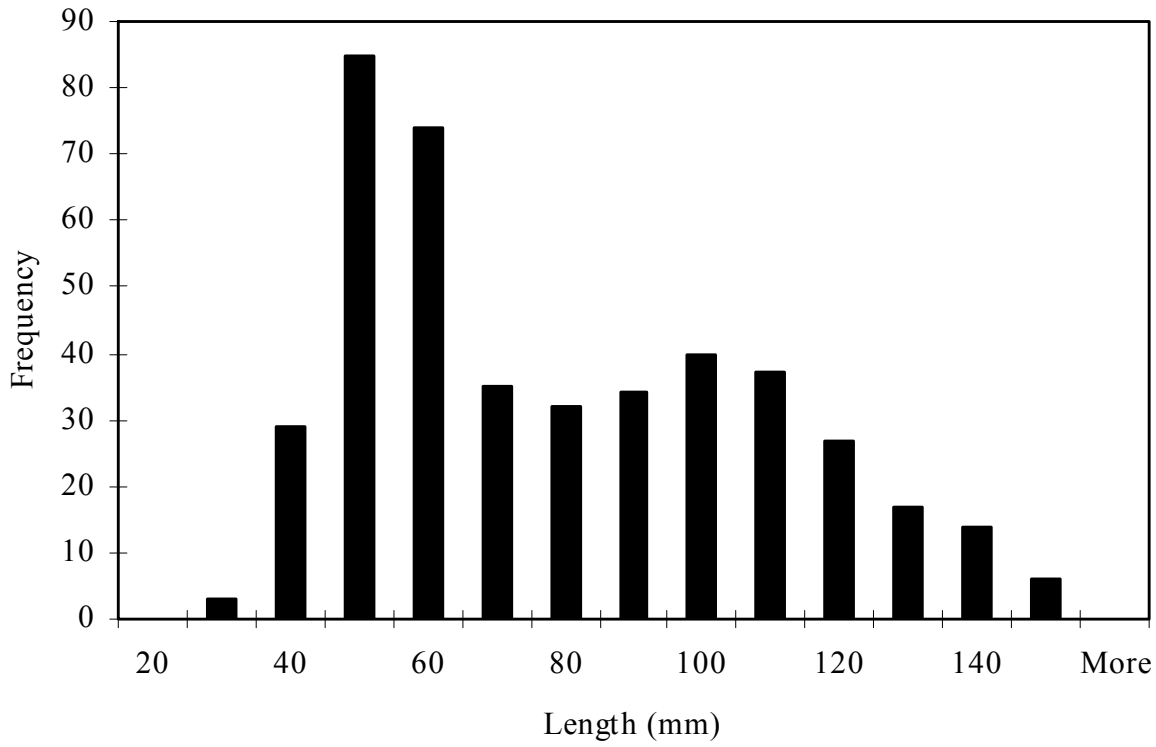


Figure 2. Length-frequency distribution of coho salmon sampled in Mat-Su basin streams, 2008.

Table 5. Summary of physical habitat parameters, water chemistry, and fishing effort by site number for streams within the Petersville sampling area in the Mat-Su basin, 2008. Stream order from Strahler (1952; channel types from Rosgen (1994). Voltage output necessary to achieve taxis and average minnow trap soak times recorded; other electrical parameters used for electrofishing include the use of pulsed DC, 30 Hz frequency, and 25% duty cycle. *Beaver complex.

| Site no. | Stream order | Reach length (m) | Wetted width (m) | Channel type | Temp (°C) | Conductivity (µmho/cm) | pH | Volts (V) | Soak time (min) |
|---|---|---|---|---|---|---|---|---|---|
| A1 | 1 | 50 | 1.25 | E4 | 10.5 | -- | 6.7 | 350 | -- |
| A2 | 1 | 70 | 1.8 | E3 | 11.2 | -- | 6.3 | 350 | -- |
| A3 | 2 | 80 | 2.6 | E3 | 13.1 | -- | 6.3 | 340 | -- |
| A4 | 1 | 76 | 1.8 | B3 | 11.9 | -- | 5.9 | 350 | -- |
| A5 | 1 | 140 | 3.2 | B3 | 11.7 | -- | 5.9 | 350 | -- |
| A6 | 1 | 120 | 3 | E3 | 11.6 | -- | 5.7 | 400 | -- |
| A7 | 1 | 40 | 2.4 | E3 | -- | -- | -- | 400 | -- |
| A8 | 2 | 80 | 2.15 | B4 | 11.5 | -- | 5.5 | 400 | -- |
| A9 | 2 | 90 | 2.3 | B3 | 12 | -- | 5.9 | 400 | -- |
| A10 | 2 | -- | -- | *Beaver | 9.5 | -- | -- | -- | 200 |
| A11 | 2 | -- | -- | *Beaver | -- | -- | -- | -- | 248 |
| A12 | 1 | -- | -- | E4 | -- | -- | -- | -- | 115 |
| A13 | 1 | -- | -- | E4 | -- | -- | -- | -- | 223 |
| A14 | 1 | -- | -- | E4 | 10.8 | -- | -- | -- | 121 |
| A15 | 2 | -- | -- | *Beaver | -- | -- | -- | -- | 139 |
| A16 | 1 | -- | -- | E4/*Beaver | -- | -- | -- | -- | 137 |
| A17 | 2 | -- | -- | E4 | 11.4 | -- | -- | -- | 123 |
| A18 | 1 | -- | -- | E4 | 14.2 | -- | -- | -- | 119 |
| A19 | 1 | -- | -- | E4/*Beaver | 11.9 | -- | -- | -- | 138 |
| A20 | 1 | -- | -- | E4 | -- | -- | -- |  | 100 |
| A21 | 1 | -- | -- | E4 | -- | -- | -- |  | 152 |
| A22 | 1 | -- | -- | E4 | -- | -- | -- |  | 117 |
| A23 | 1 | 70 | 1.32 | E4 | 12.2 | -- | -- | 450 | -- |
| A24 | 1 | 140 | 3.6 | E4 | 15.2 | -- | -- | 450 | -- |
| A25 | 1 | 48 | 1.2 | E4 | 3 | -- | -- | 450 | -- |
| A26 | 1 | 80 | 1.9 | E4 | 16.4 | -- | -- | 450 | -- |
| A27 | 1 | 76 | 1.8 | E4 | 15.4 | -- | -- | 450 | -- |
| A28 | 1 | -- | -- | *Beaver | -- | -- | -- | 450 | -- |
| A29 | 1 | 120 | 3 | C4 | 15 | -- | -- | 450 | -- |

Table 5. continued.

| Site no. | Stream order | Reach length (m) | Wetted width (m) | Channel type | Temp. (°C) | Conductivity (µmho/cm) | pH | Volts | Soak time (min) |
|---|---|---|---|---|---|---|---|---|---|
| A30 | 1 | 80 | 2.7 | C4 | 13 | -- | -- | 450 | -- |
| A31 | 1 | 80 | 2 | B4 | 13.8 | -- | -- | 450 | -- |
| A32 | 1 | -- | -- | *Beaver | -- | -- | -- | 450 | -- |
| A33 | 1 | 24 | 0.65 | E5 | 9.9 | -- | -- | 450 | -- |
| A34 | 1 | 60 | 1.5 | E3 | -- | -- | -- | 410 | -- |
| A35 | 1 | 48 | 1.2 | B3 | -- | -- | -- | 410 | -- |
| A36 | 1 | 128 | 3.2 | B3 | -- | -- | -- | 450 | -- |
| A37 | 1 | 52 | 1.9 | E3 | -- | -- | -- | 450 | -- |
| A38 | 1 | 120 | 3.1 | E4 | -- | -- | -- | 450 | -- |
| A39 | 1 | 40 | 0.9 | C5 | -- | -- | -- | 450 | -- |
| A40 | 1 | 30 | 0.75 | E4 | -- | -- | -- | 450 | -- |
| A41 | 1 | 64 | 1.6 | C4 | -- | -- | -- | 450 | -- |
| A42 | 1 | 44 | 1.1 | B3 | -- | -- | -- | 450 | -- |
| A43 | 1 | 36 | 0.9 | B3 | -- | -- | -- | 450 | -- |
| A44 | 1 | 44 | 1.1 | B3 | -- | -- | -- | 450 | -- |
| A45 | 1 | 52 | 1.3 | B3 | -- | -- | -- | 450 | -- |
| A46 | 1 | 48 | 1.2 | B3 | -- | -- | -- | 400 | -- |
| A47 | 1 | -- | -- | *Beaver | -- | -- | -- | -- | |
| A48 | 1 | -- | -- | B4 | -- | -- | -- | -- | |
| A49 | 1 | -- | -- | *Beaver | -- | -- | -- | -- | |
| A50 | 1 | -- | -- | *Beaver | -- | -- | -- | -- | |
| A51 | 1 | -- | -- | *Beaver | -- | -- | -- | -- | |
| A52 | 1 | 56 | 1.4 | D4 | -- | -- | -- | 400 | -- |
| A53 | 1 | 124 | 3.1 | B3 | -- | -- | -- | 400 | -- |
| A54 | 1 | 80 | 2 | B3 | -- | -- | -- | 400 | -- |
| A55 | 1 | 68 | 1.7 | B3 | -- | -- | -- | 400 | -- |
| A56 | 1 | 104 | 2.6 | B3/B4 | -- | -- | -- | 425 | -- |
| A57 | 1 | -- | -- | E4 | -- | -- | -- | -- | 50 |
| A58 | 1 | -- | -- | DA | -- | -- | -- | -- | 169 |
| A59 | 1 | -- | -- | E4 | -- | -- | -- | -- | 11 |
| A60 | 1 | -- | -- | -- | -- | -- | -- | -- | 311 |
| A61 | 1 | -- | -- | -- | -- | -- | -- | -- | 33 |
| A62 | 1 | -- | -- | -- | -- | -- | -- | -- | 57 |

Table 6. Summary of physical habitat parameters, water chemistry, and fishing effort by site number for streams within the core sampling area in the Mat-Su basin, 2008. Stream order from Strahler (1952); channel types from Rosgen (1994). Voltage output necessary to achieve taxis and average minnow trap soak times recorded; other electrical parameters used for electrofishing include the use of pulsed DC, 30 Hz frequency, and 25% duty cycle.

| Site no. | Stream order | Reach length (m) | Wetted width (m) | Channel type | Temp. (°C) | Conductivity (µmho/cm) | pH | Volts (V) | Soak time (min) |
|---|---|---|---|---|---|---|---|---|---|
| B1 | 1 | 86 | 2.3 | Slough | 7.9 | -- | 6.97 | 325 | -- |
| B2 | 2 | 176 | 4.4 | B2a | 7.9 | -- | -- | 450 | -- |
| B3 | 2 | 160 | 4 | B2a | 9.6 | -- | -- | 410 | -- |
| B4 | 1 | -- | -- | Pond | 14.6 | -- | 5.45 | -- | 36 |
| B5 | 1 | -- | -- | Pond | -- | -- | -- | -- | 29 |
| B6 | 1 | 130 | 2.5 | DA6 | -- | -- | -- | 350 | -- |
| B7 | 1 | 65 | 0.7 | DA6 | -- | -- | -- | 350 | -- |
| B8 | 1 | 64 | 1.8 | B5 | -- | -- | -- | 300 | -- |
| B9 | 1 | 124 | 3.1 | C5 | -- | -- | -- | 300 | -- |
| B10 | 1 | 48 | 1.2 | B4 | -- | -- | -- | 300 | -- |
| B11 | 1 | 64 | 1.8 | B3 | -- | -- | -- | 300 | -- |
| B12 | 1 | 84 | 2.1 | B4 | -- | -- | -- | 290 | -- |
| B13 | 1 | 44 | 2.1 | B4 | -- | -- | -- | 290 | -- |
| B14 | 2 | -- | -- | Pond | -- | -- | -- | -- | 62 |
| B15 | 1 | 108 | 2.7 | B4 | 7.9 | 93 | -- | 215 | -- |
| B16 | 2 | 108 | 2.7 | B3 | 7.2 | 41 | -- | 320 | -- |
| B17 | 2 | 64 | 1.8 | B3 | -- | -- | -- | 350 | -- |
| B18 | 1 | 148 | 3.2 | -- | 7.6 | 42.6 | -- | 400 | -- |
| B19 | 1 | 80 | 2 | B3 | 8.1 | 54.3 | -- | 350 | -- |
| B20 | 1 | 92 | 2.3 | B4 | 7.1 | 49.3 | -- | 400 | |
| B21 | 1 | -- | -- | B5 | -- | -- | -- | -- | -- |

*Kahiltna River watershed*

Cache Creek and Peters Creek are the two primary tributaries within the Kahiltna River watershed and Petersville Road study area (Figure 3). Forty-two sites on 12 different streams were sampled within the Kahiltna watershed in 2008. Petersville Road has a paved surface up to approximately milepost 11, where it transitions to a gravel surface. The gravel road accesses the Cache Creek mining district, near the headwaters of Long Creek. Long Creek narrows and becomes high gradient just above our sample sites (Sites A40 –A41), and where likely habitat for coho salmon existed, only Dolly Varden were captured. The unnamed tributary to Long Creek (Sites A42 –A46 and Site 61) was generally characterized by ephemeral flow and possible gradient barriers at its headwater, with the stream occasionally disappearing underground along some reaches. At Site A44, the road crosses the stream without a culvert, preventing adequate fish passage.

An extensive beaver complex was located on Deep Creek (Sites A8 – A11, A15). The topography of the area is such that the highest of the dammed pools feeds both Deep Creek and a new, unmapped stream that appears to run to Kroto Lake (62.44505$^{o}$, -150.68456$^{o}$; Figure 4). Because of time constraints, this new stream was not followed in order to obtain a GPS track for mapping purposes. Kroto Creek (which includes Kroto Lake) is cataloged in the AWC. We were able to substantiate and nominate an extension for Deep Creek in the AWC upstream to Site A11.

There are four separate unnamed tributaries to Peters Creek that were sampled. The first tributary (Sites A4 – A7, A12 - A13), is located just west of Kenny Creek (Figure 3). At Site A7, this unnamed tributary included multiple beaver ponds, with some dams as high as 2 m. Upstream movement by juvenile salmonids is restricted due to the height and configuration of the taller dams. However, the upper limit of anadromy was located upstream of A7, at Site A13, an area of slow, deep pools located near the wetland headwater. Lengths of the five coho salmon minnow trapped at Site A13 and the apparent barrier of the dams suggest that these coho salmon overwintered in this location. The second unnamed tributary to Peters Creek (Sites A1 - A2, A14, A56) also included beaver dams in excess of 2 m, and this tributary was nominated for inclusion in the AWC at Site A56, where the taller beaver dam occurred. We did not capture anadromous fish at the three sites further upstream; however, the limit of anadromy probably extends beyond Site A56. The third unnamed tributary to Peters Creek (Sites A47 – A52) was also nominated for inclusion in the AWC, where the limit of anadromy occurs just below a large and active beaver complex at Site A51. The fourth and last unnamed tributary to Peters Creek sampled in 2008 is an unmapped stream (Sites A53 – A55). We were able to nominate this stream to the AWC at Site A54, where the extent of anadromy was limited by a culvert with a 0.6 m perch. A GPS track was obtained from Site A54 down to the stream's confluence with Peters Creek; a digital line graph (DLG) was derived from the track and submitted with the AWC nomination for mapping purposes.

An additional nomination to the AWC from the Kahiltna watershed in 2008 includes Crowberry Creek at Site A17. No fish were collected at Site A18, but a lack of barriers suggests that the actual extent of anadromy may be located somewhere between these two sites. Crowberry Creek is a tributary to Kenny Creek (Figure 3).

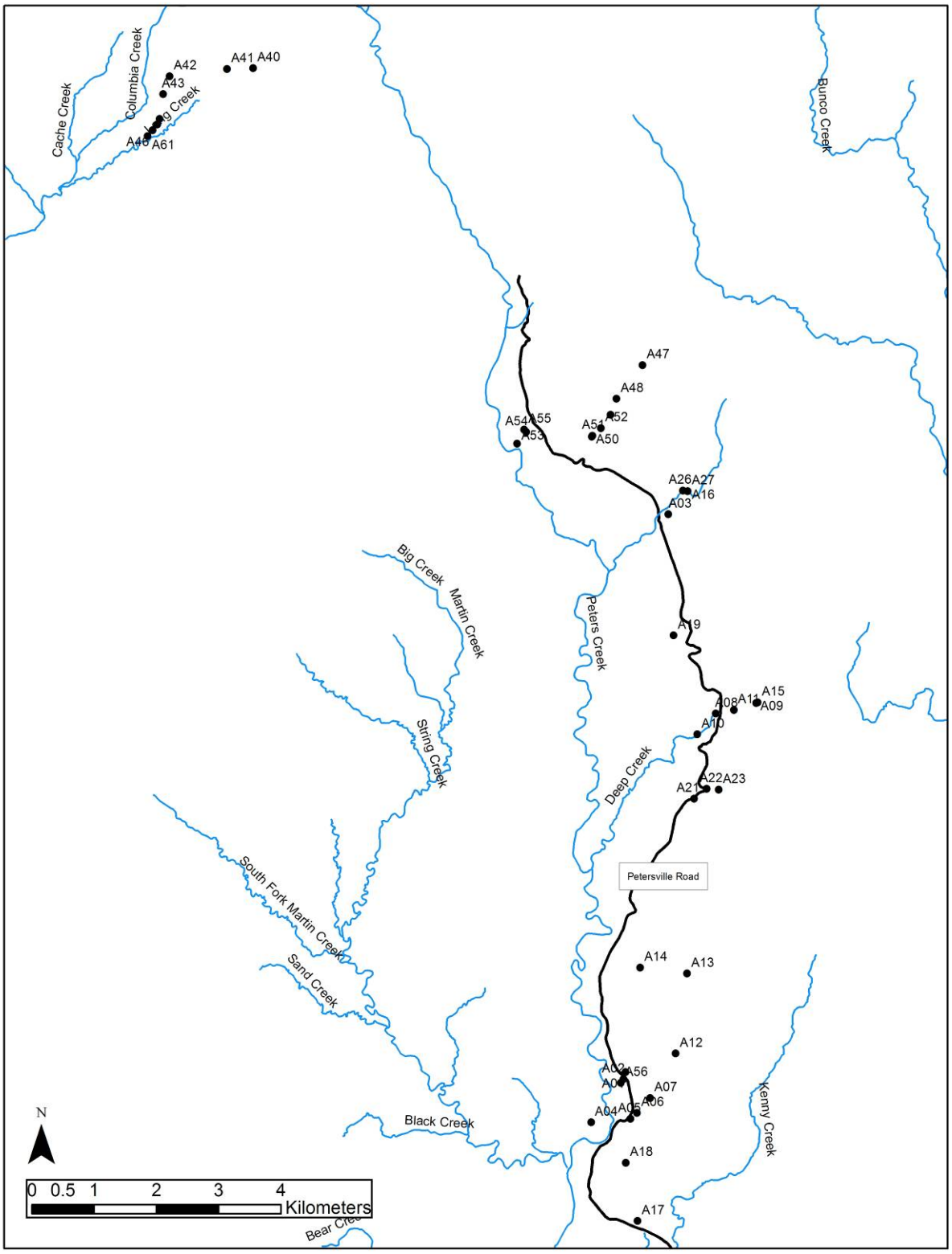


Figure 3. Kahiltna watershed in the Petersville sampling area, 2008. Blue lines represent streams and black lines represent roads.

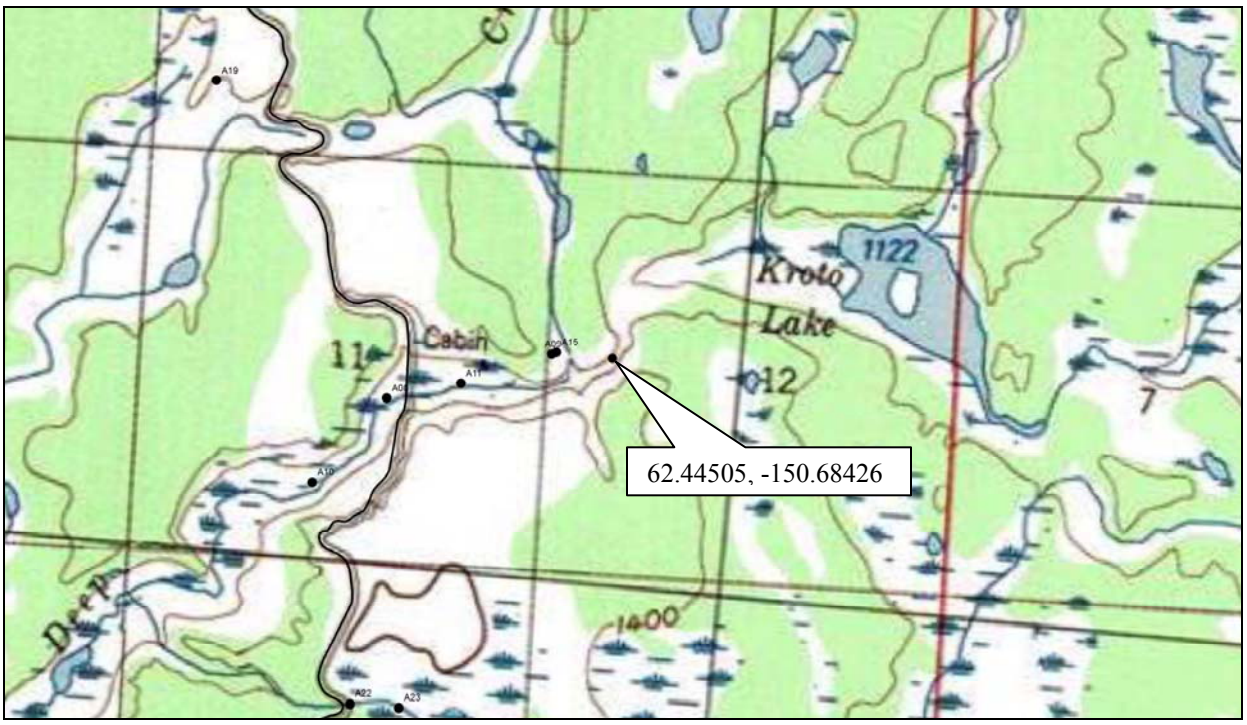


Figure 4. A GPS location (decimal degrees, NAD27) marking one point along a new, unmapped stream that originates from a large beaver complex located on Deep Creek and is believed to flow into Kroto Lake.

*Deshka River watershed*

Study sites in the Deshka River watershed and Petersville Road sampling area occur east of Kenny Creek (Figure 5). Twenty sites on nine different streams were sampled from within the Deshka drainage in 2008. Twentymile Creek (Sites A29 – A33) was cataloged as anadromous up to the upstream side of Petersville Road, but we were able to extend the limit of anadromy to an extensive beaver complex located at Site A32. Upstream of the beaver complex, Twentymile Creek narrows to a shallow stream with very low flow.

Two other streams in this watershed received nomination to the AWC. An unnamed tributary to Moose Creek is a meandering system with good rearing habitat through Site A57, and up to A39. Site A39 is likely the uppermost extent of anadromy, as we observed a potential gradient barrier at the top of the reach. The unnamed tributary to Ninemile Creek (Sites A34 – A38, A59) was nominated for inclusion in the AWC up to Site A38.

*Little Susitna River watershed*

Ten sites were sampled on seven streams that contribute to the Little Susitna River watershed (Figure 6). The streams sampled in the Government Creek area originate on borough-owned land near Government Peak, north of the Edgerton-Parks Highway. Government Creek is listed in the AWC. We were unable to extend the limits of anadromy beyond that already mapped, but submitted a backup nomination to the AWC. Both Sites B2 and B3 are higher gradient reaches with intermittent step pools and cobble substrate. Resident Dolly Varden were captured at both sample sites.

The unnamed tributary to Little Susitna River immediately east of Government Creek (Figure 6) originates on borough-owned land to the north of Waldo Reed Road and flows through several tracts of private property before it crosses at a culvert on Moose Lick Road. We were unable to capture anadromous salmonids above 750 ft elevation on "Moose Lick Creek" (Site B12); however, we did document coho salmon on an unmapped tributary to "Moose Lick Creek' (Site B13). Fish passage is impeded at this point by a severely perched pond outlet on private property. A GPS track was obtained for the entire length of this unmapped tributary; a DLG was derived from the track and submitted with the AWC nomination for mapping purposes.

Adult coho salmon were observed trying to move upstream on Coal Creek (Figure 6), but passage was blocked by a >2 m perched culvert on a well-maintained private gravel road (Site B21). This is a higher gradient stream, but possesses both spawning and rearing habitat (Site B20). Coal Creek was nominated for an extension in the AWC up to Site B21, and details regarding the perched culvert were forwarded to our Habitat Restoration Branch.

Three additional unnamed tributaries to the Little Susitna River were sampled in 2008, but did not result in changes to the AWC. The first tributary (Site B19; Figure 6) is characterized as having a narrow channel with high velocity with cobble substrate. Salmon rearing habitat is created by large woody debris (LWD) undercuts and sidepools. The second tributary was sampled at the culvert north of Holobinko Road (Site B18), where both spawning adult and juvenile coho salmon were located. This second tributary was also sampled upstream of where it crosses Moose Meadows Road Site B16), but while the habitat was suitable for salmon, we only captured sculpin and Dolly Varden. Lastly, Site B17 sampled an unnamed tributary to the Little Susitna River just west of Close Street. Both adult and juvenile coho were observed at B17, but the actual location of the stream course is inconsistent on various maps; however, we did not have time to ground-truth the stream for mapping purposes.

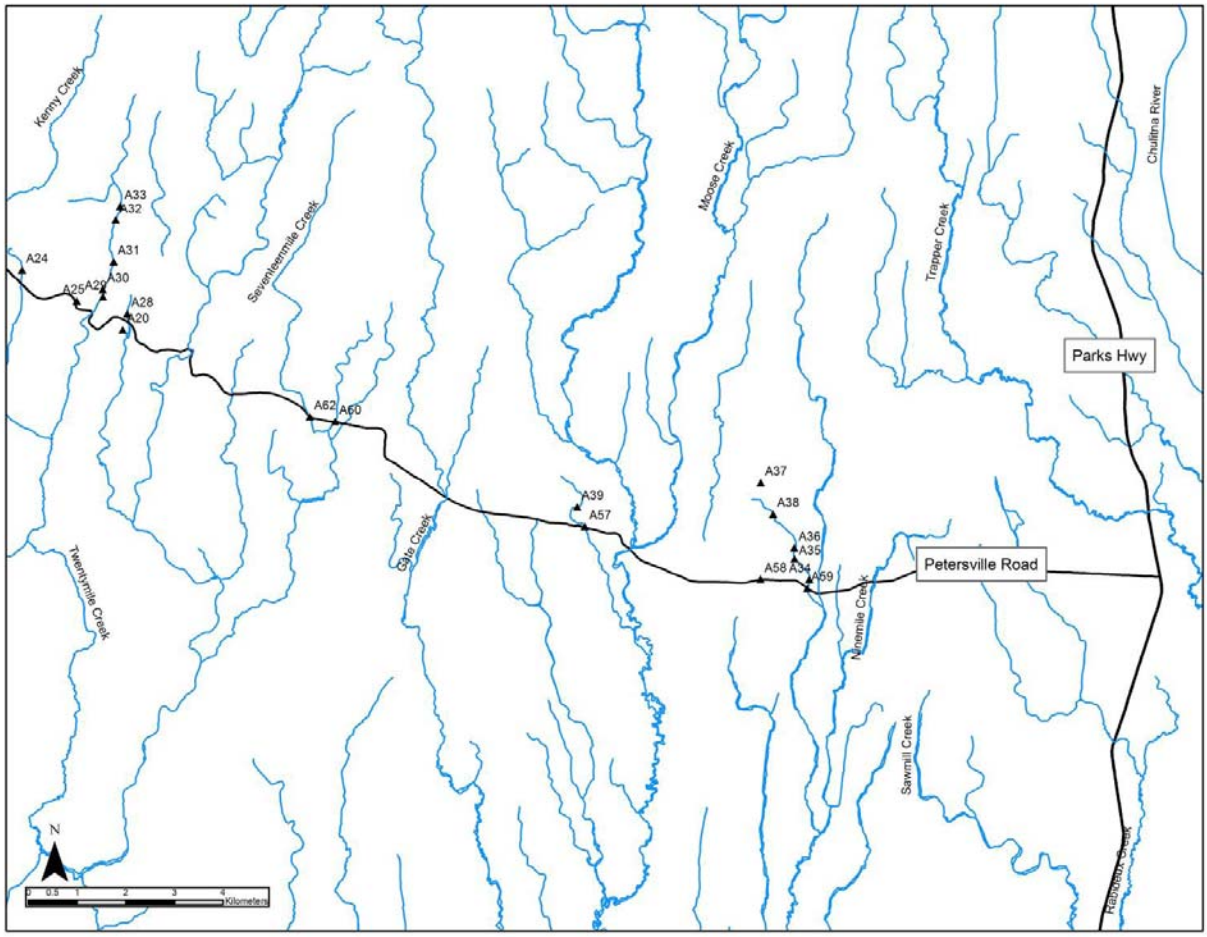


Figure 5. Deshka watershed in the Petersville sampling area, 2008. Blue lines represent streams and black lines represent roads.

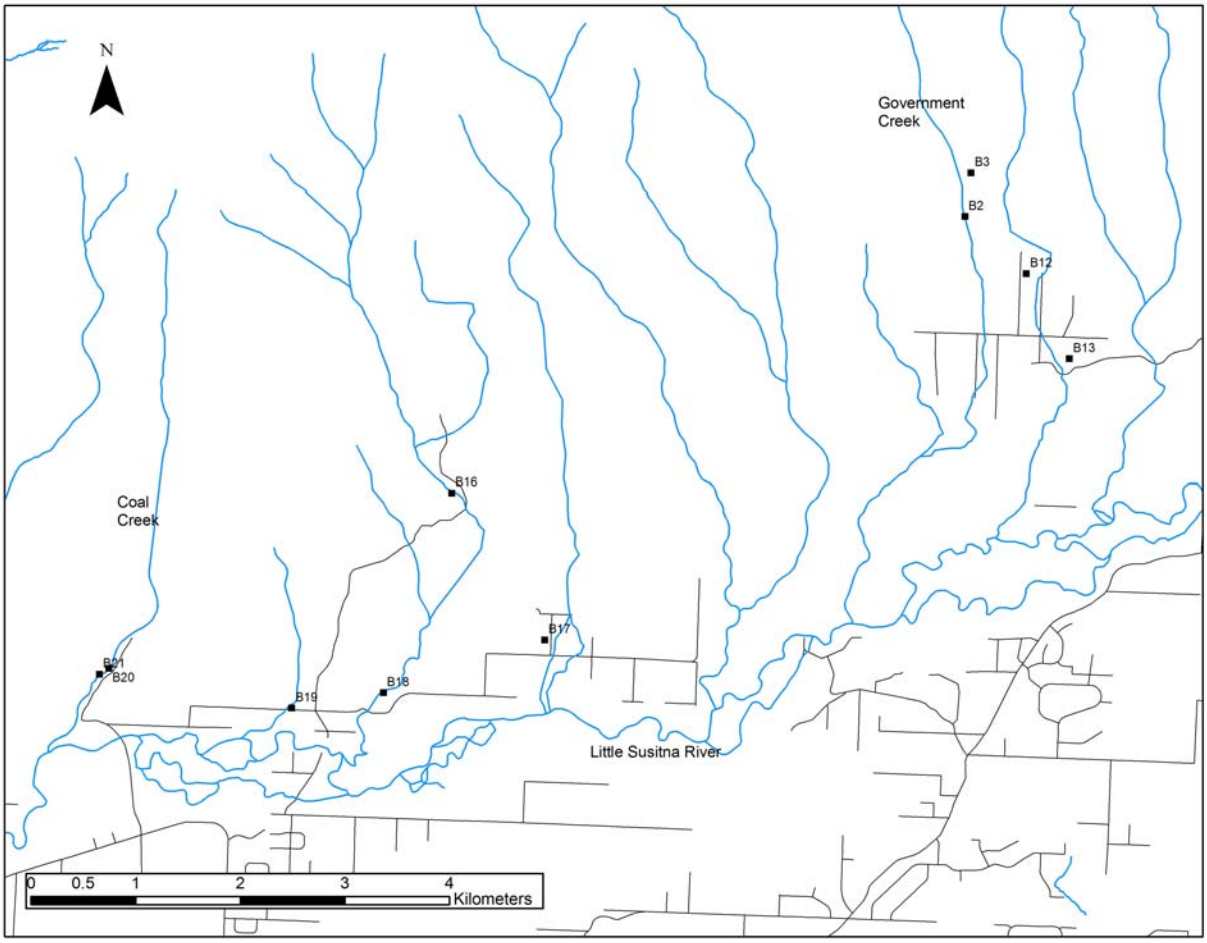


Figure 6. Little Susitna River watershed in the Core sampling area, 2008. Blue lines represent streams and black lines represent roads.

*Palmer Hay Flats watershed*

The streams that flow through the Palmer Hay Flats Game Refuge drain into the Knik Arm of Cook Inlet (Figure 7). Within this area, we sampled 11 sites in eight streams. The first of these appears to be one of several perennial side channels to Rabbit Slough. In 2007, we sampled and nominated this channel only as far as 61.54205, -149.20816 (decimal degrees, NAD27; Anderson and Tanner 2008). In 2008, we followed the channel to its source, which is where a gravel dike artificially separates the Matanuska River from Rabbit Slough. The side channel that we followed runs to the base of the dike, where water pools along the base. Juvenile coho salmon were found throughout the Rabbit Slough side channel and up to the base of the dike (Site B1), allowing the entirety of the channel to be nominated for inclusion in the AWC.

Cottonwood Slough is located in the residential outskirts of Wasilla. In one reach, the slough has been forced to run through an artificial ditch with multiple driveway culverts along West Trapline Drive. We were able to nominate Cottonwood Slough for an extension to the AWC only as far upstream as Site B7, which runs approximately 175 m beyond Fairview Loop Road. Site B7 is the start of a boggy wetland, and though we did not capture fish at Site B6, juvenile coho probably utilize habitat above B7 during high water events.

We sampled on four separate Wasilla Creek tributaries. In 2007, we captured a juvenile coho salmon on Snowgoose Creek at 61.62053, -149.18803 (decimal degrees, NAD27; Anderson and Tanner 2008), but did not have time to sample the small pond that we believed was the stream headwater. In 2008, we witnessed heavy surface feeding by juvenile salmon at "Snowgoose Pond" (B4), a shallow bog pond, and were able to minnow trap two pre-smolt coho salmon near the pond margin (B5). Additionally, we discovered an inlet to the pond, where Snowgoose Creek continues upstream as a wide, shallow, meandering stream with a silty substrate (B8). The second and third Wasilla Creek tributaries sampled in 2008 were accessed from Palmer-Fishhook Road near Babcock Road. Both Carnegie Creek (B9) and its unnamed tributary (B10) received AWC nominations, and both of these streams have culverts that may inhibit fish passage. The last Wasilla Creek tributary sampled is unpublished, unnamed, runs north of Carnagie Creek near Bonnie Drive, and was nominated for addition to the AWC at Site B11.

The last of the streams sampled in the Palmer Hay Flats area is Crocker Creek. The lower reach sampled (B14) is incorporated into a palustrine emergent wetland, and adult sockeye salmon were seen moving upstream through the system. We identified a culvert limiting fish passage for spawning coho and sockeye salmon, as well as Dolly Varden of various age classes, at Site B15, and though this may not be the extent of anadromy, we nominated an extension of Crocker Creek up to B15. The presence of larger bodied salmon and Dolly Varden restricted our ability to electrofish Crocker Creek, but this is a productive system for several non-salmonids, including threespine stickleback, and at least three salmonid species.

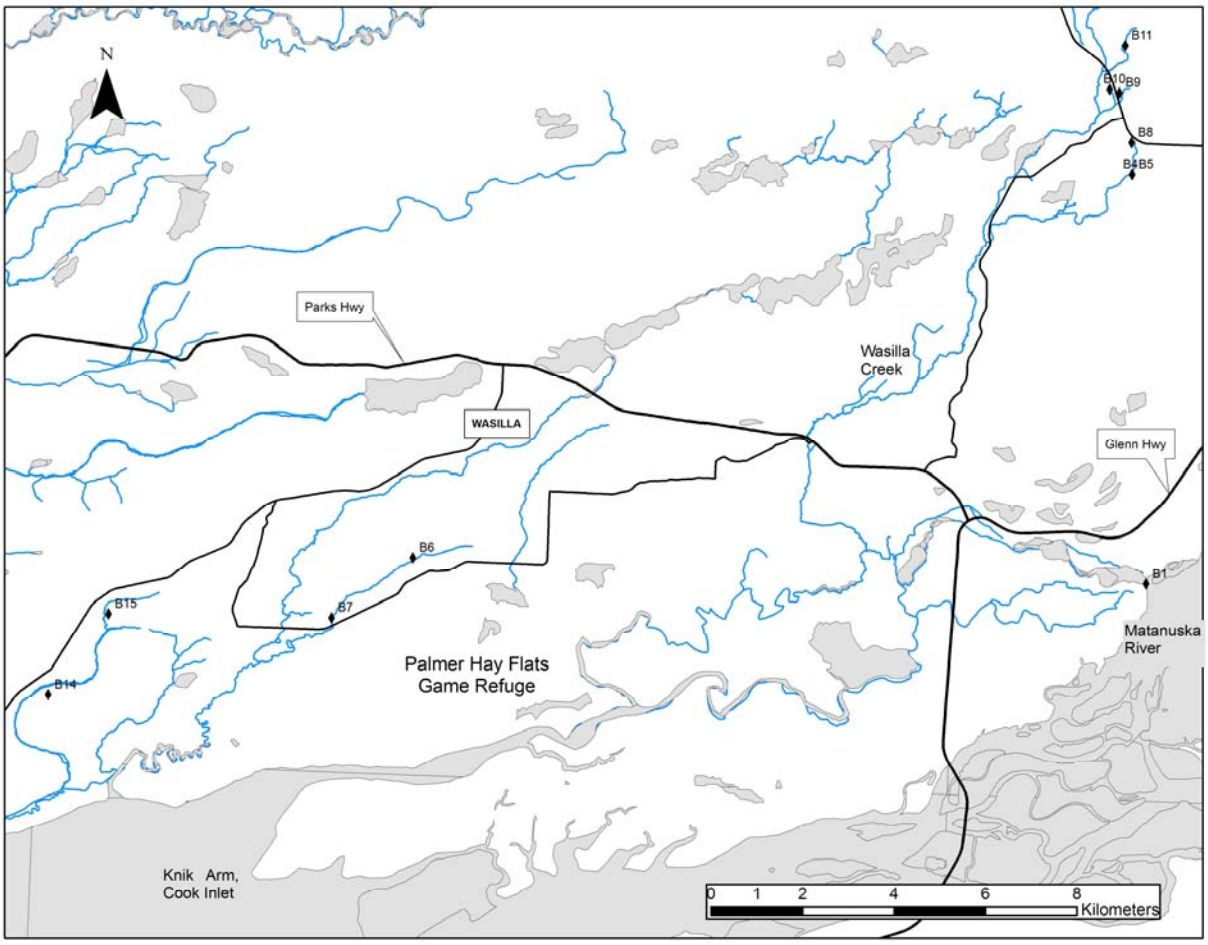


Figure 7. Palmer Hay Flats watershed in the Core sampling area, 2008. Blue lines represent streams and black lines represent roads.

## Discussion

Our sampling in 2008 was successful for updating the AWC. We sampled 83 reaches in 36 different streams resulting in 20 nominations to the AWC. In 2007, we identified two practices that impaired our sampling efficiency. The first was an easy item to remedy in 2008; this was the need for a standardized field data form. Sampling forms ensured that we were able to consistently record data at each site and allow for orderly record keeping and cross-checks. The second proved to be as much of a challenge in 2008 as it was in 2007. Obtaining permission from property owners in order to access stream reaches on their land was at times difficult and time consuming. Parcel ownership was complicated to ascertain for some properties, and some owners were not available. For the most part, the course of the streams themselves and the habitat we had to hike through altered our intended work plans and the usefulness of landowners' permissions requested in advance.

There are two common problems with available, mapped stream layers. First, streams are mobile, changing landscape features. As a result, maps may not represent current streambed locations. Second, we encountered multiple unmapped streams (i.e., not documented on USGS 1:63,360 maps). In both instances, we often had to backtrack in order to ensure we were allowed access on private property where the stream took an unexpected turn. Most of the unmapped streams were encountered specifically because we performed a census of stream crossings on Petersville Road. We followed segments of a few of these streams in order to get a GPS track, from which a stream layer was created in GIS. Time and personnel limitations prevented further follow-up on the ground at these sites, but point and line location data were noted when possible.

The backpack electrofisher was effective over the range of water conductivity encountered in 2008. However, some small fish might not have been captured. We observed small stickleback (< 20 mm) that were not affected by the electrical field even though we were able to induce electrotaxis on larger fish (> 50 mm) at the same site. We may have been able to induce electrotaxis on the smaller fish by increasing the power output, but we did not want to risk injury to the larger fish.

We did not consistently collect all habitat data at each site. Some omissions were intentional if the sample reaches were only separated by a few hundred meters and some were the result of equipment malfunctions. The Mat-Su basin experienced an unusually wet summer in 2008, and despite efforts to maintain and protect the water-resistant units, the water quality multimeters were either unreliable or inoperable through most of our field season, resulting in poor water quality data collection. In order to prevent the same situation from developing in coming field work, ruggedized and waterproof water quality multimeters have been purchased.

One significant recommendation for future work relates to the type of nominations submitted to the AWC. In 2008, we worked in several streams where a polygon nomination would have been a more appropriate nomination. Wetland areas, well-established beaver complexes, and braided systems may qualify for a polygon nomination as long as the area is appropriately sampled and documented. This may afford better protection for these dynamic or convoluted anadromous habitats. Additional future work should also be directed at substantiating extant entries to the AWC. These entries can be identified by contacting the ADF&G Sport Fish Division, Region V in Anchorage, Alaska.

This project should be continued in future years in support of the Mat-Su Basin Habitat Partnership's strategic action plan and the NFHAP. Inclusion of stream reaches in the AWC

offers basic levels of protection under AS 41.14.871, which addresses goals and objectives of the NFHAP and the Partnership. Consultations with USFWS and ADF&G personnel to select sample areas should continue in future years.

## Acknowledgements

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