

## **APPENDIX C**

### **WETLANDS, VEGETATION MAPPING AND WILDLIFE ASSESSMENT**

**Wetland Delineation,  
Vegetation Classification, and Wildlife Assessment  
Taylor Highway Project  
Chicken, Alaska to  
Canadian Border**

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## EXECUTIVE SUMMARY

Shannon & Wilson, Inc. conducted a wetland delineation, essential fish habitat assessment, and wildlife habitat evaluation for the Taylor Highway MP 64.5 to Canadian Border Environmental Assessment project (referred to herein as the Taylor Highway project). The project area consisted of the right of way along approximately 44 miles of Taylor Highway from Chicken, Alaska, east to the Canadian border.

The project corridor passes through the Mosquito Fork, Chicken Creek, South Fork, Walker Fork, and Wade Creek drainages. Several of the drainages have been mined extensively using placer mining techniques. Impacts of the mining such as braided, unvegetated riparian channels are still clearly evident within Chicken, Lost Chicken, and Wade Creeks.

The dominant plant assemblage throughout the project area is an open, needle leaf forest community. The second most dominant plant community along the alignment, primarily west of Walker Fork, includes an open broadleaf forest. At the higher elevations, from approximately the highway junction near Milepost 95 of the Taylor Highway, to the Canadian border, the area is generally devoid of trees although some areas were dominated by willow (*Salix planifolia*). This higher-elevation area is classified as an open, tall scrub community.

Wetlands were identified and delineated for the project area using methods described in the 1987 Corps of Engineers Wetland Delineation Manual. The field survey and wetland delineation was limited to those areas within the road right of way. Due to the size of the project area, wetland boundaries were not flagged. Approximate wetland boundaries were drawn on maps provided by ASCG, Inc. (ASCG) and included in Appendix B.

The wetlands along the alignment can be distinguished by vegetation type, which is influenced by the areas hydrologic regime, soil type, and past disturbance. In general, two wetland types were observed. Wetland functions and values were assessed using best professional judgment.

The site wetlands provide some habitat for sport fisheries such as arctic grayling. Walker Fork and South Fork and their tributaries provide the riverine drainage system for this site. These systems provide rearing, migration, spawning, and foraging habitat for arctic grayling, sheefish, round whitefish, longnose sucker, and slimy sculpin.

Caribou, moose, Dall sheep, grizzly bear, black bear, and wolf are the big game species present in the Fortymile River watershed. Small game species such as sharp-tailed and spruce ruffed

grouse, willow and rock ptarmigan, and snowshoe hare occupy habitat in the area. Additionally, raptors, waterfowl, shorebirds, and a variety of passerine birds can be found in the surrounding area.

No Essential Fish Habitat is present in this area.

Several state and federal regulations apply to proposed developments in and/or near wetlands and streams. A summary of applicable regulatory implications is provided.

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**WETLAND DELINEATION, VEGETATION CLASSIFICATION, AND  
WILDLIFE ASSESSMENT  
TAYLOR HIGHWAY PROJECT  
CHICKEN, ALASKA TO CANADIAN BORDER**

**1.0 INTRODUCTION**

Shannon & Wilson, Inc. was retained by ASCG, Inc. (ASCG) to conduct a wetland delineation, vegetation classification, and wildlife assessment for the Taylor Highway Environmental Assessment project (referred to herein as the Taylor Highway project). The project area includes approximately 44 miles of right of way along Taylor Highway and Top of the World Highway.

We understand that this report will be submitted to Alaska Department of Transportation (ADOT) as part of an Environmental Assessment for the proposed reconstruction of the highways in the project area. The work was authorized by Ms. Kimberly Stricklan of ASCG on September 2, 2002, and was performed in accordance with our proposal dated August 1, 2002.

**1.1 Scope of Services**

The scope of services for this project was limited to the following tasks:

- ▶ Review the Alaska Department of Fish and Game (ADFG) Anadromous Fish Stream Atlas and National Marine Fisheries Service (NMFS) Essential Fish Habitat maps to determine if the proposed action affects any cataloged anadromous fish streams or Essential Fish Habitat.
- ▶ Review information from the United States Fish & Wildlife Service (USFWS) to determine whether any bald eagle nesting trees have been identified within the project area and, if so, map their locations.
- ▶ Develop a threatened and endangered species list specific to the project area from ADFG, USFWS, and NMFS information.
- ▶ Identify and delineate wetlands found in the Taylor Highway right of way (typically 200 feet wide) that meet the triple-parameter jurisdictional definition as established by the U.S. Army Corps of Engineer's 1987 Wetlands Delineation Manual. Wetland delineation was limited to a field reconnaissance and sketching wetland boundaries onto right of way maps. Wetland boundaries were not flagged.

- ▶ Prepare a wetland delineation report describing the methods and results of our fieldwork and a set of hand drawn maps identifying wetland boundaries and the general plant communities of the project area.

## 1.2 Site Location and Description

The project area is located in the Fortymile drainage, which principally lies within the Eagle quadrangle (USGS 1:250,000). Specifically, the project area includes right of way along the Taylor Highway from just west of Chicken, Alaska, where the Mosquito Fork Bridge crosses the highway; to the Jack Wade Junction, then along the Top of the World Highway southeast through Boundary to the US/Canadian border (Figure A). The corridor is located in portions of Townships 26 and 27 North and Ranges 18, 19, 20, 21, and 22 East of the Copper River Meridian. The project corridor is approximately 44 miles in length, passing through the Mosquito Fork, Chicken Creek, South Fork, Walker Fork, and Wade Creek drainages.

Several of the drainages have been mined extensively using placer mining techniques. Mining impacts such as braided, unvegetated riparian channels are still clearly evident within Chicken, Lost Chicken, and Wade Creeks.

## 2.0 VEGETATION TYPES

The *Alaska Vegetation Classification System* (Viereck et al. 1992) was used to classify vegetation types along the corridor. It consists of a hierarchical classification containing units at five levels of resolution. This five-level classification system is specifically designed to describe vegetation associations from a general level (Level I including forest, scrub and herbaceous) to a detailed description (Level V, describing the scientific names of the specific species within the association). Vegetation is described below given by common name, with the scientific name in parentheses.

The dominant plant assemblage throughout the project area is considered an open needleleaf forest community. These areas are dominated by black spruce (*Picea mariana*), alpine blueberry (*Vaccinium uliginosum*), crowberry (*Empetrum nigrum*), Labrador tea (*Ledum palustre*), (*Ledum groenlandicum*), bearberry (*Arctostaphylos rubra*), and mosses and lichens.

The second most dominant plant community along the alignment, primarily west of Walker Fork, is an open broadleaf forest. This community occupied drier slopes and disturbed areas.



Birch (*Betula papyrifera*), aspen (*Populus tremuloides*) and alder (*Alnus crispa*) are the dominant tree species, with an understory similar to the needle-leaf forest community.

At the higher elevations, from approximately the Jack Wade junction to the Canadian border, the area is generally devoid of trees, although some areas were dominated by willow (*Salix planifolia*). This higher elevation area is classified as an open, tall scrub community. This area appeared drier than other parts of the project area, which also influenced the plant community distribution. The understory was dominated by crowberry, alpine blueberry, dwarf birch (*Betula nana*), and mosses. Soils in these areas were typically mineral with little organic matter buildup on the soil surface.

Some emergent plant communities were observed within the riparian areas along the streams and in the flood plains. They are classified as mesic, sedge-willow tundra (Level IV) or mesic graminoid herbaceous (Level III). These areas were dominated by various sedges (*Carex spp.*) and willow (*S. planifolia*). Some of these areas would also be considered successional as a result of the past disturbance from mining.

### 3.0 WETLAND DELINEATION METHODS

Shannon & Wilson, Inc. personnel, with assistance from ASCG, conducted the wetland delineation fieldwork from September 10 to 13, 2002, using methods described in the 1987 Army Corps of Engineers Wetland Delineation Manual. The field survey and wetland delineation was limited to those areas within the road right of way. Width of the right of way varied, but was typically approximately 200 feet wide. We field surveyed the project area to identify plant community types and determined wetland presence by conducting a routine method delineation using the triple-parameter approach. The triple-parameter approach considers vegetation types, soil conditions, and hydrologic conditions to determine wetland areas. For an area to be considered wetland it must display each of the following: (1) dominant plant species that are considered hydrophytic by the accepted classification indicators, (2) soils that are considered hydric under federal definition, and (3) indications of wetland hydrology, in accordance with federal definition. Please see Appendix A for more information and categorization of hydrophytic vegetation, hydric soils, and wetland hydrology.

We selected data points within identified plant community types to help describe the general conditions of the project area. Information on vegetation, soils, and hydrology was collected at each data point. We recorded data from upland and wetland plots.

Due to the large size of the project area, wetland boundaries were not flagged. Approximate wetland boundaries were drawn on maps provided by ASCG, Inc. (see Appendix B for the approximate wetland locations). Wetland functions and values were assessed using best professional judgment.

#### 4.0 DOCUMENT REVIEW

We reviewed the following documents for this project:

- ▶ Alaska Atlas and Gazetteer, DeLorme 2000.
- ▶ Aerial photographs of the site vicinity, provided by Alaska Department of Transportation including:
  - Black and White, 1:1,000, Date: 1970, Source: Aeromap U.S.
  - Boundary, 1:2,000, Date: 1983, Source: Aeromap U.S.
  - Wade Creek, 1:12,000, Date: 1994, Source: Alaska Bureau of Land Management (BLM)
  - Walker Fork, Chicken Field, 40 Mile South Fork 1:3,000, Date: 1994, Source: BLM
  - Infrared aeriels, 1:60,000, Date: 1978, Source: NASA
- ▶ Alaska Department of Fish and Game Habitat Maps
- ▶ Alaska Department of Transportation highway alignment maps for the site

#### 5.0 RESULTS

We identified and delineated wetlands interspersed throughout the project area. Approximate wetland boundaries are shown on Figures 1 through 26 in Appendix B.

The wetland boundaries were primarily established based on vegetation, hydrology, and hydric soil indicators. We recorded data from 14 data points (8 wetland plots and 6 upland plots), and we also dug and examined several other soil pits to aid in establishing the wetland boundaries. Appendix A includes vegetation indicator status definitions and Munsell Color Chart information. Data sheets are included in Appendix C.

A summary of the site wetlands and uplands follows. Data sheets 2, 3, 4, 5, 7, 9, 10, and 11 contain descriptions of the vegetation, soils, and hydrology typical of those observed in the site wetlands. Vegetation is described below by common name, with the scientific name and wetland indicator status in parentheses. Soils are described with the associated Munsell Color Chart color in parentheses.

## 5.1 Project Area Wetlands

Most of the undisturbed areas along the alignment beyond the road fill meet the federal definition of wetland with the primary exception of the area along the Top of the World Highway. In general, we observed wetland along both sides of the alignment from the Jack Wade Junction west to the South Fork Bridge. From the South Fork Bridge to the Mosquito Fork Bridge, wetlands were less continuous but still occupied the bulk of the alignment. The wetlands along the alignment can be distinguished by vegetation type, which is influenced by the areas hydrologic regime, soil type, and past disturbance. In general, two wetland types were observed as described below.

Most of the alignment (as documented in data points DP 3, 4, 5, 9, & 11) is dominated by black spruce (*Picea mariana* FACW), low ericaceous shrubs (*Vaccinium oxycoccus* OBL, *Vaccinium uliginosum* FAC, *Ledum groenlandicum* FACW, *Ledum decumbens* FACW) moss (*Sphagnum* spp.) and lichen wetlands. Wetland soils were predominantly organic in the upper layer (10YR 2/1) with 6 to 15 inches of peat or muck, underlain generally by silt loam soils (10YR 3/1 and 10YR 3/2). These soils are classified as histic epipedons. Typically these areas were saturated to the soil surface. In one soil pit (DP 11) excavated west of the Walker Fork, permafrost was encountered at 11 inches.

The low-lying riparian wetlands (DP 2 & 7) were dominated by willows (*Salix planifolia* FACW, and *Salix* spp.), horsetail (*Equisetum* spp.), sedges (*Carex* spp.), mosses, and some grasses. These areas had mineral soils ranging from a 10YR 3/2 sandy loam with 7.5YR 5/6 mottles to 2.5Y 3/2 gravelly sandy loam.

Other wetland types observed included small patches of sedge meadows and a buttercup-dominated area. Neither of these wetland types occupied a significant amount of area. The sedge meadow wetlands were primarily found interspersed along the Wade Creek as well as between Chicken and the Mosquito Fork Bridge. The buttercup-dominated wetland area was adjacent to the Jack Wade Dredge (DP 10). This area had a unique plant assemblage dominated

by buttercup (*Ranunculus gmelini* FACW), bluejoint (*Calamagrostis spp.*) sedges (*Carex aquatilis* OBL, and *Carex diandra* OBL), black spruce (*Picea mariana* FACW) and mosses. The soils in this area consisted of 6 inches of peat over a 10YR 3/1 highly organic silt loam. This area was bounded by the road on one side and a short rock bluff on the other, forming a small wetland less than ¼ acre in size.

## 5.2 Wetland Functions and Values

Wetland functions and values were assessed using best professional judgment. Assessment was limited to the functions of site wetlands within the right of way. Functions and values assessed included active/passive recreation, endangered species, uniqueness/rareness of wetland, wildlife habitat, fisheries habitat, food chain support, nutrient retention/removal, sediment retention and trapping, flood storage and reduction of peak flows, groundwater modification, and shoreline stabilization. Functions and values were rated as high, medium, or low (high indicated that the wetland is performing a function well or is highly valued for a particular characteristic, and a low indicating that the wetland is limited in its ability to perform a particular function or is considered low quality for the characteristic). Because wetlands occupy most of the alignment continuously and have similar characteristics, we rated the system as one except where severe disturbance warranted an alternate rating.

### 5.2.1 Active/Passive Recreation

Taylor and Top of the World Highways provide the primary access for recreational opportunities in the area. The undeveloped wetlands beyond the road right of way provide abundant wildlife habitat for a diverse number of species that are attractive to hunters and recreators. However, the quality of the wetlands directly adjacent to the road may be impacted by their proximity to the road. The project area wetlands all rated medium for this function.

### 5.2.2 Endangered Species

A formal consultation with the NMFS and the USFWS was not conducted, nor was it part of the scope of work for this project. However, based on telephone conversations with USFWS and NMFS, it is unlikely that this area provides habitat for any currently listed threatened or endangered species. Therefore, the site wetlands are presumed to be low for this function (for additional wildlife and fisheries information, see Section 6.0).

### **5.2.3 Uniqueness/Rareness of Wetlands**

The wetland communities identified in the project area are common throughout the region, and additional loss resulting from this project would not result in significant adverse environmental effects on adjacent wetlands. The site wetlands rated low due to disturbance from past mining activities and the proximity of the road.

### **5.2.4 Wildlife Habitat**

Site wetlands rated moderate for wildlife habitat because the road impacts the quality of the wetlands and increasing numbers of tourists predicted from the road upgrade will increase the disturbance to wildlife, especially during periods of migration, nesting, and calving. ADFG stated, however, that the road is not a migration barrier for migratory species. The surrounding wetlands beyond the right of way provide excellent, more pristine habitat that likely would be preferred by many species.

### **5.2.5 Fisheries Habitat**

The site wetlands provide some habitat for sport fisheries such as arctic grayling. Walker Fork and South Fork and their tributaries provide the riverine drainage system for this site (see Section 6.0 for more information). These systems provide rearing, migration, spawning and foraging habitat for arctic grayling, sheefish, round whitefish, longnose sucker, and slimy sculpin. However, Wade Creek, Lost Chicken Creek, and Chicken Creek have been mined in areas directly adjacent to or within the road right of way, which significantly degraded the fish habitat. Additionally, ADFG has stated that some sports fishery populations are reduced, likely due to over harvesting. The site wetland and streams rate moderate to high for fisheries habitat with the exception of Wade and Chicken Creeks, which rate low because of disturbance from mining activities.

### **5.2.6 Food Chain Support**

The wetlands provide some opportunity for grazing and foraging. Also, detritus and nutrients are exported to riverine and marine systems through regular flushing of site streams. In fact, many of the rivers have a brownish orange tint resulting from organic tannins. The site wetlands rated moderate to high for this function.

### **5.2.7 Nutrient Retention/Removal**

Vegetation cover is relatively dense over most of the alignment, with the exception of localized gravel mining areas and the stream corridors that have been disturbed by the placer mining. In addition, soils consisted predominantly of peat except in the riparian corridor areas. The site wetlands rated low for this function in areas where mining has occurred, and moderate in all other areas.

### **5.2.8 Sediment Retention and Trapping**

Most surface water passes through the site in channelized stream corridors; however, dense emergent vegetation traps some sediment in all the undisturbed areas. For the sediment retention and trapping function, the site scored moderate in areas not associated with mining and low in areas that have been mined.

### **5.2.9 Flood Storage and Reduction of Peak Flows**

During our site visit, we observed the creeks flowing at or above their capacity as a result of heavy rains. In areas that had been mined or otherwise disturbed, reduction in flood storage capacity and peak flows was evident. Several culverts under the road could not accommodate flows, and road embankment erosion had resulted. In undisturbed areas, the wetland soils consisted predominantly of a blanket of peat, which can store large amounts of surface water. In addition, these areas were heavily vegetated and did not appear to exceed flood storage capacity. Based on these site characteristics, the undisturbed site wetlands rated high for this function, whereas wetlands in the lowlands that had been disturbed rated low.

### **5.2.10 Groundwater Modification**

The project area wetlands are part of a large freshwater system. However, the wetlands in this area are typically underlain by till and therefore have little opportunity for groundwater recharge. The site wetlands rated moderate for groundwater modification.

### **5.2.11 Shoreline Stabilization**

The project area wetlands are subject to some erosion due to surface water runoff from the surrounding area and the road. Much of Wade Creek and portions of the other creeks have been significantly altered by sedimentation. As a result, these areas are limited in reducing the

velocity of flood flow. The site wetlands rated low for this function in disturbed areas, and moderate in all other areas.

### 5.3 Site Uplands

The site uplands are located primarily from the Jack Wade Junction to the Canadian border but are also interspersed throughout the alignment. These areas have similar plant communities as the wetland areas, with the addition of birch (*Betula papyrifera* FACU), bearberry (*Arctostaphylos uva-ursi* FACU), and cottonwood (*Populus balsamifera* FACU). Upland soils, in general, were mineral, composed of 10YR 4/4 and 10YR 3/2 sandy loams. Soils were dry to 18 inches, with the exception of DP1, DP6, and DP8, where they were saturated to the surface. However, these areas lacked other wetland indicators, so they were not considered wetland.

Data sheets 1, 6, 8, 12, 13, and 14 contain descriptions of the vegetation, soils, and hydrology typical of those observed in the upland areas (Appendix C).

## 6.0 WILDLIFE

### 6.1 Species and Habitats Present

Caribou, moose, Dall Sheep, grizzly bear, black bear, and wolf are the big game species present in the Fortymile River watershed. Fur bearers such as marten, lynx, red fox, beaver, otter, and mink are known in the area. During our site visit we also saw several porcupines. Small game species such as sharp-tailed and spruce ruffed grouse, willow and rock ptarmigan, and snowshoe hare occupy habitat in the area. Additionally, raptors, waterfowl, shorebirds, and a variety of passerine birds can be found in the area. ADFG confirmed that there are no threatened or endangered species in the project area. The project area is within the range of the American Peregrine falcon, which was removed from the list of threatened and endangered species on August 25, 1999.

According to the ADFG the areas around Chicken and Jack Wade Junction are intensively used for hunting caribou, moose and bear. The Fortymile caribou herd utilizes habitat in the project corridor as they migrate. The ADFG Alaska Habitat Management Guide shows the spring migration in the northwest direction with their return to the southeast in the fall. The herd is actively managed by ADFG, and the population is increasing. In 2002, the population was estimated at 46,000. Additionally, this year marks the first time since the early 1960's that the

Fortymile caribou herd has crossed the Yukon River during their fall migration. While caribou populations may be on the rise in this area, the moose population is decreasing. The low density of the moose population is unrelated to the existing road and likely results from over hunting, and calf mortality from predation (Gardner, pers. comm.).

## 6.2 Raptors

ABR, Inc. completed raptor habitat surveys in the late 1990's when raptor habitat was increasing. Information provided to us by ABR on the presence of raptors within the project area from the late 1990s is as follows. There are many pairs of peregrine falcons on the South Fork, but almost all downstream from the highway. The lower Walker Fork and the South Fork below its confluence with the Walker Fork has the best habitat for cliff nesters. No cliff nesters were found on Wade Creek, but ABR did not investigate any of its tributaries. No bald eagle nests were located on any of the project drainages, although a golden eagle nest was located more than 2 miles up the Dennison Fork. Additionally, a peregrine falcon nest was identified on the first large cliff above the Mosquito Fork highway crossing (Bob Ritchie pers. comm. 11/02).

## 6.3 Fisheries

The two major drainages associated with the alignment are the South Fork and its tributaries—Chicken Creek, Lost Chicken Creek, Mosquito Fork, Dennison Fork and Wall Street Creek—and the Walker Fork and its tributaries—Wade Creek, Ophelia, Gilliland, Warner, and Robinson Creeks. Figure B shows a map of the rivers and streams associated with the project. Fish species reported within the Fortymile River drainage include arctic grayling, sheefish, round whitefish, longnose sucker, and slimy sculpin. Infrequent occurrences of humpback whitefish, northern pike, burbot, Chinook salmon, and chum salmon have been documented in lower reaches. However, the information we obtained does not indicate that any of these secondary species occur within the drainages that would be affected by the proposed road improvements (ADFG, 1986, 1999, and 2002).

According to information in the 1988 Fortymile River Placer Mining Final Cumulative Environmental Impact Statement prepared by the BLM Department of the Interior (DOI), surveys by BLM and ADFG reported sedimentation and cementing of the Chicken Creek streambed. The creek does not support a fishery because it lacks spawning habitat, cover, and aquatic invertebrates. Similarly, Wade Creek and Lost Chicken Creek are not expected to support a fishery because of the extensive mining disturbance in those creeks.



#### 6.4 Essential Fish Habitat

In 1999, ADFG determined that anadromous fish runs in Fortymile River and its tributaries are at the upper limit of their natural distribution and may not successfully reproduce on an annual basis. Adequate winter water flows are the limiting factor for successful egg hatch, and in most years it appears there is insufficient flow. Based on their information, ADFG delisted, without prejudice, the Fortymile River and its tributaries from the *Catalog and Atlas of Waters Important for the Spawning, Rearing or Migration of Anadromous Fish* (ADFG, 1999). The Taylor Highway upgrades are being proposed entirely within drainages that are tributaries to Fortymile River. Furthermore, in an email to ASCG from Lawrence Peltz of NMFS on December 10, 2002, he confirmed that the project would not impact Essential Fish Habitat (EFH). Therefore, no EFH will be impacted by the proposed upgrades.

### 7.0 WETLAND AND STREAM REGULATIONS

Several state and federal regulations apply to proposed developments in and/or near wetlands and streams. A summary of applicable regulatory implications is provided in the following subsections.

#### 7.1 State Regulations

Alaska Department of Environmental Conservation (DEC) regulates the discharge of water or other materials directly into wetlands or streams under Section 401 of the Clean Water Act. A Section 401 Water Quality Certification (Section 401 Certification) is needed from the DEC if greater than 5 acres of wetland fill is proposed, or if less than 5 acres of wetland fill is proposed but the proposed fill area is located adjacent to a water body such as a lake or marine shoreline (streams are excluded from this criterion) (Rumfelt, 2003). Requirements for a Section 401 Certification may include pollution spill prevention and response measures, using fill material that does not compromise water quality, clearly identifying construction boundaries, and providing site access to permitting agency for inspection.

A Title 16 Fish Habitat Permit (Title 16 permit) will be required by the ADFG if site development includes work in or adjacent to a stream, such as culvert installation; stream realignment or diversion; dams; low-water crossing; and/or construction, placement, deposition, or removal of any material or structure below ordinary high water.

## 7.2 Federal Regulations

The Corps Section 404 review process is required for projects involving discharges of dredge or fill materials into the waters of the U.S., including non-isolated wetlands and streams. The Corps will likely regulate the site wetlands and streams as waters of the U.S. Any work associated with the road improvements that impact site wetlands and/or streams would likely require a nationwide permit (NWP) or an individual permit from the Corps.

If a Corps or other federal agency permit is needed, or if the project is federally funded or on federal land, the lead federal agency will need to comply with the Magnuson-Stevens Act (MSA) and the Endangered Species Act (ESA). Typically, under MSA, the lead agency would need to coordinate with NMFS on site streams that are considered EFH (i.e., site streams with anadromous fish present), however there is no EFH near this site.

The United States Environmental Protection Agency (EPA) will require a general construction National Pollutant Discharge Elimination System (NPDES) permit if proposed site construction is greater than 5 acres. The NPDES permit typically includes an erosion control plan, which must be approved by Alaska's DEC.

Because of the size of the project, its proximity to streams and river, and likely wetland impact, permits will be required from all of the agencies discussed above.

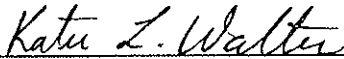
## 8.0 CLOSURE

The findings and conclusions documented in this report have been prepared for specific application to this project, and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the terms and conditions set forth in our signed proposal. The conclusions and recommendations presented in this report are professional opinions based on interpretation of information currently available to us, and are made within the operational scope, budget, and schedule constraints of this project. No warranty, express or implied, is made.

Wetland boundaries identified by Shannon & Wilson are considered to be preliminary until the Corps and/or the local jurisdictional agency validate the wetland boundaries. Validation of the wetland boundary by the regulating agency(s) provides a certification, usually written, that the wetland boundaries verified are the boundaries that will be regulated by the agency(s) until a specified date or until the regulations are modified. Only the regulating agency(s) can provide this certification.

Since wetlands are dynamic communities affected by both natural and human activities, changes in wetland boundaries may be expected; therefore, wetland delineations cannot remain valid for an indefinite period of time. Development activities on a site two years after the completion of this wetland delineation report may require revision of the wetland delineation; however, the U.S. Army Corps of Engineers typically recognizes the validity of wetland delineations for a period of five years after their verification. Changes in government code, regulations, or laws may occur. Because such changes are beyond our control, our observations and conclusions regarding this site may need to be revised wholly or in part. We have prepared Appendix D, "Important Information About Your Wetland Delineation/Mitigation and/or Stream Classification Report," to assist you and others in understanding the use and limitations of our report.

SHANNON & WILSON, INC.



Katie L. Walter, PWS  
Natural Resources Manager

KLW:DNC/klw

## 9.0 REFERENCES

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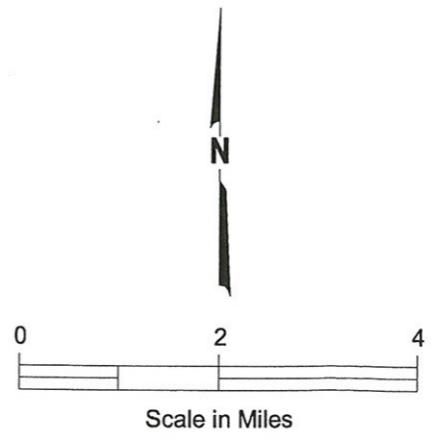
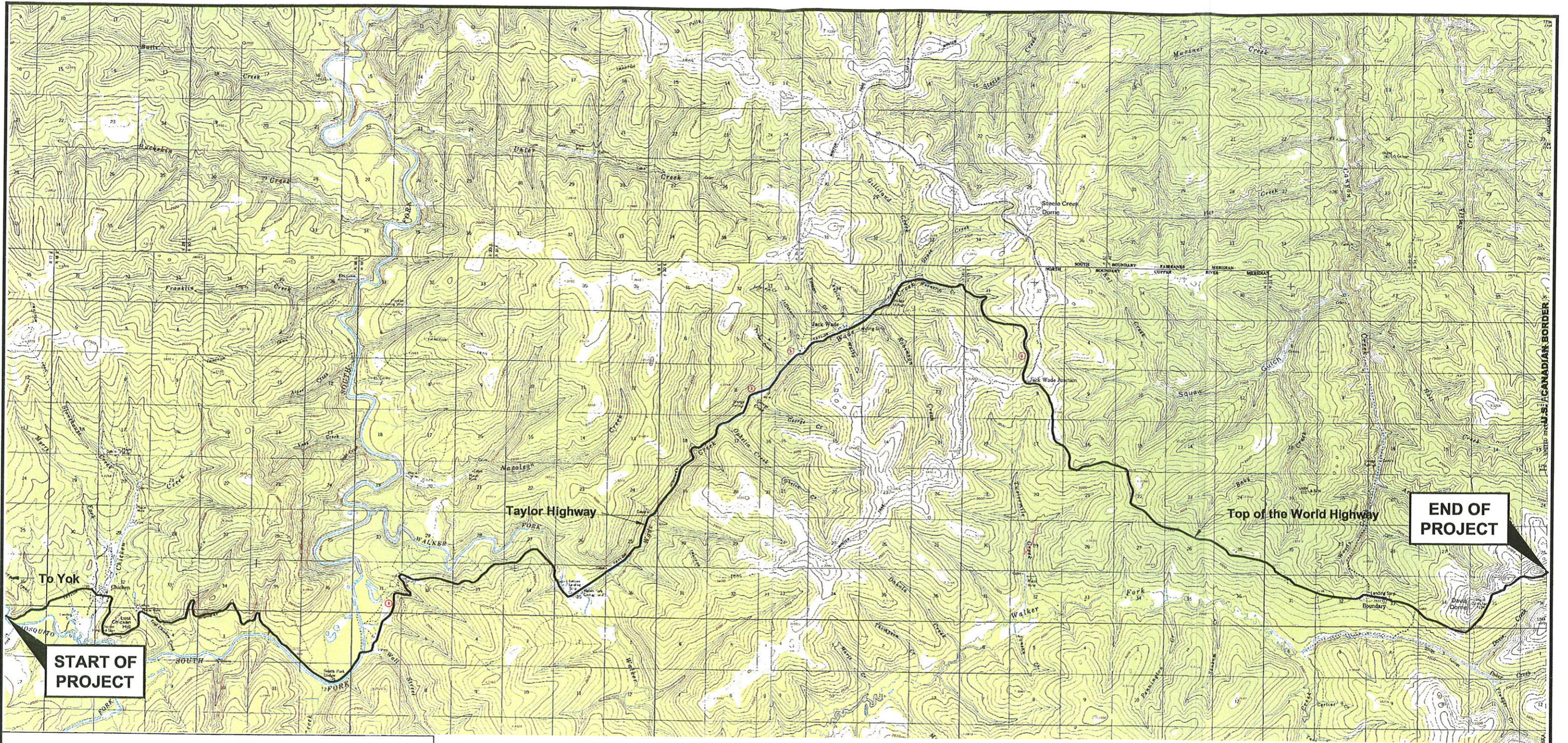
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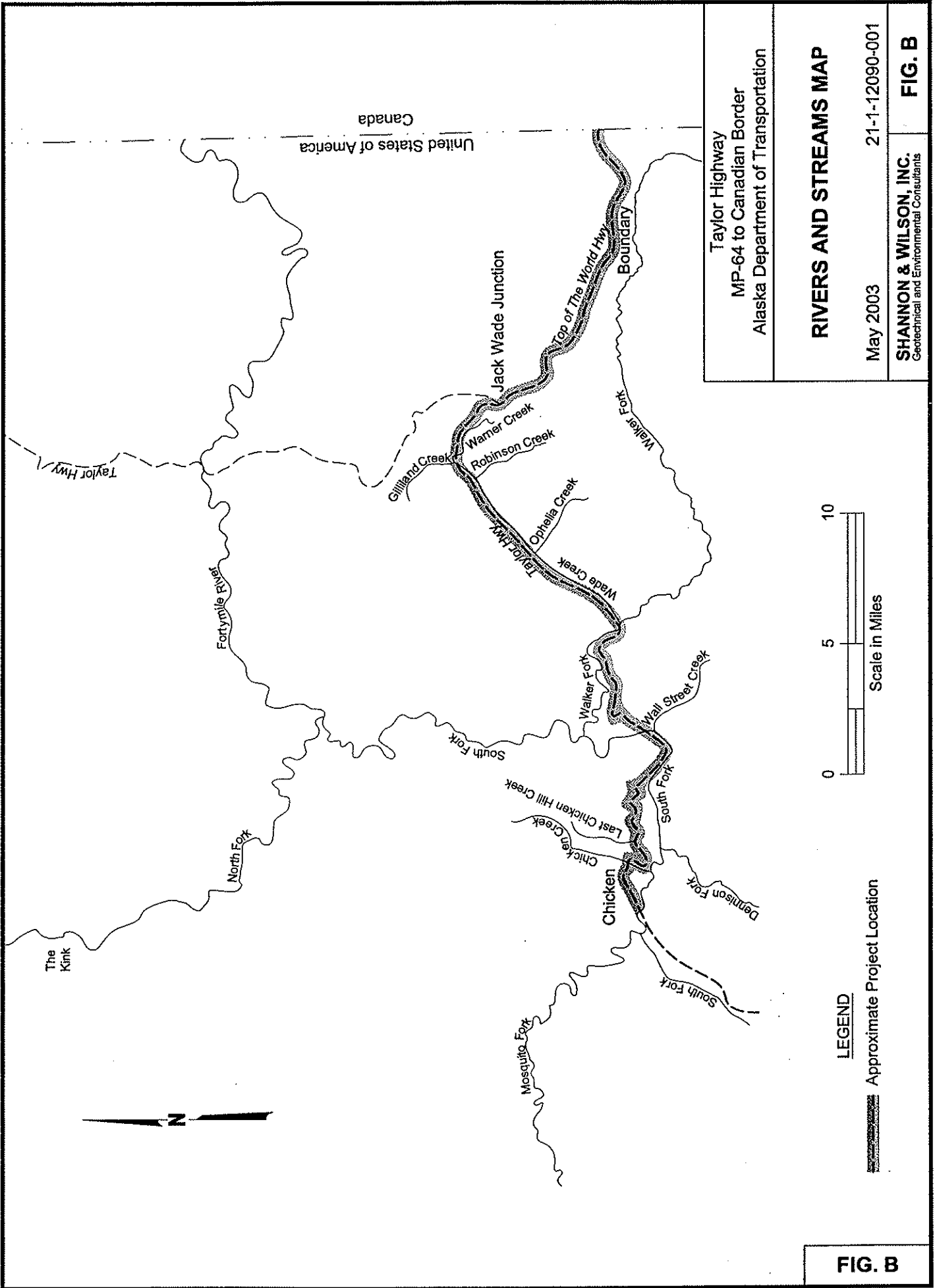




**NOTE**  
Map adapted from Big Topo,  
provided by ASCG, Inc.

Taylor Highway MP-64 to Canadian Border Alaska Department of Transportation	
<b>VICINITY MAP</b>	
May 2003	21-1-12090-001
SHANNON & WILSON, INC. Geotechnical and Environmental Consultants	<b>FIG. A</b>





Taylor Highway MP-64 to Canadian Border Alaska Department of Transportation	
<b>RIVERS AND STREAMS MAP</b>	<b>FIG. B</b>
May 2003	21-1-12090-001
SHANNON & WILSON, INC. Geotechnical and Environmental Consultants	



**LEGEND**  
 Approximate Project Location

**FIG. B**