Alaska In-Lieu Fee Compensatory Mitigation Program Instrument

Lagoons of Alaska Peninsula Refuge protected through the Alaska In-Lieu Fee Compensatory Mitigation Program

May 31, 2013

The Conservation Fund

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ACRONYMS AND ABBREVIATIONS

ADEC: *Alaska Department of Environmental Conservation*

ADF&G: *Alaska Department of Fish and Game*

ADNR: *Alaska Department of Natural Resources*

ADOT&PF: *Alaska Department of Transportation and Public Facilities*

AKILF Program: *Alaska In-Lieu Fee Compensatory Mitigation Program*

ATV: *All-terrain vehicles*

CFR: *Code of Federal Regulations*

The Corps: *The United States Army Corps of Engineers, Alaska District*

DE: *District Engineer or Designee*

EPA: *Environmental Protection Agency*

FDIC: *Federal Deposit Insurance Corporation*

GIS: *Geographic Information System*

HGM class: *Hydrogeomorphic wetlands classification system*

HUC: *Hydrologic Unit Code*

ILF: *In-Lieu Fee*

IRT: *Interagency Review Team*

NEIWCA: *Northeastern Illinois Wetland Conservation Account*

NMFS: *National Marine Fisheries Service*

NRCS: *Natural Resource Conservation Service*

NWI: *National Wetlands Inventory*

RGL: *Regulatory Guidance Letter*

TCF: *The Conservation Fund*

USC: *United States Code*

USFS: *United States Forest Service*

USGS: *United States Geological Survey*

1. PROGRAM OVERVIEW

A. Purpose:

This in-lieu fee program instrument (Instrument), regarding the establishment, use, operation, and maintenance of The Conservation Fund's (TCF) federally approved Alaska In-Lieu Fee Compensatory Mitigation Program (AKILF Program), is an agreement made and entered into by the U.S. Army Corps of Engineers, Alaska District, Regulatory Division (the Corps) and TCF.

The AKILF Program is a statewide program that operates across all of Alaska.
The Instrument establishes guidelines, responsibilities, and standards for the establishment, use, operation, and maintenance of the AKILF Program. The AKILF Program will be used for compensatory mitigation for unavoidable impacts to waters of the U.S., including wetlands, that result from activities authorized under Section 404 of the Clean Water Act, Sections 9 and 10 of the Rivers and Harbors Act of 1899, and for impacts from other activities as the Corps District Engineer or designee (hereinafter, DE) may authorize, provided that such activities have met all applicable requirements and are authorized by the appropriate authority.

The Instrument provides a mechanism whereby a permit applicant can purchase mitigation credits from the in-lieu fee (ILF) program sponsor, TCF, to compensate for wetland or other aquatic resource losses. The Instrument also describes how TCF uses the in-lieu fees to undertake mitigation projects that provide long-term protection of other aquatic resources to compensate for the unavoidable losses.

B. History of Program:

TCF was chartered as a non-profit corporation under Maryland law in 1985 and is recognized by the Internal Revenue Service as a tax-exempt, charitable organization to which contributions are deductible to the maximum extent permitted under federal law. As a non-profit organization, TCF satisfies the "Final Rule" requirement that an ILF sponsor be either a non-profit organization or governmental agency.

TCF is recognized as one of the nation's foremost environmental non-profit organizations with a mission to conserve America's legacy of land and water resources and to support sustainable economic development. Since its founding, TCF has worked with partners at all levels of government and in the private and non-profit sectors to conserve more than seven million acres and restore tens of thousands of acres of native forest, wetlands and streams, and wildlife habitat nationwide.

In January 2010, TCF signed a nationwide Memorandum of Understanding with the U.S. Army Corps of Engineers to work jointly to promote the effective and balanced management of the nation's water resources and the conservation of wildlife habitat.

Through its Midwest Office, TCF has managed the Northeastern Illinois Wetland Conservation Account (NEIWCA) for the Chicago District of the U.S. Army Corps of Engineers since 1997. NEIWCA receives penalty payments from violators of the Clean Water Act and Section 9 and 10 of the Rivers and Harbors Act of 1899, subject to the U.S. Army Corps of Engineers, Chicago District regulatory jurisdiction. Under an agreement with the U.S. Fish and Wildlife Service, TCF utilizes NEIWCA funds to provide grants for hydrologic restoration; wetland restoration, enhancement, and preservation; and, to a lesser extent, wetland education in the Chicago District's operating area. To date, TCF has completed 123 projects with NEIWCA funding totaling $4,211,683.

TCF's Alaska office opened in 1994. Since that time TCF has been the leading land conservation organization in the state. TCF has completed 200 conservation projects throughout Alaska that have protected 320,000 acres. Wetlands protection is a central focus for TCF in Alaska, with over 200,000 acres of wetlands protected in Alaska since 1994.

In 1998, TCF was the first organization in Alaska to sign an agreement with the Corps to establish a fee-based compensatory mitigation program. The agreement directed TCF to establish a dedicated account to receive mitigation fees and use them to acquire or otherwise preserve wetlands "as an appropriate alternative to active mitigation measures…"

In January 2003, TCF signed an agreement with the Alaska Department of Transportation and Public Facilities (ADOT&PF) to establish the Alaska Wetlands Conservation Fund to receive mitigation funds related to the construction or expansion of rural airports. The agreement directed TCF to establish a separate, Federal Deposit Insurance Corporation (FDIC)-protected, interest-bearing account to receive "in-lieu fees", and to apply those fees to "protect, restore or enhance high value wetlands and aquatic resources in Alaska." In this program, TCF reported annually to a multi-agency board, consulted with the board regarding potential acquisitions, and required approval from the board for the expenditure of mitigation funds. Until this program was terminated in 2008, a total of $799,295 had been received by The Conservation Fund for 35 rural airport projects across Alaska.

As of December 31, 2012, the total mitigation funds received from all sources in Alaska was $15,184,206. As of December 31, 2012, TCF had spent $6,729,676 of mitigation funds to complete the purchase and preservation of thirty-eight separate properties in Alaska totaling 37,356 acres, of which 24,696 acres are wetlands. These properties are broadly distributed across Alaska, and include projects in Southeast, Southcentral, Southwest, Interior, and Arctic Alaska. TCF secured $14.5 million of matching funds to leverage the mitigation funds to the maximum extent possible.

C. Goals and Objectives:

The primary goal of the AKILF Program is to continue to provide effective compensatory mitigation for unavoidable impacts to wetlands and other aquatic resources in Alaska. Impacts may occur through permitted actions, but may also occur from violations of the Clean Water Act or Sections 9 or 10 of the Rivers and Harbors Act of 1899. Settlement agreements between the Corps and violators may direct violators to purchase credits from the AKILF Program.

The objectives of the AKILF Program are:

- Identify and acquire properties and/or property rights to meet compensatory mitigation obligations under Corps permitting in an efficient and timely manner, in consultation with the Interagency Review Team (IRT). Where appropriate, the in-lieu fees from smaller permitted projects will be consolidated to provide mitigation through larger properties with greater ecological value.
- Work with willing landowners to acquire ecologically valuable aquatic resources where the threat of development would lead to a loss of those habitats, impair the overall ecological health of a watershed, or conflict with community land use goals.
- Preserve ecologically valuable aquatic resources that provide important functions and services, and support the ecological health and sustainability of a watershed through the acquisition of property (i.e., fee simple title) and or property rights (i.e., conservation easements). As opportunities arise, TCF may also work in partnerships on the restoration, enhancement or establishment of ecologically valuable wetlands as compensatory mitigation projects.
- Work in an efficient and transparent manner with the IRT and utilize a mitigation project site selection process and/or parcel prioritization that is ecologically-based, relies on the best available information, and provides compensatory mitigation that meets the anticipated demand for credits in the service areas.
- Provide an efficient and periodic accounting of in-lieu fees, credits, and mitigation projects.
- Provide permanent protection of ecologically valuable aquatic habitats through legal instruments, real estate transactions and stewardship of properties.
- Operate the AKILF Program in close cooperation with public land management agencies, non-profit land trusts, and other non-profit natural resources management organizations.

D. Approval of Final Instrument:

The Instrument is considered approved upon the latter date of signature by TCF and the DE of the Corps (See Section 12, "Signatures").

At such time when the Instrument becomes effective, the Instrument replaces and supersedes the "Agreement Between TCF and the Corps, AK District to Establish a Fee-Based Compensatory Mitigation Program Under Section 404 of the Clean Water Act," dated May 20, 1998.

E. Disclaimer:

The Instrument does not in any manner affect statutory authorities and responsibilities of the signatory parties. In the event of any conflict or inconsistency between the Instrument and 33 CFR 325 or 332, the regulations shall control.

F. Statutory and Regulatory Authorities:

The establishment, use, operation, and maintenance of the AKILF Program will be carried out in accordance with the following authorities: Section 404 of the Clean Water Act (33 USC 1344); Sections 9 and 10 of the Rivers and Harbors Act 1899 (33 USC 401 and 403); and the Regulatory Programs of the Army Corps of Engineers (33 CFR 320-332).

2. RESPONSIBILITIES OF THE PARTIES

A. Sponsor Responsibility:

TCF assumes responsibility for satisfying the compensatory mitigation requirements for a Corps permit 1) upon receipt and acceptance by TCF of the appropriate payment from the permittee, and 2) once TCF has submitted documentation to the Corps indicating that an ILF payment has been received, including the Corps permit number and the number and type of credits secured by the permittee.

B. Corps Responsibilities:

The United States Army Corps of Engineers, Alaska District will act as the lead Corps district for approval of the Instrument, and the DE is the chair of the Interagency Review Team (IRT) for this Instrument. The Corps is responsible for establishing the IRT, and managing the IRT's associated functions, as well as the Instrument approval and modification process. The Corps will make the final decisions regarding the amount and type of compensatory mitigation to be required of a permittee, the approval of mitigation plans for ILF projects and the use of credits from the AKILF Program to compensate for unavoidable impacts to aquatic resources.

3. GEOGRAPHIC SERVICE AREAS

TCF will operate in five distinct geographic services areas under the Instrument (Figure 1). The combined service areas will cover the entire state of Alaska, constituting the jurisdictional extent of the U.S. Army Corps of Engineers, Alaska District. The service areas are: Arctic, Interior, Southcentral, Southeast, and Southwest. Additional information pertaining to each service area is available within the Compensatory Planning Framework (CPF; Exhibit A). The service areas were created using a watershed approach, which incorporated pertinent biotic and abiotic factors, as well as economic and geopolitical considerations. The service areas were generally defined by watershed boundaries. However, in situations where borough boundaries are similar but not

identical to watershed boundaries we used the borough boundaries to define the boundary of a service area.

Large service areas were chosen because the scale is appropriate to ensure effective compensation for any adverse environmental impacts that occur across them. Modifications to the boundaries of these service areas will be allowed, as mutually agreed upon by TCF and the Corps, after consultation with the IRT.

TCF will provide compensatory mitigation for permitted impacts within the same geographic service area in which the impacts occur, unless the DE has agreed to an exception.

A. Arctic Service Area:

The Arctic Service Area contains nearly all of the United States Geological Survey's (USGS) Arctic Alaska sub-region, most of the Northwest Alaska sub-region, and a small portion of the Yukon Alaska sub-region. These sub-regions directly correspond to the level 2 Hydrologic Unit Codes (HUC): 1906, 1905, and 1904, respectively. The political boundaries that constitute the North Slope Borough and Northwest Arctic Borough were utilized in deriving the boundaries of this service area.

B. Interior Service Area:

The Interior Service Area contains nearly all of the USGS's Yukon Alaska sub-region, a minority of the Northwest Alaska sub-region, and a small portion of the Arctic Alaska sub-region. These sub-regions directly correspond to the level 2 HUCs: 1904, 1905, and 1906, respectively. The political boundaries that constitute the North Slope Borough, Northwest Borough, and Denali Borough were utilized in deriving the boundaries of this service area.

C. Southcentral Service Area:

The Southcentral Service Area primarily contains the USGS's South Central Alaska sub-region (HUC 1902). The service area also contains small inclusions of the Yukon Alaska sub-region, Southwest Alaska sub-region, and Southeast Alaska sub-region. These sub-regional inclusions directly correspond to the level 2 HUCs: 1904, 1903, and 1901, respectively. Most notably, the Southcentral Service Area excludes the Kodiak Archipelago, which is instead contained within the Southwest Service Area. The political boundaries that constitute the Matanuska-Susitna Borough, Kenai Peninsula Borough, and City and Borough of Yakutat were utilized in deriving the boundaries of the Southcentral Service Area.

D. Southwest Service Area:

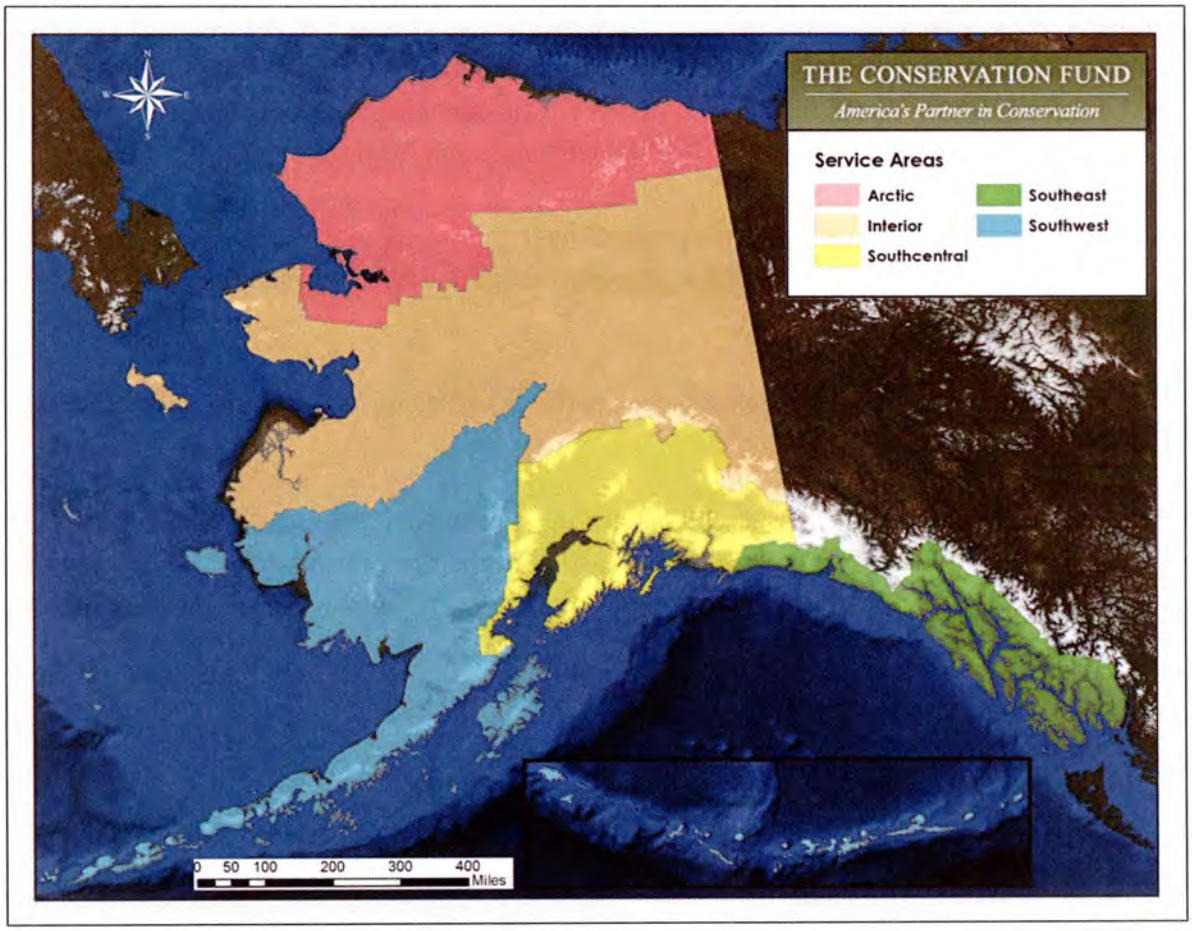
The Southwest Service Area contains most of the USGS's Southwest Alaska sub-region. It also contains a small portion of the Southcentral Alaska sub-region, mostly along the southern side of the Alaska Peninsula. These sub-regions correspond directly to the level 2 HUCs: 1903 and

1902, respectively. The political boundaries of the Lake and Peninsula Borough, and Kodiak Island Borough were considered in the creation of the Southwest Service Area.

E. Southeast Service Area:

The Southeast Service Area contains all but a small portion of the USGS's Southeast Alaska sub-region. The service area also contains a minute fraction of the Headwaters Yukon-Lake Laberge sub-region, but only the portion that extends into the United States. Those sub-regions correspond to the level 2 HUCs: 1901, and 1907, respectively. The political boundaries that constitute the City and Borough of Yakutat were considered in the creation of the Southeast Service Area.

Figure 1. *Geographic service areas of the Alaska Program*



4. COMPENSATION PLANNING FRAMEWORK FOR THE ALASKA IN-LIEU FEE COMPENSATROY MITIGATION PROGRAM

See Exhibit A. The Compensation Planning Framework (CPF) is an essential component of the Instrument. For each service area the CPF provides a detailed assessment of current aquatic resource conditions, threats to the aquatic resources, and objectives for protecting, and in some cases, restoring or enhancing aquatic resources. The CPF is meant to be a detailed and extensive section of the Instrument used to select, secure, and implement aquatic resource preservation, restoration and enhancement activities.

5. PROJECT SELECTION

TCF will use funds from the AKILF Program account to purchase and preserve, and in some cases restore or enhance, properties with significant aquatic resources. TCF will seek to preserve properties that provide important physical, chemical, and/or biological functions for the service area and that contribute to the ecological sustainability of a watershed. The broad criteria that will be used to identify specific properties for preservation under the AKILF Program are:

- Ecologically significant wetlands with high values and functions;
- Willing seller;
- Priority for a land management agency or entity;
- Strategic location for landscape-scale conservation and effective management;
- Threat of loss or conversion;

For more information on project selection and parcel prioritization, see Sections C and D of the Comprehensive Planning Framework.

The Conservation Fund will consult with the Interagency Review Team (IRT) to receive authorization to proceed with the preservation and/or restoration or enhancement of specific properties. TCF will provide the IRT with a briefing package with the following information for each proposed mitigation project:

a) Description of the parcel;
b) Property owner;
c) Property interest to be acquired;
d) Acreage, including wetlands delineation and functional assessment where available ;
e) Maps and photographs showing property location and conservation context;
f) Identification of agency or entity that will own and manage the parcel;
g) Purchase price;
h) Estimate of direct expenses;

TCF handles real estate costs, market appraisals, and other negotiated costs as confidential information. Under standard land trust practices, TCF's purchase and sales agreements with

landowners hold the transaction and appraisals confidential as well. TCF will make such confidential data available for inspection and audit by the Corps and the IRT, but this data is confidential and proprietary.

Following receipt of the briefing package, the Corps will schedule a meeting with the IRT to discuss TCF's proposed mitigation project(s). The Corps, in consultation with the IRT, will respond to TCF's proposed mitigation project(s) within 7 days of the meeting.

6. CREDITS

A. Credit Definition:

Credits are "a unit of measure (e.g., functional or areal measure or other suitable metric) representing the accrual or attainment of aquatic functions at a compensatory mitigation site. The measure of aquatic functions is based on the resources restored, established, enhanced, or preserved" (33 CFR 332.2). Credits are the currency of this Instrument, and provide a means to measure obligations for, and attainment of, aquatic resource protection.

B. Credit Generation:

Through this Instrument, TCF will generate credits by purchasing and preserving, and in some cases restoring or enhancing, properties that contain or support aquatic resources. As indicated in 33 CFR 332.3(h)(1), preservation may only be used to generate compensatory mitigation credits when specific criteria are met. Those criteria are:

- The resources preserved provide important physical, chemical, or biological functions for the watershed;
- The resources to be preserved contribute significantly to the ecological sustainability of the watershed. In determining the contribution of those resources to the ecological sustainability of the watershed, the DE must use appropriate quantitative assessment tools, where available;
- Preservation is determined by the DE to be appropriate and practicable;
- The resources are under threat of destruction or adverse modification;
- The preserved site will be permanently protected through an appropriate real estate or other legal instrument (e.g., easement, title transfer to state resource agency or land trust).

Properties purchased and preserved through the AKILF Program may be acquired with funds generated by credit sales and other funds provided or secured by TCF. However, there will be no commingling of mitigation fees with other sources of funds. As described in 33 CFR 332.3 (j)(2), certain funds, such as federal funds, previously obligated matching funds, and settlement or penalty payments may not be available to generate AKILF credits.

C. Credit Determination:

The number of credits generated by a mitigation project will be determined by the available assessment practices for the service area, or an acreage surrogate if an appropriate assessment method is not available. TCF will work with the Corps and the IRT to determine the appropriate methodology best suited for determining credits for an individual mitigation project.

A functional assessment of the aquatic resources may be the appropriate means to determine project credits. There are a variety of functional assessment methodologies that have been developed for different regions of Alaska. At present, however, there is no single accepted functional assessment methodology that can be applied across the entire state, or even in most service areas. For example, the Wetland Ecosystem Services Protocol for Southeast Alaska (Adamus 2012) is an effective system for assessing wetlands function in Southeast Alaska, but has limited applicability in other areas of the state. Other functional assessment methodologies that may be applicable to AKILF mitigation projects include those described by the U.S. Army Corps of Engineers (2009) and Natural Resource Conservation Service (2011). If an appropriate assessment method is not available then the use of an acreage ratio approach may be used as a surrogate, consistent with 332.8(o)(2) and 332.3(f)(1).

D. Advance Credits:

Advance credits will be available for use as compensatory mitigation in each service area upon approval of this Instrument. These advance credits may be used as compensatory mitigation for permits issued under Section 404 of the Clean Water Act and Sections 9 and 10 of the Rivers and Harbors Act of 1899. The number of advance credits available varies by service area (see Table 1).

Table 1. *Initial advance credits allotted to the AKILF Program by geographic service area.*

Service Area	Advance Credits
Arctic	5,000
Interior	3,000
Southcentral	2,000
Southeast	1,000
Southwest	5,000

The amount of advance credits available for each service area is based on the following factors:

- The CPF associated with the Instrument (See Exhibit A). As the CPF illustrates, there are many large-scale projects with the potential to impact wetlands and other aquatic resources that will require compensatory mitigation. TCF anticipates a significant demand for AKILF Program credits in the Arctic and Southwest Service Areas, in particular. For instance, the CD-5 project and the Foothills West Transportation Access Project will generate demand for thousands of credits in the Arctic Service Area, as will the extensive mineral development activity in Southwest Alaska. In contrast, in Southeast Alaska, where another existing ILF program operates, and where geography and resource distribution constrains the likelihood of large projects, the demand for credits from the AKILF Program is expected to be more modest.
- The annual demand for credits from TCF is increasing dramatically, going from 434 credits in 2010 to 759 credits in 2011 and 1,340 credits in 2012. Based on the analysis of threats contained in the CPF, we expect this trend of rising demand for credits to continue. An additional factor driving rising demand for credits is that the Corps is becoming more consistent in requiring mitigation for impacts.
- TCF's history of successfully implementing compensatory mitigation projects within Alaska and elsewhere in the US, including large-scale and complex preservation projects. In Alaska, TCF has protected an average of 10,000 acres of wetlands per year since 1994.
- The projected financial requirements necessary to begin planning and implementing ILF projects at the scope and scale needed to meet the demand for credits generated by the numerous large impacts discussed in the CPF.

Advance credits that TCF sells to a permittee are considered debits. Debits are subtracted from the total amount of advance credits TCF is able to sell. Once all advance credits in a service area have been sold or transferred to permittees, there are no more advance credits to sell or transfer unless released credits are produced by approved ILF projects.

In the absence of an accepted assessment methodology, advance credits will equate to acres.

E. Credit Release:

Implementation of mitigation projects will result in the generation of released credits. The amount of credits potentially available for release will be based upon the approved project-specific mitigation plan and said plan's credit release schedule. The release of credits must be approved by the Corps, after consultation with the IRT.

Released credits are first used to secure or fulfill the mitigation obligations associated with the debits of advance credit. The credit release schedule shall be consistent with 33 CFR 332.8(o)(8). Generation of released credits may not occur until the approved long-term protection mechanism(s) are finalized and executed, as indicated in individual mitigation plans.

Once the previously sold advance credits are fulfilled by released credits, an equivalent number of advance credits may be made available for sale in that service area, at the discretion of the DE and in consultation with the IRT.

TCF must submit documentation to the DE demonstrating individual mitigation plan milestones have been met before the DE can approve the release of credits. The DE will provide copies of the documentation to the IRT members for review. IRT members must provide any comments to the DE within fifteen (15) days of receiving this documentation. However, if the DE determines that a site visit is necessary, IRT members must provide any comments to the DE within fifteen (15) days of the site visit. The DE must schedule the site visit so that it occurs as soon as it is practicable, but the site visit may be delayed by seasonal considerations that affect the ability of the DE and the IRT to assess whether the applicable credit release milestones have been achieved. After full consideration of any comments received, the DE will determine whether the milestones have been achieved and the credits can be released. The DE shall make a decision within thirty (30) days of the end of that comment period, and notify the sponsor and the IRT.

TCF shall complete land acquisition and initial physical and biological improvements, if any, by the third full growing season after the sale of advance credits in that service area, unless the DE determines that more or less time is needed to plan and implement a mitigation project. If TCF fails to meet these deadlines, the DE must either make a determination that more time is needed to plan and implement a mitigation project or, if doing so would not be in the public interest, direct TCF to develop and implement an alternative mitigation plan. Disbursement of funds from the AKILF Program Account may be required to provide alternative compensatory mitigation to fulfill those compensation obligations.

F. Credit Pricing and Purchase:

The number of credits required by a permit applicant, as well as the associated mitigation ratio, will be determined by the Corps.

Based on nineteen years of real estate experience in Alaska, including fifteen years of wetlands mitigation, TCF provides the following draft fee schedule (Table 2) to show the typical cost per credit for three wetlands categories (slope/flat/depressional, riverine/lacustrine, and estuarine/marine) in the five service areas.

Table 2. *Draft fee schedule for advance credits showing the typical cost per credit by geographic service area, physical setting and wetlands category*

Service Area	Slope/Flat/Depressional Wetlands	Riverine/Lacustrine Wetlands	Estuarine/Marine Wetlands
Arctic			
Urban	$22,000	$33,000	$44,000
Rural	$11,000	$22,000	$33,000
Remote	$5,500	$11,000	$22,000
Interior			
Urban	$22,000	$33,000	$44,000
Rural	$11,000	$22,000	$33,000
Remote	$5,500	$11,000	$22,000
Southwest			
Urban	$22,000	$33,000	$44,000
Rural	$11,000	$22,000	$33,000
Remote	$5,500	$11,000	$22,000
Southcentral			
Urban	$33,000	$44,000	$55,000
Rural	$22,000	$33,000	$44,000
Remote	$11,000	$22,000	$33,000
Southeast			
Urban	$33,000	$44,000	$55,000
Rural	$22,000	$33,000	$44,000
Remote	$11,000	$22,000	$33,000

These fees reflect typical costs for credits for each service area and the actual cost of credits for a specific project will be determined on a case-by-case basis. Generally, the costs of credits in urban areas will be higher than rural areas, and rural area credit costs will be higher than remote area credit costs. This is due to the trend that urban area properties are valued higher than remote area properties, which are valued higher that rural area properties. Upon request, TCF will calculate an in-lieu fee for a permittee's mitigation requirement based on full cost accounting and using region-specific, periodically-updated costs and national standards for preservation land practices. An in-lieu fee estimate includes multiple cost components:

- *Real estate (per-acre) cost* to purchase fee simple title or a conservation easement for a property, based on real estate markets and land sales in the Service Area;
- *Transaction costs* to execute a purchase that covers the costs of staff work on the project site, a site visit, survey, market appraisal, environmental review, baseline report

(documenting the site's condition, conservation/aquatic resource values and intended uses), legal cost, and real estate closing fees;

- *A stewardship (easement monitoring and legal defense) fee* that is sufficient to cover annual monitoring and management costs and to also address any violations and/or infrequent legal defense cost in perpetuity;
- *A land management fee* that is available to and or held by the land owner or land manager to be used towards the costs of managing the land for conservation. Examples of appropriate uses of these funds include gates, fences, signage, removing abandoned property, and contingency;
- *An administrative fee* to cover TCF's costs of long-term recordkeeping, ILF program management, professional management of the ILF Funds, Agreement/ Instrument updates, and annual reporting obligations to the Corps.

Additional cost considerations may include planning and design, construction, plant material, labor, non-stewardship legal fees, monitoring, remediation or adaptive management activities, and any other financial assurances necessary to ensure completion of mitigation projects. The Conservation Fund will also consider contingency costs appropriate to the state of project planning, including uncertainties in construction and real estate expenses.

TCF will periodically update the draft fee schedule to reflect changes in real estate values and other costs. TCF will provide the cost of credits to a prospective permittee in a timely manner and no later than thirty (30) days following the original inquiry. TCF will also advise the applicant on the acceptable methods of payment. In a timely manner, TCF will notify the DE and the prospective permittee in writing by letter or email when mitigation funds are received, and no later than ten (10) business days after receipt of funds by TCF. Once a credit is sold or transferred to a permittee its value cannot change.

G. Credit Availability:

A permittee may propose to use the AKILF Program to satisfy part or all of its compensatory mitigation obligations. If a permittee chooses to use the AKILF, it must contact TCF for a statement of credit availability. TCF will provide said statement in no more than 30 days. TCF makes no guarantee credits will be available for purchase to fulfill all or part of a permittee's compensatory mitigation obligations.

Authorization to sell credits to satisfy a permittee's compensatory mitigation requirements is contingent on compliance with all of the terms of the Instrument, including amendments and modifications to the instrument.

7. PROGRAM ACCOUNT

A. Establishment of the AKILF Program Account:

TCF shall establish and maintain a system for tracking the production of credits, credit transactions, and financial transactions between TCF and authorized permittees. Credit production, credit transactions, and financial transactions will be tracked on a programmatic basis, by service area, and separately for each individual ILF project.

Prior to accepting any fees from permittees, TCF will establish an AKILF Program Account that will be an FDIC-insured, interest bearing account. The interest generated by the AKILF Program Account will accrue to the Account. All fees generated from the sale or transfer of advance or released credits will be deposited in the AKILF Program Account. If the Sponsor accepts funds from entities other than permitees, these funds must be kept in an account that is separate from the AKILF Program Account.

B. Program Account Procedures:

The AKILF Program Account shall only be used for the selection, design, acquisition, implementation, and management of in-lieu fee compensatory mitigation projects, as well as the administrative costs of the Sponsor.

TCF will collect an annual administrative fee of not more than (10) percent to operate the AKILF Program. The administrative fee will come from the permittee deposited funds and is deemed to represent and reimburse reasonable overhead and related costs of administering the AKILF Program to accomplish the mitigation projects described herein. The actual administrative fee will be calculated annually based on actual costs.

The sponsor must submit proposed ILF projects to the DE for funding approval and disbursements from the program account are subject to the requirements of 332.8(i)(2).

The DE may audit the records pertaining to the AKILF Program Account. All books, accounts, reports, files, and other records relating to the AKILF Program Account shall be available within thirty (30) days of notice from the Corps for inspection and audit by the DE.

If TCF fails to meet the deadlines outlined within a specific individual mitigation plans, the DE must either make a determination that more time is needed to plan and implement an in-lieu fee project or, if doing so would not be in the public interest, direct TCF to disburse funds from the AKILF Program Account to provide alternative compensatory mitigation to fulfill those compensation obligations.

C. Previous Agreement:

TCF and the Corps signed a memorandum of agreement (Agreement) in 1998. Under the Agreement, TCF provided compensatory mitigation to permittees and used the ILFs to purchase and protect 24,696 acres of wetlands across Alaska.

The Instrument incorporates in-lieu fees previously received by TCF under the previous Agreement signed in 1998. These monetary funds, carried forward and held in a separate account, will be expended as a priority until fully depleted. The 1998 Agreement does not carry forward any available credits to the new ILF sponsorship, as described herein.

8. LONG-TERM MANAGEMENT

TCF is not a long-term land management agency. In most cases TCF shall seek to transfer compensatory mitigation lands to an appropriate land stewardship entity. Such entities include public land management agencies, non-governmental organizations, and qualified private land managers. TCF has a history of successfully fostering such partnerships. Appropriate land stewardship entities are those that maintain facility (e.g., land) management plans, integrated natural resource management plans, or similar plans that are consistent with the objectives of the specific mitigation project.

Once a mitigation project has been identified, TCF will work with the appropriate land stewardship entity to ensure the efficient and effective transfer of compensatory mitigation lands. The land stewardship entity will be identified in the individual mitigation plan to be reviewed and approved by the DE, in consultation with the IRT. The individual mitigation plan will only be approved if it complies with conditions of 33 CFR 332.8(j), through one of the processes indicated in 33 CFR 332.8(g)(1). Responsibilities concerning long-term management shall also be addressed within the individual mitigation plan.

Prior to transfer of compensatory mitigation lands, TCF shall obtain an appropriate long-term protection mechanism. Such mechanisms include, but are not limited to, conservation easements, and restrictive covenants. For lands being transferred to a government agency, thus converting the land to government property, long-term protection may be provided through federal facility management plans or integrated natural resources management plans, or similar plans, upon approval by the Corps.

For compensatory mitigation projects on public lands where changes in statute, regulation, or agency needs results in an incompatible use, the public agency authorizing the incompatible use is responsible for notifying the Corps and providing alternative compensatory mitigation that is acceptable to the DE for any loss in functions resulting from the incompatible use, in accordance with 332.7(a)(3) and 332.7(a)(4).

The DE will be provided sixty (60) day advance notice before any action to void or modify the real estate instrument, management plan, or long-term protection mechanism(s), including transfer of title to, or establishment of any other legal claims over the compensatory mitigation site. This includes activities that result in an incompatible use on public lands originally set aside for compensatory mitigation through the Instrument by way of changes in statute, regulation, or agency needs or mission.

Long-term management will consider 33 CFR 332.7(d)(3) and shall be identified in individual mitigation plans. Said plans will take into considerations the needs, if any, of the long-term land stewardship entity to manage the compensatory mitigation lands. In the case of transfer of mitigation lands to a public land-management agency, the Corps may waive the requirement for long-term financing, provided there is a high level of confidence that the compensatory mitigation will be provided and maintained. Criteria that will lead to a high level of confidence include the existence of a current management plan and a proven track record of effective stewardship.

9. REPORTING PROTOCOLS

A. Annual AKILF Program Report:

Upon approval of the Instrument, TCF shall create an annual report ledger in accordance with 33 CFR 332.8(i)(3), as well as individual ledgers that track the production of released credits for each in-lieu fee project.

TCF will record all financial transactions associated with the AKILF Program Account separately from those accepted from non-permittee entities and/or for other purposes. TCF will also create an AKILF Credit Ledger for tracking all credit activity, and will use RIBITS to track ledger activity, as well. TCF will provide the DE and IRT with an Annual Program Report within sixty (60) days of the end of the calendar year. The Annual AKILF Program Report will provide information pertaining to the AKILF Program Account and AKILF Program Credit Ledger.

The Annual AKILF Program Account Report will include the following information:

- All income/fees received, their source, and interest earned by the AKILF Program Account;
- A list of all permits for which funds were accepted to the Program by service area, including: the Corps permit number, the service area in which the authorized impacts are located, the amount and type of authorized impacts, the amount of required compensatory mitigation, the amount paid to the AKILF Program by the permittee, and the date the funds were received from the permittee;

- A description of Program Account expenditures/disbursements from the AKILF Program Account by service area such as the costs of land acquisition, management, administration and TCF administrative fee;
- The Annual AKILF Program Credit Ledger will include the following information:
    - The balance of advance credits and released credits at the beginning and end of the reporting period, by service area;
    - The permitted impact for each resource type;
    - All additions and subtractions of credits;
    - Other changes in credit availability.

Detailed financial information regarding the Program Account is considered confidential and not subject to public review. Information TCF considers to be confidential, but that is necessary for audit by the Corps, will be submitted separately from information that is available as part of the public record.

TCF will present the Annual AKILF Program Report at a meeting within 60 days of the preceding calendar year. TCF will hold periodic meetings with the Corps and IRT as needed.

B. Credit Transaction Notice:

In the event TCF accepts fees from a permittee in exchange for credits, TCF shall provide notice to the DE indicating the occurrence of the transaction. Any notice will be signed and dated and occur within thirty (30) days of deposit of funds to the AKILF Program Account. The information contained within a notice will at a minimum include the permit number and a statement indicating the amount and type of credits transferred.

C. Financial Assurance and Long-Term Management Funding Reports:

If the DE determines financial assurances and long-term management are required for an ILF project, such assurances and long-term management requirements will be addressed in sufficient detail, as described in 33 CFR 332.3(n) within the individual mitigation plan. The timeframe for providing Financial Assurance and Long-term Management Funding Reports as described in 33 CFR 332.8(q)(3) will also be discussed in the individual mitigation plan. If required, Financial Assurance and Long-term Management Funding Reports will include, at a minimum:

- Beginning and ending balances of the accounts providing funds for financial assurances and long-term management;
- Deposits into and any withdrawals from the accounts providing funds for financial assurance and long-term management;
- Information on the amount of required financial assurances and the status of those assurances, including their potential expiration.

In the event any or all long-term management of a project is transferred from TCF to a land stewardship entity, so too will the long-term management funds of said project, if any. The terms of transfer will be legally binding, as agreed upon by TCF, the land stewardship entity, and the Corps such that any required Long-Term Management Funding Reports will be the responsibility of the land stewardship entity.
Financial Assurance and Long-term Management Funding Reports will be made available to the public, upon request.

D. Monitoring Reports:

Monitoring is required of all compensatory mitigation projects to determine if the project is meeting its performance standards and if additional measures are necessary to ensure that the compensatory mitigation project is accomplishing the objective(s) determined in the individual mitigation plan. If TCF fails to submit reports within sixty (60) days of the deadline(s) outlined in the individual mitigation plan(s), the Corps may take appropriate compliance actions (See Section 10.C., Default Actions).

Individual mitigation plans for approved ILF projects will detail the parameters to be monitored, the length of the monitoring period, the party responsible for conducting the monitoring, the frequency for submitting monitoring reports to the DE and IRT, and the party responsible for submitting those monitoring reports to the DE and IRT. Monitoring will be consistent with 33 CFR 332.6. If required by the DE, monitoring reports will also be consistent with Regulatory Guidance Letter 08-03.

When TCF transfers compensatory mitigation lands to a land stewardship entity and the Corps requires monitoring, TCF will seek to contractually require the land stewardship entity to adhere to the appropriate monitoring guidelines mutually agreed upon by TCF, the land stewardship entity, and the Corps, consistent with the Instrument.

10. AMENDMENT, DEFAULT, AND CLOSURE PROVISIONS

A. Instrument Amendment and Modification:

Both the Corps and the sponsor may seek to amend or modify the terms of the Instrument. To the extent appropriate, amendments or modifications to the Instrument will be processed under the streamlined review process in accordance with 33 CFR 332.8(g)(2). In circumstances where the streamlined review process is not appropriate or the DE deems an amendment or modification is significant, the standard review process will be used, consistent with the terms of 33 CFR 332.8(d).

TCF will submit to the Corps a request for approval of each proposed mitigation plan in accordance with 33 CFR 332.8(j).

B. Circumstances of Default:

If, after review of the monitoring reports or various annual reports on the operation of the AKILF Program, the Corps determines that TCF has failed to provide compensatory mitigation in a timely manner or is not in compliance with the Instrument (e.g., ILF Sponsor has failed to meet milestones of individual mitigation plans, establish and maintain a credit ledger and individual ledgers for ILF projects, submit annual reports required by the Instrument in a timely manner), the Corps may take appropriate action (see next section) to achieve compliance with the terms of the Instrument or any approved mitigation plans, such as directing the Sponsor to prepare an alternative mitigation proposal to include (but not limited to) securing credits from approved mitigation banks or other ILF programs.

C. Default Actions:

Failure to provide compensatory mitigation, as defined in the above section, may result in the following actions: suspending credit sales, requiring adaptive management, reducing the number of credits a deficient mitigation project may produce, utilizing financial assurances, and terminating the Instrument. Sixty (60) days written notice is required for the Corps to pursue any default actions.

D. Force Majeure:

Any delay or failure of TCF to comply with the terms of the Instrument shall not constitute a default hereunder if and to the extent that such delay or failure is primarily caused by any act, event or conditions beyond TCF's reasonable control and significantly adversely affects its ability to perform its obligations hereunder, including: 1) acts of Nature, earthquake, fire, landslide, flooding, or interference by third parties; 2) condemnation or other taking by any governmental body; 3) change in applicable law, regulation, rule, ordinance or permit condition, or the interpretation or enforcement thereof; 4) any order, judgment, action or determination of any federal, state or local court, administrative agency or government body; or 5) the suspension or interruption of any permit, license, consent, authorization or approval. If the performance of TCF is affected by such event, TCF shall give written notice thereof to the Corps and IRT as soon as is reasonably practicable. It is TCF's responsibility to demonstrate to the Corps' and the IRT's satisfaction that the delay or failure was cause by force majeure. In the event long-term management is transferred to a land stewardship entity, TCF shall provide language in any contracts or agreements such that the land stewardship entity shall also be required to provide the above notice.

E. Program Closure Process:

Either party to this agreement may terminate this agreement within sixty (60) days of written notification to the other party. In the event that the AKILF Program operated by TCF is terminated, TCF is responsible for fulfilling any outstanding project obligations including the successful completion of ongoing mitigation projects, relevant maintenance, monitoring,

reporting, and long-term management requirements not contractually transferred to a third-party. TCF shall remain responsible for fulfilling these obligations until such time as the long-term financing obligations have been met and the long-term ownership of all mitigation lands has been transferred to the party responsible for ownership and all long-term management of the ILF project(s).

F. Allocation of Unused Funds:

In the event of closure of the AKILF Program, funds remaining in the AKILF Program Account after the AKILF Program obligations are satisfied (see above paragraph) shall be transferred to a land stewardship entity approved by the Corps. Said funds will be used for restoration, establishment, enhancement, and preservation of aquatic resources. The Corps itself cannot accept directly, retain, or draw upon those funds in the event of default or closure.

11. MISCELLANEOUS

A. Notice:

Any notice required or permitted hereunder shall be deemed to have been given either (i) when delivered by hand, or (ii) by email, or (iii) by U.S. mail, or (iv) sent by Federal Express or similar next day nationwide delivery system, addressed as follows (or addressed in such other manner as the party being notified shall have requested by written notice to the other party):

U.S. Army Corps of Engineers
District Engineer
Regulatory Division
P.O. Box 6898
JBER, AK 99506-0898
harry.a.baij@usace.army.mil

The Conservation Fund
Alaska Representative
2727 Hiland Road
Eagle River, Alaska 99577
bmeiklejohn@conservationfund.org

and

The Conservation Fund
Attn: General Counsel
1655 N. Fort Myer Dr., Ste 1300
Arlington, VA 22209
rerdmann@conservationfund.org

B. Invalid Provisions:

In the event any one or more of the provisions contained in the Instrument are held to be invalid, illegal, or unenforceable in any respect, such invalidity, illegality, or unenforceability will not affect any other provisions hereof, and the Instrument shall be construed as if such invalid, illegal, or unenforceable provision had not been contained herein.

C. Headings and Captions:

Any section or paragraph heading, or captions contained in the Instrument shall be for convenience of reference only and shall not affect the construction or interpretation of any provisions of the Instrument.

D. Legally Binding:

The Instrument shall be immediately, automatically, and irrevocably binding upon TCF and its successors, assigns, and legal representatives upon signing by TCF and the Corps even though it may not, at that time or in the future, be executed by the other potential parties to the Instrument, such as the various IRT agencies.

E. Liability of Regulatory Agencies:

The Corps administers its regulatory program to best protect and serve the public's interest in its aquatic resources, and not to guarantee the availability of credits to any entity, or ensure the financial success of in-lieu fee sponsors, specific individuals, or entities. The public should not construe the Instrument as a guarantee in any way that Corps or TCF will ensure sale of credits from the AKILF Program, or that the regulatory agencies will forgo other mitigation options that may also serve the public interest. The Corps retains the authority to make the final decision as to whether the AKILF Program is acceptable to provide compensatory mitigation for a particular permit.

F. Right to Refuse Service:

The Corps' approval of purchase of credits from the ILF program does not signify TCF's acceptance or confirmation of TCF's offer to sell credits. TCF reserves the right to refuse to sell credits from the AKILF Program for any reason and at any time.

12. Signature Approvals:

IN WITNESS WHEREOF, the parties hereto have executed this In-Lieu Fee Program Final Instrument on the date herein below last written:

ALASKA IN-LIEU FEE PROGRAM SPONSOR

6/5/13

The Conservation Fund — Date
Richard Erdmann
General Counsel

U.S. ARMY CORPS OF ENGINEERS, ALASKA DISTRICT

for 07 JUNE 2013

Christopher D. Lestochi — Date
Colonel, U.S. Army Corps of Engineers
District Commander

Interagency Review Team Concurrence affirmed by signature below for The Conservation Fund In-lieu Fee Program Final Instrument of May 31, 2013:

	6·20·13
NOAA - National Marine Fisheries Service	Date
James. W. Balsiger, Ph.D.	
Administrator, Alaska Region	

Interagency Review Team Concurrence affirmed by signature below for The Conservation Fund In-lieu Fee Program Final Instrument of May 31, 2013:

USDA – Natural Resources Conservation Service
Michelle Schuman
State Resource Ecologist

Date

Interagency Review Team Concurrence affirmed by signature below for The Conservation Fund In-lieu Fee Program Final Instrument of May 31, 2013:

JUN 28 2013

U.S. Fish and Wildlife Service
Geoffrey L. Haskett
Regional Director, Alaska region

Date

Exhibit A

4. Compensation Planning Framework for the Alaska In-Lieu Fee Compensatory Mitigation Program

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A. Overview:

This Compensation Planning Framework (CPF) is an essential component of the Instrument for the Alaska In-Lieu Fee Compensatory Mitigation Program (AKILF Program). The CPF comprises Section 4 of the Instrument.

The purpose of the CPF is to:

- Assess current aquatic resource conditions in the service areas of the AKILF Program;
- Assess threats to aquatic resources in the service areas; and
- Define objectives for protecting aquatic resources in the service areas.

Information related to aquatic resources in Alaska is uneven and incomplete. In some areas, most notably the urban centers of Anchorage, Juneau, and Fairbanks, detailed information about the status and distribution of wetlands is comprehensive. Yet over vast regions of the state, basic information about wetlands distribution, not to mention aquatic values and functions, is lacking. The National Wetlands Inventory (NWI), long-since complete in the lower 48 states, remains patchy in Alaska. Of the nearly 600 million acres of potentially mappable areas in Alaska (including some maritime environments), approximately 35 percent has been inventoried[1] (Figure 1). Digitally available versions of this inventory, which represent greater than 83 percent of the entire data set, indicate that 85.5 million acres of wetlands and other aquatic sites, including rivers, estuaries, and the maritime environment, occur in and around Alaska. More specifically, the NWI's digital dataset indicates that the following percentages of each service area have been mapped: Arctic – 26%, Interior – 28%, Southcentral – 59%, Southeast – 92%, and Southwest – 25% (Table 1).

While it is not currently possible to provide an accurate assessment of aquatic resource conditions across the State of Alaska, or for any one of the five service areas of the AKILF Program, The Conservation Fund (TCF) has compiled the existing data, which is fragmentary and inconsistent. As new data regarding Alaska's wetlands emerges, TCF will attempt to incorporate that information into the AKILF Program.

There have been hundreds of planning documents completed for various regions of Alaska. TFC makes no pretense towards summarizing, compiling, or referencing all these documents, as TCF does not see value in such an exercise. This CPF is not a comprehensive plan for wetlands conservation in Alaska, but the context for our work to preserve aquatic habitats in Alaska. TCF does not set specific goals or priorities for wetlands conservation in Alaska. Instead, TCF functions effectively by working to achieve the goals and priorities established by our local, state, federal, and private partners.

[1] http://www.fws.gov/wetlands/Data/index.html. Accessed 02/02/2013.

The terms "wetlands" and "aquatic resources" are used throughout the document in a way that suggests that they are interchangeable. TCF recognizes that these terms are not truly interchangeable, that wetlands are generally a subset of all aquatic resources. Here we use "wetlands" to mean those land areas where the water table is at or near the surface, or the land is covered by water (Hall *et al.* 1994). As TCF through the AKILF Program contemplates the purchase of lands or interest in land, our focus is more on the "land" components of wetlands and less on the "wet" components of aquatic resources. While our expectation is that our efforts to preserve wetlands will enhance certain aquatic values and functions (e.g., water quality, salmon spawning, and recreation), our ability to directly affect those values and functions is limited.

B. Geographic Service Areas:

Section 3 of the Instrument provides an explanation of the selection of service area boundaries. The five geographic service areas in Alaska include: Arctic Service Area, Interior Service Area, Southcentral Service Area, Southwest Service Area, and Southcentral Service Area (Figure 2).

A comprehensive inventory and distribution of wetlands is not currently available for Alaska. Various entities, such as the NWI and Cook Inlet Keeper, have performed regional assessments at varying spatial scales, but no wetlands data set covers an entire service area, let alone the entire state of Alaska.

No one has yet refined the assessment of Dahl (1990) that less than 1% of Alaska's wetlands have been lost to development. As Alaska is estimated to have roughly 175 million acres of wetlands, there is no data suggesting that the 1% figure has been surpassed, although local losses in urban areas such as Anchorage and Fairbanks have exceeded 1%. Senner (1989) estimated that human activity had resulted in the loss of 80,000 acres of wetlands in Alaska, but admitted that such an estimate was undoubtedly low due to incomplete information.

As the vast majority of Alaska wetlands (98%, Hall *et al.* 1994) are palustrine types, it is not surprising that the majority of human-caused impacts and losses have been to palustrine wetlands, principally scrub/shrub wetlands. Hall and Kratzer (2001) found that 85% of wetland losses resulting from human activity on the lower Kenai Peninsula from 1950 to 1996 were to palustrine scrub/shrub types. The relative rarity of estuarine, riverine, and lacustrine habitats in Alaska, combined with their values and functions, suggest that they merit special attention for preservation.

i. ARCTIC SERVICE AREA:

The Arctic Service Area (Figure 3) includes much of the Kotzebue Sound, Brooks Range, and Arctic coastal plain with the Colville, Noatak, and Kobuk Rivers. To the south in the Brooks Range, high-energy streams and glacial features producing a dendritic pattern over the landscape have significantly shaped the area. Despite these features, colluvial and eolian soils

dominate this reach of the service area. To the north are marine, fluvial, glaciofluvial, and eolian soils. The northern portion of the service area is a windswept landscape stretching across the top of Alaska. The service area is underlain by deep and continuous permafrost, which dominates the landscape and controls the distribution and function of wetlands and other aquatic resources in the area.

The Arctic Service Area is characterized by an abundance of lakes, wetlands, and permafrost-related features such as pingos, ice-wedge polygon networks, peat ridges, and frost boils. These features are promoted by the climate of the service area, which is dominated by a dry polar climate, with short, cool summers and long, cold winters. While the climate tends to be slightly wetter to the south, most of the area's precipitation falls as snow. Areas not as significantly impacted by permafrost tend to be drainages, which tend to be dominated by willows and alders. Outside of the drainages in much of the service area are mixed shrub-sedge tussock tundra and other forms of tundra.

While most of the Arctic Service Area is treeless, some trees species are present in the southern extent of the Brooks Range. The habitats of the Arctic Service Area are home to many fauna including: caribou, muskoxen, lemmings, arctic ground squirrels, arctic foxes, gray wolves, brown bears, polar bears, Dall sheep, arctic ground squirrels, peregrine falcons, marmots, loons, spectacled eiders, and a variety of migratory shorebirds, ducks, geese, swans, and passerines. Fish species present include chinook, sockeye, coho, chum, and pink salmon, arctic cisco, broad whitefish, least cisco, Dolly Varden, arctic char, and arctic grayling.

a. Current Condition and Historic Loss of Aquatic Resources:

Current Conditions: The Arctic Service Area is comprised of approximately 81 million acres, of which roughly 49 million acres (61%) are wetlands (Hall *et al* 1994). The NWI has digitally mapped 26 percent of this area (Table 1 and Figure 1). According to this data, the freshwater emergent wetland type is the most common, encompassing 71.2 percent of the area. Freshwater shrub wetlands and lakes are the second and third most common aquatic resource type in the area, being 13 and 11 percent of the area mapped, respectively. The total amount of wetlands mapped for the area is roughly 18.6 million acres.

Estuarine, palustrine, and lacustrine wetlands in the Arctic Service Area provide breeding habitat for numerous bird species, including several bird species in decline. For example, spectacled eiders and Steller's eiders, both federally threatened species, breed on the northern coastal plains in large river deltas, and wet, polygonized coastal plains near shallow ponds often associated with *Carex* spp. and *Arctophila fulva*. Both species of eiders forage primarily on insect larvae by diving and dabbling in shallow wetlands (US Fish and Wildlife Service 1996; US Fish and Wildlife Service 2002). Yellow-billed loons, a candidate species for federal protection, breed on the northern coastal plains near deep-

water, fish-inhabited lakes where forage (freshwater fish) is plentiful (Center for Biological Diversity 2004). Kittlitz's murrelets, a candidate species for federal protection, are found along the coast of the Arctic Service Area where they forage near the outflow of glacial streams often associated with estuarine wetlands (Center for Biological Diversity 2001).

Anadromous waters and associated estuarine, riverine, and lacustrine wetlands in the Arctic Service Area provide habitat for salmon, which are important to several species in decline. Bearded seals and ringed seals, both candidate species for federal protection, forage on salmon (Center for Biological Diversity 2008), and polar bears, a federally threatened species, forage on both bearded and ringed seals (Center for Biological Diversity 2005).

Historic Loss: Industrial activities on Alaska's North Slope have affected the chemistry, flow patterns, and drainage patterns of the area's fresh water (National Research Council 2003). Such impacts are a result of withdrawal or redistribution of water for construction of ice roads and pads, gravel mining in rivers, and blockage of drainage by gravel roads. Despite these impacts, the service area contains no waters designated as impaired by the Alaska Department of Environmental Conservation (ADEC; ADEC 2010).

Approximately 10,000 acres, much of which is undoubtedly wetland, have been directly impacted by energy development in the Arctic Service Area. The actual complex of industrial facilities indirectly impact a larger area, encompassing an area at least 1,000 miles square, which is nearly 100 miles wide, east to west (and getting larger with the recent expansion of the "CD-5 Area" in the Colville Delta). An additional estimated 2,000 acres of wetlands was also filled in the construction of the Dalton Highway and the Trans-Alaska Pipeline (U.S. Fish and Wildlife Service 2001). The vast majority of wetland impacts in the Arctic Service Area have been to palustrine wetlands types that are widespread in the service area, especially in the arctic coastal plain where energy development is concentrated.

In addition, petroleum development in the Arctic Service Area has resulted in significant indirect impacts. In the wettest parts of the Prudhoe Bay oil field, thermokarst (i.e., thermal erosion) and subsequent flooding are a common challenge around permanent roads and structures. Stream crossings for pipelines or access roads can affect water quality through changes to stable stream banks, erosion, siltation, and stream bottom disturbance.

Secondary effects such as the release of contaminants, sewage dumping, oil spills, and dust have damaged or degraded wide areas of tundra wetlands adjacent to oil and gas facilities. Contaminants released from reserve pits by overflows, leaching, or breaching has released diesel fuel, heavy metals, ethylene glycol, and soluble salts onto the tundra, and has killed vegetation surrounding reserve pits. Diesel and crude oil, for example, can cause severe damage to tundra vegetation and can remain toxic for more than 4 years after the spill.

According to figures from the ADEC Spill Prevention and Response database, there have been over 10,500 reported spills in the service area between January 1990 and March of 2013[2]. In 2011 alone, more than 45,000 gallons of hazardous materials spilled in the North Slope and Northwest Arctic ADEC subareas (ADEC 2012a). In 2012, there was a significant increase in the amount of hazardous material spilled (almost 100,000 gallons overall) in these subareas, some of which can be attributed to the Repsol spill of roughly 42,000 gallons of drilling mud (ADEC 2012b). Besides drilling mud, other major constituents of these spills include diesel, ethylene glycol, gasoline, crude, methyl alcohol, and aviation fuel.

The impact of all-terrain vehicles (ATVs) on wetlands is severe in many parts of Alaska, including the Arctic Service Area. ATVs damage wetlands vegetation by abrading, compressing, and shearing, and in ice-rich soils, by subsidence. ATVs often increase erosion and sedimentation, which can result in increased water temperature, reduced oxygen content, and can smother gravel beds used by spawning fish (Bane 2001). ATV use around Barrow and other communities in the Arctic Service Area has displaced nesting waterfowl, including Steller's and spectacled eiders.

Recently, the Red Dog mine near Kotzebue has undergone expansion. The Aqqaluk Project has the potential to disturbed approximately 119 acres of wetlands.

b. Threats to Aquatic Resources in the Arctic Service Area:

Urbanization: Urbanization has had a minimal impact on wetlands in the Arctic Service Area, mainly because the communities in the service area are relatively small and compact. Barrow, the largest community in the service area, has experienced some loss of wetlands due to the expansion of residential development and community infrastructure. Of particular concern is the loss of nesting habitat for Steller's and spectacled eider resulting from wetlands fills in the Barrow area.

Resource Development: The principal impacts to aquatic resources in the Arctic Service Area derive from the exploration for and the extraction and transportation of energy resources, principally oil. The construction of roads, pipelines, powerlines, refineries, airstrips, docks, causeways, buildings, drill pads, and other types of infrastructure related to energy development have been the principal sources of wetland impacts in the Arctic Service Area for many decades.

Oil and gas exploration and development in wetland areas have significant impacts, particularly in arctic regions where vegetative recovery is slow. The effects of oil and gas

[2] http://www.dec.state.ak.us/applications/spar/SpillsDBQuery/SpillSearch.asp. Accessed 03/18/2013.

activities on wetlands differ between the exploration phase and the development phase. The exploration phase of oil and gas operations usually results in little surface disturbance. Initial stages of geophysical reconnaissance are supported by helicopter personnel and only require small, temporary camps. Subsequent seismic surveying causes greater disturbance from overland transportation of equipment and personnel. Seismic surveys or transportation corridors can affect tundra wetlands, particularly if activities occur when the tundra is not completely frozen.

Exploratory drilling, the final stage of exploration, can involve considerable surface disturbance, including: construction of drilling sites, campsites, and airstrips; and overland transport of equipment and personnel to drilling sites. Transporting heavy equipment to drilling sites can cause removal or compaction of tundra, which in turn can cause thawing of permafrost and subsidence of the terrain. The combination of thermal erosion (thermokarst) and hydraulic erosion over longer periods of time can create further slumping or gullies and ravines. Using ice to construct exploratory drill pads and roads, although less damaging than using gravel, can require millions of gallons of water, and can drain tundra, ponds, and streams.

Petroleum development on the arctic coastal plain results in extensive disturbance of wetlands because it requires fill material (usually gravel) to construct infrastructure. This infrastructure, which includes drill pads, storage areas, transportation facilities, gravel mines, and other developments, alters terrain, disrupts natural drainage patterns, and changes or eliminates fish and wildlife habitat. The existing infrastructure for oil and gas operations in the Prudhoe Bay-Kuparuk complex is spread over more than 1,000 square miles of tundra (National Research Council 2003). This complex is expected to expand and further impact aquatic resources in the service area.

As an example of wetland impacts associated with resource extraction in the Arctic Service Area, the Point Thompson project is expected to result in the loss of 274 acres of palustrine wetlands through the construction of drill pads, pipelines, and gravel roads.

Other current and future sources of wetlands impacts in the Arctic Service Area include large-scale mining operations such as the Red Dog Mine near Kotzebue, the expansion of communities, and the construction of roads, pipelines, airports and other types of infrastructure.

Transportation: As discussed above, resource development in the Arctic Service Area has required the establishment and expansion of a transportation network to move equipment, people, and supplies across the region. Fewer than 1,000 miles of year-round roads exist in the Arctic Service Area, largely because the ubiquity of wetlands results in significant

construction challenges and costs. Seasonal ice roads are a common alternative to permanent roads, but require the drawdown of freshwater for construction and maintenance.

An example of the complex challenges involved in expanding transportation in the Arctic Service Area is the proposed CD-5 Project, which is part of the larger Alpine Satellite Development Plan being developed by ConocoPhillips[3]. The CD-5 Project seeks to expand the existing road network and build a bridge over the Colville River. The bridge, if constructed, is likely to result in the loss of an estimated 60 acres of wetlands and cause impacts to another 300 acres of wetlands.

The Foothills West Transportation Access Project is another large-scale transportation development with the potential to impact wetlands and other aquatic resources, both directly and indirectly. The project proposes to construct an all-season road from the Dalton Highway to Umiat for the expressed purpose of encouraging oil and gas development in the region. According to project documents[4] the final route may be 100 miles long and include up to six major river crossings (i.e., Anaktuvuk, Chandler, Colville, Itkillik, Kuparuk, and Toolik Rivers) depending on the route alternative selected.

Climate Change: Climate change has the potential to alter the distribution and character of aquatic resources across the Arctic Service Area. Warmer temperatures in the region have caused coastal erosion, tundra fires, habitat conversion, and permafrost degradation, all of which have the potential to negatively impact wetlands and other aquatic resources on a permanent basis. Coastal erosion, exacerbated by warmer average temperatures and accelerated by thawing permafrost, is having a dramatic impact on coastal wetlands in the Arctic Service Area. Coastal erosion is advancing as rates of up to 25 meters per year in places along the Beaufort Sea (Jones *et al.* 2009), allowing for the intrusion of salt water into fresh water wetlands. The magnitude of this problem and its impacts on aquatic resources is not yet fully understood.

As with coastal erosion, warming temperatures, in conjunction with low precipitation, produced conditions favorable to those that contributed to the Anaktuvik River Fire of 2007, which burned 1,039 km^2 of tundra (Hu *et al.* 2010), much of which was wetland. This resulted in the release of 2.1 teragrams of carbon into the atmosphere (Mack *et al.* 2011), an amount similar in magnitude to the net carbon sequestered by the entire arctic tundra biome in one year (McGuire *et al.*2009). The most reliable climate change models indicate the warming trend that the arctic is experiencing will continue, thus improving conditions for additional tundra fires and possibly creating a positive feedback loop resulting in the arctic and its wetlands becoming carbon sources rather than sinks.

[3] http://www.blm.gov/eis/AK/alpine/alpineproject.html. Accessed 3/24/2013.
[4] http://www.foothillswesteis.com/. Accessed 03/18/2013.

Another major impact of climate change on the vast tundra wetlands of the Arctic Service Area will be changes in soil temperature, which will result in the melting of permafrost leading to changes in the morphology and distribution of the permafrost-affected soils. While the amount of tundra wetlands is expected to diminish over the next century, the extent of change is uncertain. Nevertheless, on a broad scale, it appears that tundra habitat will retreat northwards, being replaced by boreal forest. Some estimates predict that two-thirds of the tundra habitat will be lost (Ramsar 2001).

Depending on changes in rainfall and drainage conditions, degradation of permafrost may result in over-saturation or desiccation of the surface, which will have major implications for some wetlands. It is expected that lichens and mosses, which dominate the tundra regions, will be replaced by a denser cover of vascular plants. This, combined with higher evaporation rates, is likely to reduce the amount of ponded water and run-off. Furthermore, loss of permafrost will create a link between the surface and groundwater aquifers, potentially leading to the drainage of wetlands. However, land subsidence due to permafrost thawing (i.e., the development of thermokarst terrain) may lead to the development of new wetlands and drainage networks, particularly in areas of ice-rich permafrost. This has already been reported in areas of relatively warm, discontinuous permafrost in central Alaska (Ramsar 2001).

c. Opportunities for Aquatic Resource Compensatory Mitigation:

Opportunities for compensatory mitigation through wetlands preservation in the Arctic Service Area include the purchase of strategic inholdings in the Arctic National Wildlife Refuge, Gates of the Arctic National Park, and Kobuk Valley National Park. The potential also exists to develop conservation easements with communities to conserve high value wetlands. One such example concerns ongoing discussions with the community of Barrow regarding the conservation of habitat for nesting eiders.

Since 1994 The Conservation Fund has preserved five properties totaling 560 acres in the Arctic Service Area within the Gates of the Arctic and Kobuk Valley National Parks.

d. Parcel Prioritization:

The use of geographic information systems (GIS) can be an effective way to identify and prioritize specific properties to advance the aquatic resource objectives. These GIS parcel prioritizations typically involve the selection of a set of biological and geographical attributes to analyze properties in a particular geographic area. TCF will use information from parcel prioritizations to assist with identifying properties to preserve aquatic resources in the Arctic Service Area.

TCF will work with conservation partners to help them achieve their land preservation priorities. Partners set these priorities through parcel prioritization projects, which typically use GIS and other tools. When available, TCF will use partner prioritizations to help direct TCF preservation projects. For the Arctic Service Area, such partners may include U.S. Fish and Wildlife Service, Alaska Department of Natural Resources, Alaska Department of Fish and Game, National Park Service, Bureau of Land Management, The Nature Conservancy, NANA Regional Corporation, Arctic Slope Regional Corporation, and numerous village corporations.

Because no prioritization had been done for the Arctic Service Area, TCF completed a GIS parcel prioritization in 2012 for the entire service area (The Conservation Fund 2012). This parcel prioritization does not include data on threats to aquatic resources; instead this prioritization used numerous biological and geographic attributes to generate a score for each parcel. The higher the score, the more valuable the property is for preservation. Several important attributes used in this prioritization for the Arctic Service Area include anadromous waters, wetlands, Important Bird Areas, endangered and threatened species habitat, polar bear habitat, and coastline acreage. TCF will use the scores from the parcel prioritization to identify properties of high ecological and biological value.

TCF will evaluate all prioritizations to determine that the criteria outlined in 33 CFR 332.3(h)(1) are satisfied. Those criteria are:

- The resources preserved provide important physical, chemical, or biological functions for the watershed;
- The resources to be preserved contribute significantly to the ecological sustainability of the watershed. In determining the contribution of those resources to the ecological sustainability of the watershed, the DE must use appropriate quantitative assessment tools, where available;
- Preservation is determined by the DE to be appropriate and practicable;
- The resources are under threat of destruction or adverse modification;
- The preserved site will be permanently protected through an appropriate real estate or other legal instrument (e.g., easement, title transfer to state resource agency or land trust).

TCF may work with Alaska Natives and village and regional corporations to use Traditional Ecological Knowledge (TEK) to incorporate cultural, subsistence, historical and ecological information into parcel prioritizations in the Arctic Service Area.

In addition to using the parcel prioritization, TCF may identify parcels based on threats to aquatic resources. Resource extraction and associated site and transportation infrastructure and urban development are identified as the primary threats to aquatic resources in the

Arctic Service Area. Based on this information, TCF may identify parcels that are vulnerable to these threats, which include wetlands in areas where resource extraction is occurring and/or is likely to increase; expanding coastal and river communities, and inholdings where development is likely to increase.

ii. INTERIOR SERVICE AREA:

The climate on the Interior Service Area (Figure 4) is generally continental, becoming a mix of polar and maritime near the coast. The western portion of the service area maintains cool, moist summers with fog from the ocean. The eastern and central portions of the service area tend to have short, dry summers, and long, cold winters. This region contains soils with discontinuous permafrost. At near 30 degrees F (-1 degrees C), the permafrost in this region is warmer than that in the northern Alaska region. Distribution of the permafrost soils is determined by landform position, particle size, and moisture content of the soil. Much of the area on the flanks of the Brooks Range and Alaska Range is covered by rock, snow, and ice. Wildfires, the dominant disturbance regime in the region, disturb the insulating organic surface, lowering the permafrost table and eliminating perched water tables. Depending on fire frequency, landform position, and particle size, these newly formed non-permafrost soils (Inceptisols) may or may not revert back to permafrost soils (Gelisols).

The native vegetation across the region ranges from boreal forests to alpine tundra. The southern Brooks Range and the flanks of the Alaska Range are dominated by alpine tundra with grasses, sedges, mosses, lichens, ericaceous shrubs, and willows. The low hills and mountains are a mix of alpine tundra and boreal forests. The basins are predominantly boreal forests with black spruce, white spruce, paper birch, and quaking aspen. Other common vegetation types in the Interior Service Area include dryas-lichen tundra, sedge-ericaceous shrubs, and sedge tussock tundra. In warmer areas, floodplains often contain white spruce and birch stands, while colder areas tend to host willow and alder thickets. Floodplains tend to consist of unconsolidated fluvial material not strongly influenced by permafrost. Outside of the floodplain permafrost is variable throughout the service area and can be thick and continuous in one area and thin and discontinuous in another, a pattern that is influenced not only by latitude and aspect, but also by the depth to the bedrock (NRCS 2004).

The service area contains part of the Yukon-Old Crow Basin (ADF&G 2006), which extends into Canada. The basin is the most productive arctic habitat on the continent (McNab and Avers 1994). This area supports rich aquatic habitats that attract millions of waterfowl and provide prime habitat for moose, river otters, beavers, and muskrats. Examples of other animals in the service area include: Dall sheep, mountain goats, caribou, moose, brown bears, gray wolves, Canada lynx, hoary marmots, and ground squirrels. Other birds in the area include: olive-sided flycatcher, boreal owl, great gray owl, arctic loon, and boreal chickadees.

The service area's rivers, lakes, and streams support chinook, sockeye, coho, chum, and pink salmon, arctic grayling, Alaska blackfish, northern pike, and whitefish.

a. Current Condition and Historic Loss of Aquatic Resources:

Current Condition: The Interior Service Area is approximated by the following subdivisions: Interior Alaska Highlands, Kanuti Flats, Kuskokwim Highlands, Koyukuk-Innoko Lowland, Norton Sound Highlands, Tanana-Kuskokwim Lowland, Yukon Flats, and Yukon-Kuskokwim Delta (Rieger *et al.* 1979). Using wetland estimates for those divisions, the Interior Service Area contains approximately 97 million acres of wetlands (Hall *et al.* 1994). The NWI has digitally mapped 28 percent of this area (Table 1 and Figure 1), and the most common major wetland types indentified are freshwater shrub, freshwater emergent, and freshwater forested, representing 47.2, 30.8, and 10.8 percent of the mapped area, respectively. The total amount of wetlands mapped for the service area is 17.4 million acres.

NWI data were used by Whitcomb *et al.* (2009) to produce a map illustrating the distribution of Alaska's wetlands (exclusive of St. Lawrence Island and much of the Aleutian Islands). The "Whitcomb map" estimates that the Interior Service Area contains 39 million acres of wetlands, which is likely an underestimate of the resource. Additionally, the map indicates most of the wetlands to the east are scrub/shrub with large, sporadic complexes of emergent and open water, in the form of ponds/lakes and rivers. The largest wetland complexes in the east occur near Fairbanks in the Tanana Flats (Fort Wainwright Military Reservation) and Minto Flats as well as the Koyukuk National Wildlife Refuge, Denali National Preserve (a subunit of Denali National Park), and along the Yukon Flats. To the west, emergents constitute a much larger proportion of the vegetated wetlands. Open water in the form of lakes and ponds significantly increase in the region. By far, the largest wetland complexes in the west occur on the Yukon-Kuskokwim Delta and on the coast of the Seward Peninsula.

The wetlands of the Interior Service Area lie within the Yukon River Basin and drain into the Yukon River via other major rivers, which include the Tanana, Nenana, Koyukuk, Porcupine, and Innoko. These and many other rivers support anadromous species, including: coho salmon, king salmon, chum salmon, sockeye salmon, pink salmon, humpback whitefish, and sheefish. According to data from ADF&G (2012), the total number of known (mapped and surveyed) anadromous river and stream miles in the Interior Service Area is 21,200 miles, although mapping is incomplete and many headwaters have not been surveyed.

Wetlands in the Interior Service Area provided habitat for several imperiled species. For example, Steller's eiders, a federally threatened species, forage and breed in palustrine

wetlands near the north coast of the Seward Peninsula. Spectacled eiders, a federally threatened species, forage and breed in palustrine, wet tundra regions of the Yukon Delta along shallow ponds associated with vegetation, such as *Carex* and *Arctophila* (US Fish and Wildlife Service 1996).

Wood bison, a federally threatened species, historically inhabited much of the Interior Service Area and state and federal agencies are moving to reintroduce wood bison to the Yukon Flats. Though not a wetland-dependent species, wood bison forage on vegetation in wetlands when available. Wood bison forage on willow, shrubs, grasses, and sedges associated with palustrine, riverine, and lacustrine wetlands, and inhabit areas where moose and waterfowl are common (Gardner, Berger, & Taras 2007).

Anadromous waters and associated estuarine, riverine, and lacustrine wetlands in the Interior Service Area provide habitat for salmon, which are important for several species in decline. Bearded seals and ringed seals, both candidate species for federal protection, forage on salmon (Center for Biological Diversity 2008), and polar bears, a federally threatened species, feed on both bearded and ringed seals (Center for Biological Diversity 2005). Steller sea lions, a federally endangered species in this region, also forage salmon in this region (National Marine Fisheries Service 2008).

Historic Loss: Wetlands and aquatic resources in interior Alaska have experienced disturbances from a variety of sources including: transportation projects (e.g., Parks Highway, local roads), mining (e.g., Fort Knox, Usibelli coal mine), energy development (e.g., Trans-Alaska Pipeline System), agriculture, tourism, and recreation. However, the largest impact to wetlands has likely come from urbanization.

Commercial and residential development has occurred in and around the 246 communities of the Interior Service Area. The most extensive urbanization, however, has likely occurred in the Fairbanks North Star Borough (ADEC 2010). Using data gathered from Jenkins *et al.* (2010) and historic aerial photos, ABR (2011) determined that of the approximately 78,000 acres of wetlands in the greater Fairbanks area, over one quarter have been lost to urban development projects or converted to uplands between 1949 and 2007. Notably, 32.4% of emergent marshes and wet meadows and 20.4% of sloughs have been lost in that same time period. These habitats are significant for a number of water and wetland-dependent migratory birds (ABR 2011).

Urbanization and development have impaired a number of waters in the Fairbanks area, including Noyes Slough, Chena River, Chena Slough, and Garrison Slough. Other waters in the Service Area have also been impaired due to mining activity including: Upper Birch Creek, Eagle Creek, Golddust Creek, Crooked Creek, Goldstream Creek, Cabin Creek, near

Nabesna, the Kuskokwim River and Red Devil Creek near Red Devil, and Slate Creek in Denali National Park (ADEC 2010).

As in other parts of Alaska, ATV activity has degraded wetlands and streams in the Interior Service Area and remains a localized threat to wetlands.

The Interior Service Area is already seeing wetland loss and transformation resulting from climate change. Riordan *et al.* (2006) report a loss of up to 31% of wetland surface area in closed-basin wetlands across boreal regions of Alaska.

b. Threats to Aquatic Resources:

Urbanization and population growth: Urbanization of the Interior Service Area is likely to be highest along the road corridors and larger population centers such as the greater Fairbanks area. Much of this urbanization will be due to increases in residential and commercial development (e.g., roads, utility corridors, public works projects) to support growing populations. The population of the Fairbanks North Star census area, for example, is expected to increase by 34.8 percent between 2010 and 2035 (a net change of 98,000 to 132,076 residents). This increase is expected to put additional strain on aquatic resources to accommodate these additional residents. Other census districts that occur roughly within the Interior Service Area are: Nome, Wade Hampton, Yukon-Koyukuk, Denali, and Southeast Fairbanks. Combined, these census areas are expected to grow from 129,564 residents (2010) to 169,495 residents (2035), which represents a population increase of 30.8%. Only the Yukon-Koyukuk and Denali census districts are expected to lose residents (Hunsinger *et al.* 2012).

An additional disturbance in the Fairbanks area is the extraction of peat and gravel, which has led to the direct conversion of extensive areas of wetlands to gravel pits.

Transportation: Alaska Department of Transportation and Public Facilities' (DOT&PF) "Let's Get Moving 2030: Alaska Statewide Long-Range Transportation Policy Plan" (ADOT&PF 2008a) indicates the agency's intent to spend $5.5 billion to fulfill strategic system development goals for surface transportation in all of Alaska. Several of these goals that will impact the Interior Service Area and include:

- Complete the modernization of the National Highway System to current standards to address safety and connectivity;
- Address demand-driven urban capacity on the most congested highways in Alaska (e.g., Fairbanks);
- Add strategic new system links to improve connectivity and efficiency;
- Improve selected Alaska Highway System links to enable economic development;
- Taylor Highway improvement project;

- Implement other strategic capital needs and committed projects of note;
- Implement a number of rehabilitation and maintenance projects along the Parks, Richardson, and Glenn highways; and
- Develop infrastructure related to the Alaska Gasline Inducement Act.

The "2012-2015 Statewide Transportation Improvement Program" outlines projects for the entire state (ADOT&PF 2012). Many of these projects have the potential to impact wetlands and other aquatic resources. The list of project is extensive and includes nineteen projects in the Fairbanks area alone. Many of the projects will require wetlands mitigation to offset their impacts.

A project outside of Fairbanks that will require wetlands mitigation is the Western Alaska Access project (a.k.a., the "Road to Nome"). The current favored alternative for the project proposes to connect the Elliot Highway (Manley Hot Springs) to the Nome-Council Highway via 500 miles of new construction. Spurs to significant mineral projects (i.e., Ambler, Donlin Creek, Illinois Creek, and 10 larger placer mines) and energy developments could potentially be added to the corridor as well, thus increasing the impacts of the project's footprint on wetlands, streams, and navigable rivers.

The Federal Aviation Administration's (FAA) Alaska Regional Airport Improvement Program Project Schedule identifies near-term projects that will occur in communities in the Interior Service Area (FAA 2012). Some of these projects have the potential to impact wetlands in the service area. For example, Chevak, Hooper Bay, and Golovin are having runway improvements done, which will increase their footprint. Additionally, Alakanuk and Manley Hot Springs are each getting a new airport. These types of projects are consistent with improvements happening throughout the service area (For examples, see ADOT&PF 2002).

The Alaska Railroad Corporation has begun work on the Northern Rail Extension.[5] The extension will connect the communities of Fairbanks and Delta Junction via an addition of 80 miles of rail to the current rail belt. The new rail will follow the Tanana River, a majority of the rail line to be installed on the south side of the river. This southern alignment requires a crossing of the Tanana River, and the potential crossing of a number of other smaller river features, such as the Salcha, Little Delta, and Delta Rivers, and Delta Creek. Of the 7,051.8 acres of wetlands within the study area of the rail project, the favored alternative will potentially impact 1,046.3 of those acres, the most common type being scrub/shrub wetlands.

[5] http://www.stb.dot.gov/stb/environment/key_cases_alaska.html. Accessed 3/24/2013

Transportation projects in the Interior have required extensive mitigation to offset unavoidable impacts to wetlands. Construction of new impervious surfaces, as well as improvement and realignment to existing transportation infrastructure, pose significant threats to aquatic resources for various reasons, including, but not limited to: run-off, site contamination during the construction process, introduction of invasive and non-native species, and disturbance of hydraulic connectivity. In addition, the construction of new transportation infrastructure encourages new residential, commercial, and industrial development on adjacent land.

Resource Development: A long-discussed natural gas pipeline project could impact wetlands and aquatic resources along its corridor. One plan involves a pipeline that would roughly parallel the existing Trans-Alaska Pipeline System from Prudhoe Bay to Delta Junction, or possibly Valdez, with other variants running to Canada or Cook Inlet. Project documents indicate the total wetlands area to be disturbed (inside and outside the Interior Service Area) is 9,966 acres. The bulk of these potentially disturbed wetlands are composed of palustrine scrub/shrub habitats and complexes of palustrine scrub/shrub and emergent habitats. Additional natural gas spur lines to Nikiski or Valdez are also being explored.

Hydrocarbon developments in the Interior Service Area are also being pursued by Doyon Ltd., a regional native corporation, in the Nenana and Yukon Flats basins. Doyon Ltd. recently converted 485,000 acres of exploration license in the Nenana basin to 400,000 acres of leases. The Nenana basin is relatively close to existing infrastructure (e.g., roads, railroad) and the town of Nenana, potentially improving the economics of any serious find.

The Interior Service Area has an extensive mining history, but global mineral prices in recent years have produced an interest in mineral wealth unprecedented even by Alaskan standards. In 2010 there were at least 19 major hard rock mineral exploration projects (Szumigala *et al.* 2010) located in the Interior Service Area alone. Most mineral development projects require relatively large footprints not just for the resources being extracted, but also for related infrastructure (e.g., milling facilities, roads, and utilities).

Considering the ubiquity of wetlands in interior Alaska, it is certain that wetlands and related aquatic resources will be impacted by mineral production in the future. For example, the proposed Jumbo Dome coal project, sponsored by Usibelli Coal Mine Inc., has been authorized to disturbed 1,098.7 acres over a 27 year mine life[6], 160.4 acres of which are wetland[7]. Another major proposed mine is the Livengood project, which is one of the largest new gold discoveries in North America. The potential ore body being investigated is as much as 3.7 miles long by 1.25 miles wide (Szumigala *et al.* 2010). Other significant

[6] http://dnr.alaska.gov/mlw/mining/coal/jumbo-dome/pdf/jdm-public-notice-02072012.pdf. Accessed 3/18/2013
[7] http://dnr.alaska.gov/mlw/mining/coal/jumbo-dome/pdf/jdm-part-c.pdf. Accessed 3/18/2013

mineral resources are also being explored or solicited by regional native corporations and state authorities (i.e., the Trust Land Office).

Smaller scale mining activity, such as placer mining, has increased steadily in Alaska as well. Mining applications, which are rarely denied and include both new applications and active-applications (i.e., renewal of multi-year applications), have increased from 287 in 2002 to 803 in 2012, for the entire state. As of March 18, 2013, the Alaska Department of Natural Resources' Division of Mining, Land and Water received 470 mining applications so far for the 2013 calendar year, which is 75 more applications than were received by that date of the previous year. Of these 470 applications, 268 were active-applications for placer mining, 109 were active-applications for suction dredging, 42 were active-applications for hard rock exploration, and the remaining 51 were new applications for mining. Most of the new applications are for placer mining; however, suction dredging has been increasing dramatically because of new interest in Nome resulting from several popularity reality TV shows about mining.

Climate Change: Climate change appears likely to be a major threat to wetlands in the Interior Service Area. The thawing of permafrost and drying of water bodies has already been documented and appears to be accelerating. Because permafrost in the Interior is generally discontinuous and not as thick as in the arctic, it is more vulnerable to the effects of climate change and is likely to greatly transform the extent, distribution, and form of wetlands in the Interior Service Area. Coastal erosion and the intrusion of salt water into fresh water systems is also likely to accelerate along the coastal areas of the Interior Service Area.

c. Opportunities for Aquatic Resource Compensatory Mitigation:

Opportunities for compensatory mitigation through wetlands preservation in the Interior Alaska Service Area include the purchase of strategic inholdings in the White Mountain National Recreation Area, Yukon Flats National Wildlife Refuge, Tetlin National Wildlife Refuge, Creamer's Field State Game Refuge, Chena River State Recreation Area, and other state and federal conservation units. Other opportunities include the creation and expansion of "green" infrastructure in and adjacent to communities, such as the Chena Greenbelt Project in Fairbanks.

Since 1994 The Conservation Fund has preserved ten properties totaling 756 acres in the Arctic National Wildlife Refuge, Gates of the Arctic National Park, Chena River State Recreation Area, and Chena Flats Greenbelt Project. The Chena Flats Greenbelt is a multi-partner effort to link approximately thirty properties together to form a network of green space for recreation, watershed protection, and wildlife habitat in the vicinity of Fairbanks.

d. Parcel Prioritization:

The use of geographic information systems (GIS) can be an effective way to identify and prioritize specific properties to advance the aquatic resource objectives. These GIS parcel prioritizations typically involve the selection of a set of biological and geographical attributes to analyze properties in a particular geographic area. TCF will use information from parcel prioritizations to assist with identifying properties to preserve aquatic resources in the Interior Service Area.

TCF will work with conservation partners to help them achieve their land preservation priorities. Partners set these priorities through parcel prioritization projects, which typically use GIS and other tools. When available, TCF will use partner prioritizations to help direct TCF preservation projects. For the Interior Service Area, such partners may include Interior Alaska Land Trust, U.S. Fish and Wildlife Service, National Park Service, Bureau of Land Management, Alaska Department of Natural Resources, Alaska Department of Fish and Game, The Nature Conservancy, Bering Straits Native Corporation, Doyon Ltd., Calista Corporation, and numerous village corporations.

The only parcel prioritization in the Interior Service Area was completed by the Interior Alaska Land Trust for the Greater Fairbanks area (USKH 2011). For this area, the parcel prioritization focused on important attributes such as anadromous waters, riverine wetlands, wildlife habitat, proximity to protected lands, and bird habitat to generate parcel scores. When indentifying properties in the Fairbanks area, TCF will use the scores from this parcel prioritization to identify parcels of high ecological and biological value.

TCF will evaluate all prioritizations to determine that the criteria outlined in 33 CFR 332.3(h)(1) are satisfied. Those criteria are:

- The resources preserved provide important physical, chemical, or biological functions for the watershed;
- The resources to be preserved contribute significantly to the ecological sustainability of the watershed. In determining the contribution of those resources to the ecological sustainability of the watershed, the DE must use appropriate quantitative assessment tools, where available;
- Preservation is determined by the DE to be appropriate and practicable;
- The resources are under threat of destruction or adverse modification;
- The preserved site will be permanently protected through an appropriate real estate or other legal instrument (e.g., easement, title transfer to state resource agency or land trust).

TCF may work with Alaska Natives and village and regional corporations to use Traditional Ecological Knowledge (TEK) to incorporate cultural, subsistence, historical, and ecological information into parcel prioritizations in the Interior Service Area.

In addition to using the parcel prioritization, TCF may identify properties based on threats to aquatic resources. Urbanization, transportation, and resource extraction are identified as the primary threats to aquatic resources in the Interior Service Area. Based on this information, TCF may identify parcels that are vulnerable to these threats, which include wetlands in the Fairbanks area; areas where roads will likely increase; areas where resource extraction is occurring and/or is likely to increase; and river communities and in-holdings where development is likely to increase.

iii. SOUTHCENTRAL SERVICE AREA:

The Southcentral Service Area (Figure 5) is bounded by the Alaska Range to the north and the Gulf of Alaska to the south. The major rivers flowing through the region are the Matanuska, Susitna, Kenai, and Copper. The Copper River drains the Ahtna basin, which supported Lake Ahtna, a proglacial lake, during the Pleistocene. Much of the Southcentral Service Area was glaciated during the Pleistocene, promoting hundreds of present-day lakes, swamps, and bogs on ground moraines, especially in the Cook Inlet area. Glaciers are still prominent features in the service area and where glaciers have melted, cirques and U-shaped valleys persist.

The climate of the Southcentral Service Area is transitional; it is continental along the Alaska Range and to the west, becoming maritime near the coast and to the east. Precipitation and temperatures away from the coast tend to be lower and more variable, respectively, than those adjacent to the Gulf of Alaska. The high amounts of precipitation in the east promote the northern edge of the temperate rainforest. The better drained areas in the east support lush western hemlock and Sitka spruce forests, while other areas throughout the region support black spruce muskegs, tall scrub communities, low scrub bogs, wet graminoid herbaceous communities, and wet forb herbaceous communities. Drier areas support white spruce and hardwood forests. Permafrost is discontinuous to absent in the region.

Included in the Southcentral Service Area is one of the most important shorebird stopover sites in North America: the Copper River Delta. Along with nearby Controller Bay (Bering River Delta), the area supports the largest spring concentration of shorebirds in the Western Hemisphere (Bishop et al. 2000). The Cook Inlet provides vital habitat for the Wrangell Island Snow Goose, which migrates across the mouth of the Kenai River and Trading Bay in the spring. Additional sensitive landbirds in the area are the olive-sided flycatchers and blackpoll warblers. Non-avian wildlife species of note include moose, brown and black bears, beavers, muskrats, pygmy shrew, northern water shrew, Sitka black tail deer, foxes, coyotes, caribou, wood frogs, western toads, and five Pacific salmon species.

a. Current Condition and Historic Loss of Aquatic:

Current Condition: The Southcentral Service Area is comprised of roughly 46 million acres of which approximately 6 million (14%) are wetlands. The Southcentral Service Area contains the watersheds of the Kenai and Copper rivers, two of the most productive and valuable salmon fisheries in Alaska.

In total, the NWI has digitally mapped 59 percent of the Southcentral Service Area (Figure 1 and Table 1). This represents a total of 5.3 million acres of wetlands and aquatic resources. The most commonly mapped wetland types are freshwater shrub, freshwater forested, and freshwater emergent, which constitute 40.7, 21.5, and 16.4 percent of the area, respectively. Freshwater moss-lichen, estuarine and marine deepwater, and pond habitats were the least commonly mapped types in the service area. According to the U.S. Fish and Wildlife Anchorage Wetland Trend Study (1993), approximately 10,000 acres of wetlands were filled in the Anchorage Bowl between 1950 and 1990, with roughly another 1,000 acres filled since 1990. This rate of wetlands loss, roughly 50%, is apparently the highest for any portion of the state. Elsewhere in the Southcentral Service Area, the Palmer/Wasilla area has apparently experienced a loss of between 9-23% of its wetlands and the lower Kenai Peninsula less than 2% (Hall and Kratzer 2001).

Estuarine wetlands in the Southcentral Service Area provide habitat for several species in decline. For example, Kittlitz's murrelets, a candidate species for federal protection, forage almost exclusively by tidewater glaciers or near the outflow of a glacial stream associated with estuarine wetlands. Kittlitz's murrelet populations have shown a dramatic decline in Prince William Sound (Center for Biological Diversity 2001). Anadromous waters and associated estuarine, riverine, and lacustrine wetlands in the Southcentral Service Area provide habitat for anadromous fish, which are an important food source for Steller sea lions, a federally endangered species in this region (National Marine Fisheries Service 2008).

Historic Loss: The principal impacts to wetlands in the Southcentral Alaska Service Area have resulted from urban and suburban development. Impacts to wetlands have been most acute in industrial and commercial zones of Anchorage, Seward, Kenai, Valdez, and Wasilla. Wetland impacts exist along all the major transportation and utility corridors, including the Parks, Glenn, Richardson, Seward, and Sterling highways.

As in all other service areas, the impact of ATVs on wetlands is localized and severe in the Southcentral Service Area. Wrangell-St. Elias National Park has approximately 600 miles of ATV trails, many of which have severely impacted wetlands, degraded water quality and

impaired spawning habitat (Weeks 2003). The impact of ATVs on wetlands is severe in other portions of the service area, especially in the Matanuska-Susitna Borough.

There are a number of impaired waters in the Southcentral Service Area. In the Anchorage area these waters include: Campbell Creek, Campbell Lake, Chester Creek, Eagle River, Fish Creek, Furrow Creek, Lake Hood, Lake Spenard, Little Campbell Creek, Little Rabbit Creek, Little Survival Creek, Ship Creek, University Lake, and Westchester Lagoon. Most of these waters have been impaired due to urban runoff. Urban runoff has also impaired waters in outside of Anchorage, primarily in Wasilla. Wasilla's impaired waters include: Cottonwood Creek, Lake Lucille, and Big Lake. Other impaired waters in the Southcentral Service Area are Eyak Lake (Cordova) and Matanuska River (Palmer). Beaches impacted by the 1989 Exxon Valdez oil spill are still considered impaired (ADEC 2010).

b. Threats to Aquatic Resources:

Urbanization: Urban and suburban development has been and continues to be the main threat to aquatic resources in the Southcentral Service Area. The Anchorage Coastal Management Plan (La Roche 2007) noted that "encroachment into sensitive wetlands, into the upper reaches of the watersheds, improper development within floodplains, and inadequate construction setbacks from shorelines and stream banks can pose direct and significant cumulative and secondary impacts to the water quality of streams, lakes and marine waters, thereby negatively impacting habitats and recreation areas."

The population of the Matanuska-Susitna Borough increased by 70% between 1990 and 2000, compared to an 18% increase for the state of Alaska as a whole. This rapid population growth will impact wetlands as more land is converted to residential, commercial, and industrial uses. Coastal lands will be particularly impacted as the population centers of Wasilla and Palmer expand southward towards Anchorage. This threat is amplified by the possibility of a Knik Arm bridge connecting the Matanuska-Susitna Borough directly to Anchorage, as the bridge would provide increased access for developments of wetlands in the Port MacKenzie area.

The continued expansion of the network of ATV trails will remain a threat to wetlands throughout the Southcentral Service Area.

Transportation: Because of rapid population growth, the Matanuska-Susitna Borough will see continued expansion of the transportation network. Construction of new roads, as well as realignment of existing roads, poses significant threats to aquatic resources including the direct fill of wetlands and run-off from impervious surfaces.

The Alaska Railroad has proposed to construct 30-45 miles of rail line to connect Port McKenzie to the main line. This rail line would cross a large area of freshwater wetlands and likely require extensive mitigation.

Resource Development: A number of large-scale resource development projects are being contemplated that could impact aquatic resources in the Southcentral Service Area. These include proposed coal projects along the Matanuska and Chuitna rivers and two hydroelectric projects.

The Matanuska watershed is currently experiencing a resurgence of interest in coal development. Alaska possesses roughly half of the nation's coal and nearly 1/8th of the world's known reserves. Much of Alaska's coal is inaccessible except for the anthracite seam that runs along the Matanuska River from Palmer to Eureka. Two companies currently hold exploration permits to test the market and feasibility of coal mining in the region. The Alaska Railroad is considering reactivating a rail spur from Palmer to access the mining district. The proposed mining activities could have significant impacts on Moose Creek, Eska Creek, Granite Creek, and the Matanuska River.

The Chuitna Coal Project is another major resource development venture, and is located approximately 45 miles west of Anchorage on the west side of the Cook Inlet. Project documents[8] indicate the developers are considering various scenarios within the footprint of the mine, which include the Chuitna Coal Mine itself, six transportation corridors, two port sites, two mine facilities, three housing facilities, and an airstrip with supporting amenities. The study boundary includes a total of 12,494 acres of wetlands and aquatic resources. Of those acres, 662 are vegetated ponds and 810 are coastal resources. The area also includes 18 acres of the Chuit (Chuitna) River, as well as 143 miles of perennial streams and 4 miles of intermittent streams (the latter two resources being inventoried as linear features rather than polygonal). The area contains anadromous streams and salmon species. A number of rare plants species tracked by the Alaska Natural Heritage Program also occur in the area, including: leathery grape fern, green-keel cottongrass, boreal bedstraw, bog adder's mouth, elephanthead lousewort, false melic, and Selkirk violet.

A new hydroelectric project is currently being considered along the Susistna River[9], southeast of Cantwell, in the Talkeetna Mountains. The intent of the Upper Susitna dam is to reduce power costs in the growing population centers along Alaska's rail belt. In addition to the dam itself, new roads and road improvements, new transmission lines and improvements, airports, a railroad spur line, and a number of temporary features will be required to support dam construction and operations. Once built, the dam is expected to

[8] http://chuitnaseis.com/project-support-documents.html, Accessed 3/18/2013.
[9] http://www.susitna-watanahydro.org. Accessed 3/24/2013.

impact 42 river miles of the Susitna River, filling-in 24,000 acres, some of which will undoubtedly be wetland. The project study boundary is evolving and the area has not yet been mapped for wetlands, however a number of different wetlands types have been observed during field reconnaissance work. The most frequent wetland types include seasonally flooded/saturated and semi-permanently persistent emergent wetlands, and saturated broadleaf deciduous scrub-shrub wetlands.

On the Kenai Peninsula, the Kenai Hydro LLC project at Grant Lake appears to be moving forward and likely will result in impacts to aquatic resources.

Climate Change: Climate change appears likely to be a major threat to aquatic resources in the Southcentral Service Area. According to Berg *et al.* (2009) and Morton (2010), the warming and drying climate has already resulted in warming streams, drying of wetlands, and changing fire regimes. On the Kenai Peninsula, over two-thirds of water bodies observed by Klein *et al.* (2005) decreased in area between 1950 and 1996. Berg *et al.* (2009) reported an 11% decadal decrease in the herbaceous area of wetlands as wetlands dried and forests invaded.

c. Opportunities for Aquatic Resource Compensatory Mitigation:

Opportunities for compensatory mitigation through preservation are widespread through the Southcentral Service Area. Numerous strategic wetland properties exist in state and federal conservation units, including the Palmer Hay Flats, Goose Bay State Game Refuge, Denali State Park, Chugach State Park, Kenai River Special Management Area, Chugach National Forest, Kenai National Wildlife Refuge, and Wrangell-St. Elias National Park and Preserve.

Numerous opportunities exist to preserve palustrine and marine coastal wetlands. Opportunities to preserve estuarine habitat are limited because state or federal governments own most lands below mean high tide line.

Since 1994 The Conservation Fund has purchased 90 properties totaling 18,000 acres in the Southcentral Service Area, namely in the Kenai National Wildlife Refuge, Chugach State Park, Wrangell-St. Elias National Park, Goose Bay State Game Refuge, Kachemak Bay State Park, Palmer Hay Flats, Valdez Duck Flats, Denali State Park, the Anchor River, Kasilof River Special Management Area, Ninilchik State Recreation Area, Kenai River Special Management Area, and Lake Clark National Park.

d. Parcel Prioritization:

The use of geographic information systems (GIS) can be an effective way to identify and prioritize specific properties to advance the aquatic resource objectives. These GIS parcel prioritizations typically involve the selection of a set of biological and geographical

attributes to analyze properties in a particular geographic area. TCF will use information from parcel prioritizations to assist with identifying properties to preserve aquatic resources in the Southcentral Service Area.

When available, TCF will use partner parcel prioritizations to help direct TCF preservation projects. For the a Southcentral Service Area, such partners may include Great Land Trust, Kachemak Heritage Land Trust, U.S. Fish and Wildlife Service, National Park Service, Bureau of Land Management, Alaska Department of Natural Resources, Alaska Department of Fish and Game, The Nature Conservancy, Cook Inlet Regional Inc., AHTNA Inc., Chugach Alaska Corporation, and numerous village corporations.

Several parcel prioritizations have been completed in the Southcentral Service Area. Great Land Trust completed prioritizations for the Matanuska-Susitna Valley (Great Land Trust 2012a), Knik Arm (Great Land Trust 2010), and Anchorage area (Jones 2010) where they focused on a diversity of wetlands and wildlife habitats throughout the Mat-Su and Anchorage regions. Alaska Department of Fish and Game completed an inventory of inholdings in State game refuges, critical habitats, and game sanctuaries around Cook Inlet (ADF&G 2002). The Kachemak Heritage Land Trust completed a parcel prioritization for the Kenai Peninsula by using biological and geographic attributes such as salmon, seabird colonies, wetlands, and rare plants to rank parcels based on scores. For the Southcentral Service Area, TCF will use the parcel prioritizations specific to the area in which a preservation project is located to assist with determining the value of the property and associated aquatic resources for preservation. For the Southcentral Service Area, important attributes for many of these prioritizations include anadromous waters, diversity of salmon, wetlands, Important Bird Areas, and other wildlife habitat.

TCF will evaluate all prioritizations to determine that the criteria outlined in 33 CFR 332.3(h)(1) are satisfied. Those criteria are:

- The resources preserved provide important physical, chemical, or biological functions for the watershed;
- The resources to be preserved contribute significantly to the ecological sustainability of the watershed. In determining the contribution of those resources to the ecological sustainability of the watershed, the DE must use appropriate quantitative assessment tools, where available;
- Preservation is determined by the DE to be appropriate and practicable;
- The resources are under threat of destruction or adverse modification;
- The preserved site will be permanently protected through an appropriate real estate or other legal instrument (e.g., easement, title transfer to state resource agency or land trust).

TCF may work with Alaska Natives and village and regional corporations to use Traditional Ecological Knowledge (TEK) to incorporate cultural, subsistence, historical, and ecological information into parcel prioritizations in the Southcentral Service Area.

In addition to using the parcel prioritizations, TCF may identify properties based on threats to aquatic resources in the Southcentral Service Area. Urbanization, transportation, and resource development are identified as the primary threats to aquatic resources in the Southcentral Service Area. Based on this information, TCF may indentify parcels that are vulnerable to these threats, which include wetlands in Mat-Su and Anchorage areas; areas where anadromous waters are present; areas where resource extraction is occurring and/or is likely to increase; and coastal and river communities and in-holdings where development is likely to increase.

iv. SOUTHWEST SERVICE AREA:

The Southwest Service Area's (Figure 6) climate ranges from continental to maritime, with more temperature fluctuation occurring to the north and inland, and fog occurring along the coast. Coastal storms, wildfire, and volcanic activity are the major disturbance regimes in the area. Volcanic activity is frequent, particularly along the Aleutian Islands, where the Bering Sea tectonic plate and the Pacific tectonic plate collide. Soils in the region reflect this activity, supporting andic material. Soils in the Aleutian Islands do not support permafrost, but permafrost becomes more prevalent further inland.

Glacial activity is evident throughout the Southwest Service Area. Glaciers have produced steep mountain ridges, thin, deep lakes, and broad U-shaped valleys over much of the continental portion of the service area. Some streams and rivers indicate glacial activity inland. These glacially influenced rivers and streams carry varying amounts of glacial flour producing a myriad of colors from opaque blue to muddy brown. The Kuskokwim is a major, glacially influenced river that drains into the Kuskokwim Bay.

To the southeast of the Kuskokwim Bay is the Bristol Bay, which represents the terminus of another major river system: The Nushagak. This river supports the third largest king salmon run in the world. An adjacent river, the Kvichak River may be one of the most productive sockeye salmon systems in the world and connects Alaska's largest lake, Lake Iliamna, to the Bristol Bay.

Aside from sockeye and king salmon, the service area also supports chum, coho, and pink salmon, steelhead, lake trout, sheefish, whitefish, Dolly Varden, and arctic grayling. Included in the service area is the Kuskokwim delta, which makes up part of the Yukon-Kuskokwim Delta and supports 50% of the world's black brant, all of North America's nesting cackling Canada geese, and the highest densities of nesting tundra swans. The service area also

provides prime habitat for several bird species, including but not limited to: emperor goose, king eider, Steller's eider, McKay's bunting, red-faced cormorants, Leach's and fork-tailed storm petrels, red-legged and black-legged kittiwakes, common and thick-billed murres, and least and crested auklets. The region also supports brown bear, black bear, moose, beaver, marten, mink, weasels, Canada lynx, caribou, wood frogs, and river otters.

Abundant lakes and wetlands support beaver populations. A common wetland type in the region is moist and wet tundra. Other vegetation types include: black spruce forests, spruce-aspen-birch forests, ericaceous shrub, low-shrub assemblages of willow, birch, and alder, and alpine tundra. Sitka spruce forests are on the Kodiak Archipelago. The Aleutian Islands host species not found to the north or in Interior Alaska, including the Alaska arnica, Siberian spring beauty, caltha-leaved avens, western buttercup, and Kamchatka rhododendron.

a. Current Condition and Historic Loss of Aquatic Resources:

Current Condition: Information pertaining to the distribution, amounts, and conditions of wetlands in the Southwest Service Area is sparse. Hall *et al.* (1994) roughly estimated as much as 38 million acres of wetlands occur in the area, or roughly 50% of the service area. Most of those wetlands occur in the interior portion of the service area, with less than 2 million acres occurring in the Aleutian Islands. The NWI has digitally mapped only 25 percent of the service area (Figure 1 and Table 1), the lowest rate for any of the service areas. However, this still represents a total of 12.1 million acres of known wetlands. Freshwater emergent wetlands are the most commonly mapped type, representing 63.3 percent of the known wetlands. Less common wetland types include freshwater moss-lichen, freshwater forested, and riverine habitats.

Despite the NWI's estimates, the service area contains thousands of rivers, streams, lakes (e.g., the Wood-Tikchik system), and tundra ponds. Data from the ADF&G (2012) indicate at least 24,000 miles of known anadromous rivers and streams in the service area. These drainages support some of the world's largest runs of wild salmon, as well as resident rainbow trout, char, grayling, and other numerous other fish species. For example, an estimated 51% of the world's sockeye come from the Bristol Bay area alone (Southwest Alaska Salmon Habitat Partnership 2011). These freshwater bodies sustain the region's subsistence, commercial, and sport fisheries, which are the basis of the region's economy and lifestyle.

Several species in decline in the Southwest Service Area are affected by wetland habitats. For example, Kittlitz's murrelets, a candidate species for federal protection, are found along the numerous coastlines of the Southwest Service Area where they forage primarily on marine fish by tidewater glaciers or near the outflow of a glacial stream associated with estuarine wetlands (Center for Biological Diversity 2001). Steller's eider, a federally

threatened species, winter in the Southwest Service Area where they forage primarily on insect larva associated with shallow estuarine, riverine, palustrine, and lacustrine wetlands (US Fish and Wildlife Service 2002). Spectacled eiders, a federally threatened species, forage and breed on the Kuskokwim Delta in wet, sedge, and grass marshes with numerous small, shallow waterbodies (US Fish and Wildlife Service 1996).

Anadromous waters and associated estuarine, riverine, and lacustrine wetlands in the Southwest Service Area provide habitat for salmon, which are an important food source to several species in decline. Bearded seals and ringed seals, both candidate species for federal protection, and Steller sea lions, a federally endangered species in this region, forage on several species of salmon throughout this area (Center for Biological Diversity 2008; National Marine Fisheries Service 2008).

Historic Loss: The principal impacts to wetlands in the Southwest Service Area have occurred in and around communities in the region, and are a result from residential and commercial development and related community infrastructure including roads, airstrips, ports, docks, schools and other public facilities.

Ambient surface and subsurface water quality for freshwater streams and lakes is generally good and unaffected by development, except in the vicinity of communities and some abandoned mines (e.g., Red Devil Mine). Impaired fresh waters in the service area include Red Devil Creek and its mixing zone with the Kuskokwim River, the Egigik River, and the Red Lake Anton Road Ponds. These waters have been impacted by mining activity, fuel spills/leaking, and urban runoff, respectively. Impaired marine waters include: Akautan Harbor, King Cove, South Unalaska Bay, Udagak Bay, Cold Bay, Dutch Harbor, Ililiuk Harbor, and Popof Straight. Iliukuk Harbor, Dutch Harbor, and Cold Bay have been impacted by urban, industrial, or military developments, while the others have been impaired due to seafood processing (ADEC 2010).

b. Threats to Aquatic Resources:

Urbanization: Current development activities within the Southwest Service Area are largely concentrated in the vicinity of communities. Basic needs for housing, heat, electricity, water, sewage treatment, and solid waste landfills will continue as community services are improved and expanded. In addition, community and regional needs for infrastructure improvements will expand as local projects for roadways, health services, airports, recreation facilities, fuel storage depots, ports, and harbors are funded and constructed. On a larger scale, these types of developments are still relatively limited to the geographic boundaries of existing communities.

Resource Development: Mining is a high visibility concern in the region. Aquatic resources that could be impacted by mining development activities include wetlands, lakes, ponds, streams, and rivers. Impacts can occur during exploration, construction, operation, and abandonment/restoration of a project area. Mining impacts can be short-term (duration of construction, or life of the mine) or long-term (permanent alteration of aquatic resources). Some impacts can be mitigated during mine operation or following completion of use (restoration of disturbed areas). Although environmental impacts from mine development are generally adverse, some mining operation activities can improve or enhance site conditions where prior impacts or existing conditions have degraded environmental conditions. Opportunities for positive environmental impacts are most commonly related to improvement in water quality and enhancement/restoration of previously disturbed habitats.

Construction of a reservoir for a water supply or construction of a dam to contain a tailings disposal area could alter the hydrology of the affected area during operation of the mine. Runoff characteristics of affected basins could be dramatically changed during the life of the project. This alteration of the hydrology could become a long-term impact if these impoundments are retained following cessation of the mining activity.

Construction of tailings impoundments and water reservoirs can alter ground saturation levels underneath these structures and potentially allow some areas of undisturbed permafrost to thaw (shallow and/or deep). Impoundments and reservoirs can capture surface runoff, which reduces downstream flow in an affected drainage system and may impact downstream resources that are dependent on year-round stable flows (e.g., fish spawning areas where incubating eggs are present in the gravel during the winter, or stream overwintering areas for fish).

Flooding and dewatering could occur as part of the mine project construction and operation. If a tailings disposal area or process water impoundment were required to control offsite discharges due to water quality concerns, both runoff and seepage from the affected area may need to be controlled. The hydrological conditions at a specific mining development site will determine the severity of impacts associated with interception or alteration of surface and groundwater flows.

Surface water drainage across a mine site and subsurface groundwater conditions could be subject to substantial changes in water quality and flow. Depending on mining site conditions and processes, discharge effluents could contain dissolved or suspended materials that exceed state water quality standards, including potential degradation of water quality below requirements necessary for growth and propagation of aquatic resources. Of concern to almost all hard rock mining ventures is the potential production of acid mine drainage because of the exposure of sulfides to weathering processes. Erosion, surface

drainage from developed facilities, and discharges/seepages from mining operations, settling ponds, and tailings disposal areas could introduce sediment loads into drainage systems and adversely affect the ambient water quality of aquatic wetlands, streams, rivers, and lakes and ponds. Offsite effects of reduced water quality and sediment loading could adversely affect drainage basin resources for a significant distance downstream.

Open-pit mining operations create a deep excavation, which could fill with water after completion of mining activities. The potential occurrence of acid-forming sulfides and heavy metals in the pit and ore body could produce a lake of polluted water with potential to contaminate adjacent groundwater and surface water drainages in the area, which may adversely impact fish and wildlife. An extensive tailings disposal area could produce similar concerns for water quality.

Aquatic resources could be directly impacted by diversion, dewatering, flooding, excavation, and filling for mining development facilities, both at the mine and tidewater port site and along the length of transportation systems. The identification of important aquatic resources, and the subsequent avoidance of these locations during planning and construction/operation activities is the most valuable strategy available to avoid adverse disturbances to these habitats.

Aquatic resources could also be indirectly impacted by adverse alteration of surface or groundwater flows, or degradation of water quality that decreases or limits the functions of aquatic habitats. Fish, waterfowl, some furbearers, moose, and riparian vegetation communities are either totally or seasonally dependent on aquatic habitats for their existence and welfare. Mining developments that alter water flow or degrade water quality have potential to cause significant adverse impacts to these resources. Drainage basins could be impacted anywhere from their headwaters to lower reaches of stream and lake systems (Resource Analysts and Issacs 1993).

Mineral development potential exists in the Bristol Bay lowlands along the north side of the Alaska Peninsula, where conditions are recognized as being favorable for deposits of coal. However, only a few areas on the Alaska Peninsula with potential for coal development have been identified. The only known coal deposit in the Bristol Bay area occurs along Chignik Bay where an estimated 300 million tons of bituminous coal occurs in impure beds 0.3 to 1.5 meters thick (La Roche and Associates 2007).

Two recognized areas of significant mineral deposits include the Alaska Range in the vicinity of Lake Clark, and the Pacific side of the Alaska Peninsula from the Kupreanof Peninsula to Wide Bay. This area contains deposits of copper, lead, zinc, silver, gold, and molybdenum (La Roche and Associates 2007).

The Pebble Project is located on state-owned land within the Lake and Peninsula Borough approximately 17 miles northwest of the village of Iliamna. The mine footprint under low and high impact scenarios, but excluding a number of infrastructure elements (e.g., a proposed 86 mile road from the mine to the Cook Inlet), could cover between 8,330 acres and 20,293 acres. These scenarios could also result in the loss of 55 to 87 miles of possible spawning and rearing habitat for a number salmon and other fish species and removal of 2,512 to 4,286 acres of wetlands (EPA 2012).

The Donlin Gold project[10] is a major gold prospect in the Southwest Service Area, and a portion of this prospect extends into the Southcentral Service Area via a proposed 313-mile natural gas pipeline from the mine site to the Beluga area, which is across the Cook Inlet from Anchorage. The mine site is located 10 miles North of the village of Crooked Creek, which is upstream of Aniak along the Kuskokwim River. The Donlin Gold project will likely have major impacts on aquatic resources if and when it is developed. The proponents of the mine report that wetlands comprise roughly 50% of the proposed mine area (Donlin Gold 2012). The mine area will host an open pit 2.2 miles long by one mile wide by 1,850 feet deep, a waste treatment facility of 2,350 acres, and a waste rock facility covering an additional 2,300 acres. In total, the mine area is expected to impact 16,300 acres, of which approximately 8,150 acres are wetlands. Additional impacts to wetlands and other aquatic resources will occur outside the mine area due to infrastructure needs of the mine. Aside from the natural gas pipeline and facilities, other specific infrastructure needs include a 227-megawatt power plant, barge terminals in Bethel and near Jungjuk Creek, and support roads and airports.

The source of energy for most Southwest Service Area's communities will, for the foreseeable future, continue to be diesel. Local investment in renewable energy technologies could augment diesel consumption, but it is unlikely to replace it in the near term. Development of any oil, gas, or coal resources in the region will likely be for export, but could provide energy for adjacent communities. A large mine may require the installation of a power plant, but such a facility will likely be single-use. Such developments have low potential to impact energy consumption in the service area's communities.

Oil and gas exploration and development can significantly affect coastal resources and uses. The most important effect would be from an oil spill, especially an offshore spill. Effects include displacement of wildlife, recreation, subsistence, and commercial fishing activities. Seismic exploration activities can displace fish and marine mammals and interfere with commercial fishing operations. Effects resulting from facility construction would be similar

[10] http://donlingoldeis.com. Accessed 3/24/2013.

to other developments. Pipelines have the potential to disrupt wildlife migration, especially when associated with roads, and sub-sea pipelines can interfere with fishing operations, especially when the pipelines are not buried.

Currently, the geology of the area indicates that the Nushagak Peninsula has the best potential for petroleum development, as oil seeps have been reported, but not substantiated, near the lower Nushagak River. The potential for petroleum development on the Nushagak Peninsula and the nearby offshore waters of Bristol Bay will remain essentially unknown unless intensive exploratory work takes place.

A 329,113-acre area surrounding Dillingham was opened to exploration licensing in 2004. Little is known about the subsurface geology of this area. The Bristol Bay basin contains the thickest concentration within the onshore licensing area extension of geologic formations associated with oil and gas. The area likely has a greater potential for gas deposits than for oil. While not enough information exists to develop an accurate estimate of the amount of gas in the area, ADNR believes there could be between several billion cubic feet to a trillion cubic feet of gas in the area (Gray and Harbanuk 2008).

The Chikimunik Hydro Project located in the Wood-Tikchik State Park is also being considered as a means of reducing the high costs of diesel energy consumption in the region. In addition to the main Chikimunik site, three adjacent and alternative sites on the Kisaralik River are also being considered.

Transportation: A number of potential transportation corridors in the Southwest Service Area are under consideration including: Port Alsworth, Bristol Bay Pipeline, Alaska Peninsula Roadway and Utility Corridor; and Iliamna Lake Corridor – King Salmon to Puale Bay, Egegik Bay to Portage Bay, Pilot Point to Wide Bay, and Port Heiden to Kujulik Bay or Aniakchak Bay.

Construction of transportation and utility facilities can have significant effects to aquatic resources. Roads also change drainage patterns and improperly placed culverts can be a barrier to fish migration, especially to young coho salmon that use small tributaries for rearing. Erosion and runoff can result from road construction leading to increased suspended solids in water bodies. In addition, roads provide access for hunters and fishermen to areas previously not easily accessible, which can lead to new pressures on fish and wildlife populations.

Roads and transportation corridors are often, by necessity, constructed through wetland areas in Southwest Service Area. If these areas are associated with lakes or streams, the wetlands may provide rearing habitat for salmonids or other fish species. Wetlands also

function as hydrologic recharge systems to store water during periods of high runoff and release water during periods of reduced stream flow, thereby stabilizing and moderating drainage basin discharge. If flow through a wetland is blocked by a road or fill, the upslope side may be flooded while the downslope area is dewatered. In both cases, existing aquatic habitat is altered and may be rendered unusable (Stadum Group 2006).

Climate Change: As in the other service areas, climate change is likely to be a major threat to aquatic resources in the Southwest Service Area. Coastal erosion and the intrusion of salt water into fresh water systems is also likely to accelerate in this service area.

c. Opportunities for Aquatic Resource Compensatory Mitigation:

Numerous opportunities exist to preserve palustrine and marine coastal wetlands in the Southwest Service Area. Opportunities to preserve estuarine habitat are limited because most lands below mean high tide line are owned by state or federal governments.

Since 1994 The Conservation Fund has preserved 120 properties totaling 330,000 acres in Southwest Alaska. These projects include a conservation easement on 21,000 acres in Wood-Tikchik State Park and 70,000 acres of land preserved in the Izembek National Wildlife Refuge Complex.

Opportunities for compensatory mitigation through wetlands preservation include the purchase of strategic inholdings in Wood-Tikchik State Park, Togiak, Becharof, Alaska Peninsula Izembek and Kodiak National Wildlife Refuges, Afognak and Shuyak Island State Parks, Katmai and Lake Clark National Park, and other state and federal conservation units.

d. Parcel Prioritization:

The use of geographic information systems (GIS) can be an effective way to identify and prioritize specific properties to advance the aquatic resource objectives. These GIS parcel prioritizations typically involve the selection of a set of biological and geographical attributes to analyze properties in a particular geographic area. TCF will use information from parcel prioritizations to assist with identifying properties to preserve aquatic resources in the Southwest Service Area.

When available, TCF will use partner parcel prioritizations to help direct TCF preservation projects. For the a Southwest Service Area, such partners may include Bristol Bay Heritage Land Trust, Great Land Trust, U.S. Fish and Wildlife Service, National Park Service, Bureau of Land Management, Alaska Department of Natural Resources, Alaska Department of Fish and Game, The Nature Conservancy, Bristol Bay Native Corporation, Koniag Inc., Aleut Corporation, Calista Corporation, and numerous village corporations.

Several parcel prioritizations have been completed in the Southwest Service Area. Bristol Bay Heritage Land Trust completed a prioritization for the northern area of Bristol Bay (Nushagak-Mulchatna Watershed Council 2007) and TCF completed a prioritization for the southeast area of Bristol Bay (The Conservation Fund 2013). The prioritizations largely focused on inholdings, salmon habitat, proximity to protected lands, and wetlands. Great Land Trust completed a prioritization for Kodiak Island (Great Land Trust 2012b) where they focused on attributes such as salmon diversity, anadromous waters, wetlands, and proximity to protected lands. For the Southwest Service Area, TCF will use the parcel prioritizations specific to the area in which a preservation project is located to assist with determining the value of the property and associated aquatic resources for preservation. Several important attributes in these prioritizations for the Southwest Service Area include anadromous waters, salmon diversity, riverine wetlands, Important Bird Areas, proximity to protected lands, and other wildlife habitat.

TCF will evaluate all prioritizations to determine that the criteria outlined in 33 CFR 332.3(h)(1) are satisfied. Those criteria are:

- The resources preserved provide important physical, chemical, or biological functions for the watershed;
- The resources to be preserved contribute significantly to the ecological sustainability of the watershed. In determining the contribution of those resources to the ecological sustainability of the watershed, the DE must use appropriate quantitative assessment tools, where available;
- Preservation is determined by the DE to be appropriate and practicable;
- The resources are under threat of destruction or adverse modification;
- The preserved site will be permanently protected through an appropriate real estate or other legal instrument (e.g., easement, title transfer to state resource agency or land trust).

TCF may work with Alaska Natives and village and regional corporations to use Traditional Ecological Knowledge (TEK) to incorporate cultural, subsistence, historical and ecological information into parcel prioritizations in the Southwest Service Area.

In addition to using the parcel prioritization, TCF may identify properties based on threats to aquatic resources in the Southwest Service Area. Resource development (mining), transportation, and urbanization are identified as the primary threats to aquatic resources in the Southwest Service Area. Based on this information, TCF may indentify parcels that are vulnerable to these threats , which include areas near anadromous waters; areas where resource extraction is occurring and/or is likely to increase; and coastal and river communities and in-holdings where development is likely to increase.

v. SOUTHEAST SERVICE AREA:

The Southeast Service Area (Figure 7) is primarily characterized by the Alexander Archipelago, which contains temperate rain forests, long fjords, abundant islands, and a maritime climate. Past glaciers carved deep, narrow valleys, which subsequently filled with seawater when the glaciers retreated. A few alpine glaciers still remain in broad U-shaped valleys at the heads of fjords, but most major glaciers have retreated from the region. Rolling moraine landforms dominate the hills and valley bottoms. Tectonic movement and the forces of rebound after glacier retreat have raised and lowered marine terraces, forming rich coastal lowlands and estuaries. The large rivers slow near the coast and end in broad deltas.

The temperate rain forest, consisting primarily of western hemlock and Sitka spruce, reaches from the coastline to the steeper, rockier mountain slopes. Salal and western red cedar are also found in the region. Mixed conifer, black cottonwood, and lodgepole pine occur on drier sites. Where bedrock is not exposed, the forest gradually transitions to shrublands and alpine tundra with mosses and sedges. Water-tolerant plants such as sphagnum moss, sedges, bog kalmia, and shore pine occur in peat lands. Poorly drained soils support open muskeg and forested wetlands. Various disturbance regimes affect the landscape—localized intense winter winds topple coastal trees, frequent landslides and avalanches denude steep mountain slopes, and flooding recurs in streams and rivers.

Rivers and lakes support Dolly Varden and cutthroat, rainbow, and steelhead trout, five species of Pacific salmon, lampreys, and eulachon. Spawning fish provide rich food for bears, wolves, ravens, gulls, and the highest nest density of bald eagles in the world. Other birds include Vancouver Canada geese, trumpeter swans, red-tailed hawks, peregrine falcons, red-breasted sapsuckers, Pacific-slope flycatchers, rufous hummingbirds, and golden-crowned kinglets. The Southeast Service Area also encompasses the largest marbled murrelet population in the world. Marbled murrelets are listed as threatened throughout their range south of the Southeast Service Area. Other animal species of note include: river otter, marten, mink, weasel, beaver, red squirrel, brown bears, black bears, gray wolves, rough-skinned newts, northwestern salamanders, long-toed salamanders, wood frogs, spotted frogs, and boreal toads.

a. Current Condition and Historic Loss of Aquatic Resources:

Current Condition: The Southeast Service Area is comprised of approximately 24 million acres of which roughly 5 million acres (22%) are wetlands (Hall *et al.* 1994). This estimate is corroborated by digital NWI data, which estimates the service area contains 5.2 million acres of wetlands (Figure 1 and Table 1). This is a high confidence estimate as 92 percent of the service area has been digitally mapped. The most common NWI habitats in the service area are freshwater forested wetlands, freshwater emergent wetlands, and freshwater shrub wetlands, representing 46.7, 22.2, and 12.8 percent of the known wetlands,

respectively. The least common wetland types are freshwater moss-lichen and freshwater pond habitats.

Schoen and Dovochin (2007) estimate that Southeast Alaska has approximately 18,000 miles of marine shoreline which supports abundant populations of shellfish, fish, and wildlife in a complex mosaic of geophysical and biological features where uplands, freshwater, estuarine, and marine environments interface. These shorelines interface with almost 6,000 anadromous rivers and streams, according to the Alaska Department of Fish and Game Anadromous Waters Catalogue[11].

The Southeast Service Area also includes a number of Important Bird Areas including: Mendenhall Wetlands, Berners Bay, Blacksand Spit, Port Snettisham, Yakutat Bay and Forelands, Icy Bay, and Chilkat Bald Eagle Preserve.

Wetland habitats in the Southeast Service Area are important to several species in decline. Kittlitz's murrelets, a candidate species for federal protection, are found along the numerous coastlines of the Southeast Service Area where they forage primarily on marine fish by tidewater glaciers or near the outflow of a glacial stream associated with estuarine wetlands. Kittlitz's murrelets have shown a dramatic decline in numbers in Glacier Bay National Park (Center for Biological Diversity 2001). Steller sea lions, a federally threatened species in this region, forage on salmon and other anadromous fish that rely on estuarine, riverine, and lacustrine wetlands to reproduce (National Marine Fisheries Service 2008).

Historic Loss: The impacts of urbanization in the Southeast Service Area are concentrated near the communities, which include small villages and the regional hub of Juneau. While the amount of human alteration along the vast coastline is small, much of it occurs within communities where developments have reduced the beneficial functions, services, and productivity of streams, muskeg wetlands, forested wetlands, estuaries, mudflats, and coastal wetlands. An estimated 9,800 acres of natural habitat (primarily rainforest, muskeg wetlands, and marine shorelines) have been converted by urbanization to largely impervious surfaces (Albert and Schoen 2007). Examples of this in Juneau are found on Jordan Creek, Lemon Creek, Pederson Hill Creek, and Vanderbilt Creek. Adamus (1988) concluded that Juneau had experienced a loss of approximately 13% of its wetland acreage between 1948 and 1984. A number of waterbodies in the Southeast Service Area have been listed at some point as being impaired due to urbanization include Jordan Creek, Lemon Creek, Pederson Hill Creek, and Vanderbilt Creek in Juneau (ADEC 2010).

[11] http://www.adfg.alaska.gov/sf/SARR/AWC/. Accessed 3/28/2012.

Approximately 767,000 acres of forest have been harvested across Southeast Alaska (USFS 2008). These harvests required support roads and log transfer facilities. The roads have altered drainage patterns in a number of sub-basins. Bark and woody debris from log transfer facilities have impaired a number of waterbodies (ADEC 2010) by covering and smothering benthic environments, creating anoxic conditions, and otherwise altering nearshore habitats. Increased regulatory oversight has produced a significant reduction of the impacts of these sites in recent decades (NMFS 2005).

Mining activity in the Southeast Service Area dates from the early 20th century, and the decaying remains and wastes of these small coastal mine sites (e.g., wharves, fill, mechanical debris, tailing piles, etc.) can be found throughout the region. Larger mine activities occurred in the Juneau area until World War II, while the Skagway Harbor operated as an ore transshipment port for Canadian Yukon mines in more recent decades.

Approximately 1,000 miles of roads occur on wetlands in this region, including about 11 miles in estuaries. Other infrastructure in the service area includes: airports, commercial harbors, and ferry terminals. Usually, these developments are associated with urbanized areas.

Seafood processing facilities from the early 20th century are found throughout the service area, with associated wharves, fill, and mechanical debris. Most modern facilities occur adjacent to the communities of Craig, Excursion Inlet, Haines, Hoonah, Juneau, Kake, Ketchikan, Metlakatla, Pelican, Petersburg, Sitka, and Wrangell. Discharges from these facilities are regulated under the Alaska Pollution Discharge Elimination System program administered by the ADEC.

Hydropower has been a significant power source in Southeast Alaska since before statehood. There are currently about twenty-five hydropower plants in the region.

b. Threats to Aquatic Resources in the Southeast Service Area:

Urbanization: The population in the Southeast Service Area decreased by nearly 1,500 people between the years 2000 and 2011. Despite this reduction in people, urban infrastructure and impervious surfaces are expected to increase, as is the amount of aquatic resources impacted.

Transportation: ADOT&PF (2004) has proposed one new airport (Angoon) in the region, as well as two new seaplane floats (Edna Bay and Naukati). A number of airports are also being expanded in the region. The Southeast Regional Aviation System Plan indicates there are number of future airport projects in Haines, Kake, and Klawock. Many ferry terminals in the region have aging infrastructure, which is expected to need maintenance, upgrades,

and reconfiguration (ADOT&PF 2008b). The Southeast Alaska Transportation Plan supports the construction of a few new ferry terminals (ADOT&PF 2004). Some private and municipal harbors may require some maintenance, but few impacts are expected to occur from these infrastructure types.

The Draft Statewide Transportation Improvement Program for Southeast Alaska identifies highway rehabilitation, maintenance, repaving, realignment, etc. of existing highways as being a higher priority than the construction of new roads (ADOT&PF 2009). However, some new highways are being proposed, including the following projects: Juneau Access, Kupreanof Highway, and Revillagigedo.

Resource Development: Prince of Wales Island, the Petersburg and Wrangell areas, and northeastern Chichagof Island are currently at greatest risk of potential threats to aquatic resources from continued logging activities.

Current exploration and mining projects include, but are not limited to: Greens Creek, Kensington, Bokan Mountain, Niblack Mine, Palmer, CJ, Mount Andrew, Geohedral, Herbert Glacier, and Snettisham. Future exploration is largely dependent on global mineral prices.

Hydroelectric power is likely to remain the primary alternative energy source to that produced from diesel generators. Other potential energy developments include: geothermal, tidal, wind, and biomass. Additional transmission lines connecting communities to hydroelectric power plants are being funded through state and federal appropriations.

The Alaska Energy Authority, through the Alaska Renewable Energy Fund, has provided a significant amount of funding for alternative energy projects. These energy/utility projects and related infrastructure have the potential to impact a number of aquatic resources due to dredge or fill activities, restriction, and diversion of streams, and sediment load alteration.

Hydrokinetic (ocean) energy projects and additional communication cables may also impact wetlands and aquatic resources in the region.

Other threats that might impact significant amounts of wetlands in the Southeast regions include tourism, seafood processing, aquaculture, and other non-point source impacts (i.e., invasive species).

Climate Change: As in the other service areas, climate change is likely to be a major threat to aquatic resources in the Southeast Service Area. Coastal erosion and the intrusion of salt water into fresh water systems are also likely to accelerate in this service area.

c. Opportunities for Aquatic Resource Compensatory Mitigation:

Opportunities for compensatory mitigation through preservation in the Southeast Service Area are primarily private inholdings within state and federal conservation units. Strategic wetland properties exist in Tongass National Forest, Misty Fiords National Monument, Glacier Bay National Park, Chilkat Bald Eagle Preserve, and other state and federal conservation units.

Opportunities exist to preserve marine coastal wetlands and forested wetlands. Because most lands below mean high tide line are owned by either state or federal governments, opportunities to preserve estuarine wetlands that lie below mean high tide are limited.

Since 1994 The Conservation Fund has preserved ten properties totaling 2,000 acres in the Chilkat Bald Eagle Preserve, Lunch Creek State Park, Misty Fiords National Monument and the Tongass National Forest.

d. Parcel Prioritization:

The use of geographic information systems (GIS) can be an effective way to identify and prioritize specific properties to advance the aquatic resource objectives. These GIS parcel prioritizations typically involve the selection of a set of biological and geographical attributes to analyze properties in a particular geographic area. TCF will use information from parcel prioritizations to assist with identifying properties to preserve aquatic resources in the Southeast Service Area.

When available, TCF will use partner parcel prioritizations to help direct TCF preservation projects. For the a Southeast Service Area, such partners may include Southeast Alaska Land Trust, U.S. Fish and Wildlife Service, National Park Service, Bureau of Land Management, Alaska Department of Natural Resources, Alaska Department of Fish and Game, The Nature Conservancy, Sealaska Corporation, and numerous village corporations.

A wetland assessment has been completed in the Southeast Service Area for the Juneau area (Bosworth and Adamus 2007). This project focused on identifying and delineating wetlands in the Juneau area, where development is growing in a constrained geographic area. For preservation projects in the Juneau area, TCF will use this wetlands assessment to give value to properties containing aquatic resources. Important attributes for this assessment include wetlands, Important Bird Areas, and proximity to protected lands.

TCF will evaluate all prioritizations to determine that the criteria outlined in 33 CFR 332.3(h)(1) are satisfied. Those criteria are:

- The resources preserved provide important physical, chemical, or biological functions for the watershed;

- The resources to be preserved contribute significantly to the ecological sustainability of the watershed. In determining the contribution of those resources to the ecological sustainability of the watershed, the DE must use appropriate quantitative assessment tools, where available;
- Preservation is determined by the DE to be appropriate and practicable;
- The resources are under threat of destruction or adverse modification;
- The preserved site will be permanently protected through an appropriate real estate or other legal instrument (e.g., easement, title transfer to state resource agency or land trust).

TCF may work with Alaska Natives and village and regional corporations to use Traditional Ecological Knowledge (TEK) to incorporate cultural, subsistence, historical, and ecological information into parcel prioritizations in the Southeast Service Area.

In addition to using the parcel prioritization, TCF may identify properties based on threats to aquatic resources in the Southeast Service Area. Urbanization, transportation, and resource development (logging, hydropower) are identified as the primary threats to aquatic resources in the Southeast Service Area. Based on this information, TCF may identify parcels that are vulnerable to these threats include areas near anadromous waters; areas where resource development is occurring and/or is likely to increase; and coastal and river communities and in-holdings where development is likely to increase.

C. Aquatic Resource Objectives of the AKILF Program:

Defining highly-detailed aquatic resource objectives for each of the AKILF service areas would be a daunting, if not impossible task, considering the vast size of the service areas and the inconsistent level of information available. We are able to see patterns and trends in specific parts of Alaska, such as the loss, and threat of loss, of coastal wetlands in all the service areas. Yet wetlands of all types across all areas of Alaska face some level of threat and loss, and assigning relative importance to these threats and losses is not a task we are equipped to handle. Because of the inconsistent level of information available to us, because preservation is by its nature opportunistic, and because TCF does not set priorities but rather pursues the opportunities of our partners, we are not comfortable proposing specific action plans.

Instead, our aquatic resource objectives for the AKILF Program are broad, with the details informing the need for specific preservation projects to come from the evaluation of information at a finer scale than is possible in this CPF. In all five service areas, TCF will seek to achieve the following aquatic resource objectives:

- Use parcel prioritizations, existing land management plans, and local knowledge to identify and protect important aquatic habitats.

- Through fee simple acquisition, conservation easements, and other conservation tools, preserve aquatic resources that provide important ecological functions.
- As opportunities arise, TCF may also work in partnerships on the restoration, enhancement or establishment of ecologically valuable wetlands as compensatory mitigation projects.
- Preserve aquatic resources that are in imminent threat of development and whose loss would impair the function of the service area.
- Preserve aquatic resources that provide important habitat to migratory birds, anadromous fish, and plants and animals that are rare, threatened, or endangered.
- Preserve aquatic resources that will facilitate adaptation to climate change.
- Preserve relatively rare wetland types, including estuaries, coastal wetlands, and riverine wetlands, especially those which support significant populations of migratory birds and anadromous fish.
- Provide public benefit by directing mitigation resources to the preservation of high-value habitats that also offer open space, passive recreation, drinking water protection, and other services to Alaska communities.
- Aggregate in-lieu fees from smaller projects to protect larger properties with greater ecological value.

For additional detail on project selection, see Section 5 of the Instrument.

D. Parcel Prioritization:

As mentioned for each service area, parcel prioritizations have been completed by various agencies and entities including: Matanuska-Susitna Valley (Great Land Trust 2012a), Cook Inlet (ADF&G 2002), Anchorage area (Jones 2010), Knik Arm (Great Land Trust 2010), Kenai Peninsula (Kachemak Heritage Land Trust 2007), Kodiak Island (Great Land Trust 2012b), Greater Fairbanks area (USKH 2011), Arctic Service Area (The Conservation Fund 2012), Bristol Bay region (Nushagak-Mulchatna Watershed Council 2007, The Conservation Fund 2013), and Juneau (Bosworth and Adamus 2007). While the criteria have varied among these different efforts, they have generally considered at least some of the following attributes: proximity to floodzone, tract size, political boundaries, overlap with impervious cover, proximity to roads, slope, soil properties, wetland status, functional status, zoning, adjacency to trails, adjacency to protected or conserved land, bird habitat value, proximity to streams and anadromous streams, land status (e.g., urban development, recreational designation), ownership status, wildlife habitat, special conservation merit (i.e., Alaska Department of Fish & Game's Most Environmentally Sensitive Areas, Audubon Alaska Important Bird Areas, National Oceanic and Atmospheric Administration Sensitivity Index), proximity to known rare plant populations, elevation, proximity to threatened or impaired waterbodies, proximity to lakes, and proximity to estuarine and marine habitats.

These prioritizations, along with TCF's internal policies for project selection, are examples of how TCF will meet requirements for selecting the best wetland mitigation projects. Prioritizations and selection criteria will be updated as necessary to reflect changes in land ownership, aquatic resources, and priorities as determined by TCF and the IRT.

TCF will work with all of Alaska's land management and natural resource agencies, major landowners, land trusts, and other key user groups and interested parties to identify ecologically significant wetlands needing protection. TCF is not a long-term property owner and manager. Accordingly, TCF will only acquire properties that are environmentally valuable and will be owned, well-managed, and are desired by a natural resource agency or organization with the appropriate skills and resources to meet long-term conservation objectives. TCF will seek to protect larger, ecologically-meaningful properties rather than smaller, isolated tracts.

TCF's experience in Alaska and elsewhere is that, when it comes to real estate, many factors often make it challenging to follow a strict prioritization scheme, as real estate acquisition is often an opportunistic enterprise. An effective program to protect wetlands and waters must have some flexibility to take advantage of opportunities as they arise. TCF is a non-governmental entity without the power of eminent domain and can only work with landowners on a willing seller basis.

E. Justification for Preservation as a Mitigation Tool:

The AKILF Program is fundamentally one of preservation, and TCF acknowledges that preservation does not fully support the goal of "no-net loss" of aquatic resources. Changing the protected status of one acre of wetlands does not make up for the permanent fill and loss of one acre elsewhere. Mitigation ratios higher than one-to-one are an attempt to make up for this shortcoming, by allowing for the preservation of many more acres than are lost. In some parts of the country where preservation is allowed as compensatory mitigation, mitigation ratios run as high as 30:1 (i.e., 30 acres of wetland preservation to one acre of wetland loss), yet in Alaska the typical range of mitigation ratios is from 1.5:1 to 3:1. The Corps, not TCF, sets the ratios while TCF offers credits for the required debits.

Despite the foregoing, the AKILF Program will provide substantial resource benefit and advance the objectives of the 2008 Rule in several ways. First, the existing parcel prioritizations, and others that will undoubtedly follow, will aid in the identification of properties whose protection will yield the maximum benefit for the watershed and service area. Secondly, the AKILF Program will focus on the protection of wetlands with equal or greater functional value to those that have been impacted. Third, a focus on the preservation of wetlands reduces the uncertainty of functions that will be produced by a mitigation project and provides a high level confidence that a mitigation project will be successful. Finally, the AKILF Program will focus on the protection of larger properties, larger wetland complexes, and larger landscapes than those that have been impacted by individual projects. The approach of the AKILF Program will shift the

focus of wetlands mitigation from smaller, isolated tracts to larger and contiguous tracts that provide greater functional values and greater watershed benefits. One exception to this strategy is in the case of high value wetlands under imminent threat of development. In these cases, it may be more ecologically beneficial to preserve a smaller tract rather than larger tract. Such a determination will have to be made on a case-by-case basis.

F. Stakeholder Involvement:

TCF has and will continue to seek regular input from the IRT to assure that service areas' needs for high quality wetland and aquatic resources mitigation are being met. The IRT shall meet at least annually to review the AKILF Program's performance, financial status, and potential projects. The Conservation Fund has also and will continue to seek regular input from all of Alaska's land management agencies, major landowners, land trusts, and key user groups and interests to identify ecologically significant wetlands needing protection.

G. Long-Term Protection and Management Strategies:

TCF is not a long-term land management agency. In most cases TCF shall seek to transfer compensatory mitigation lands to an appropriate land stewardship entity. Such entities include public land management agencies, non-governmental organizations, and qualified private land managers. TCF has a history of successfully fostering such partnerships. Appropriate land stewardship entities are those that maintain facility (e.g., land) management plans, integrated natural resource management plans, or similar plans that are consistent with the objectives of the specific mitigation project.

Once a mitigation project has been identified, TCF will work with the appropriate land stewardship entity to ensure the efficient and effective transfer of compensatory mitigation lands. The land stewardship entity will be identified in the project-specific mitigation plan to be reviewed and approved by the DE, in consultation with the IRT. The project-specific mitigation plan will only be approved if it complies with conditions of 33 CFR 332.8(j), through one of the processes indicated in 33 CFR 332.8(g). Responsibilities concerning adaptive management strategies shall also be addressed within the project-specific mitigation plan, in accordance with 33 CFR 332.7(c).

Prior to transfer of compensatory mitigation lands, TCF shall obtain an appropriate long-term protection mechanism. Such mechanisms include, but are not limited to, conservation easements and restrictive covenants. For lands being transferred to a government agency, thus converting the land to government property, long-term protection may be provided through federal facility management plans or integrated natural resources management plans.

For compensatory mitigation projects on public lands where changes in statute, regulation, or agency needs results in an incompatible use, the public agency authorizing the incompatible use

is responsible for providing alternative compensatory mitigation that is acceptable to the District Engineer or designee for any loss in functions resulting from the incompatible use, in accordance with 332.7(a)(3) and 332.7(a)(4).

H. Strategy for Periodic Evaluation and Reporting:

TCF will report annually to the Corps and IRT on the progress on the AKILF Program. In addition to the required financial and credit/debit information, this report will provide information on the types of wetlands that have been impacted for which credits were sold by the AKILF Program. To the extent possible, TCF will provide an evaluation of the wetlands protected through AKILF Program mitigation projects as compared to the wetlands impacted by authorized permits. This annual report will also provide a forward-looking assessment of the major threats to wetlands and opportunities for mitigation across all service areas.

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Table 1. *Percentages and acres mapped by the National Wetlands Inventory (NWI) for geographic service areas in Alaska*

	Service Areas					
	Arctic	Interior	Southwest	Southcentral	Southeast	All Service Areas
Percent of Service Area Inventoried*	26%	28%	25%	59%	92%	35%
Major Wetland Type	Acres	Acres	Acres	Acres	Acres	Acres
Estuarine and Marine Wetland	149,510	87,019	430,651	113,963	407,261	1,188,404
Freshwater Moss-Lichen	96	28,378	12,337	16	4,869	45,695
Freshwater Emergent Wetland	13,243,075	5,367,884	7,660,191	873,202	1,154,567	28,298,919
Freshwater Shrub Wetland	2,409,375	8,232,859	1,708,631	2,166,811	666,714	15,184,391
Freshwater Forested Wetland	10,538	1,875,861	109,024	1,146,858	2,422,462	5,564,743
Freshwater Pond	318,785	360,486	361,384	129,347	62,417	1,232,418
Lake	2,050,444	740,895	1,652,310	440,406	308,299	5,192,354
Riverine	410,427	746,245	175,527	458,054	162,508	1,952,761
Total Wetlands Inventoried	18,592,251	17,439,626	12,110,056	5,328,656	5,189,097	58,659,686

*Table based on digital data available as of 2/22/13. Percentages of Service Areas inventoried are approximate, since areas with paper maps were not included (resulting in an under estimate) and entire topographic quads, excluding the ocean, were used to include areas with inventoried uplands but not documented by the NWI (resulting in an over estimate). The Estuarine and Marine Deepwater major wetland type was not included in the acreage summary table, since these areas included an arbitrary mapping distance out to sea beyond the tidal influence, and are unlikely areas suitable for compensatory mitigation credits.

Figure 1. *National Wetlands Inventory (NWI) status for Alaska Region as of February 2013 with intersecting geographic service areas*

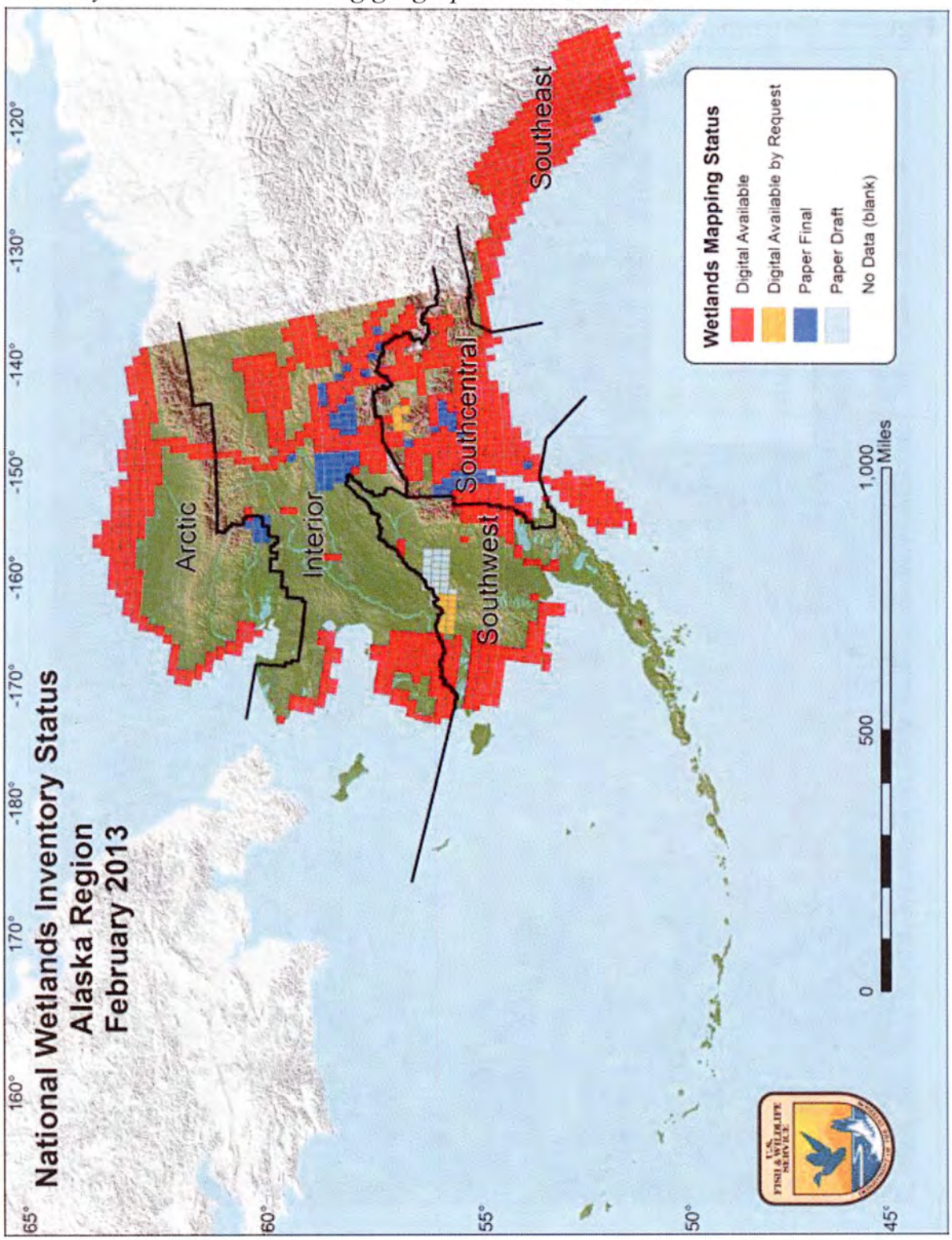

Figure 2. *Geographic service areas in Alaska*

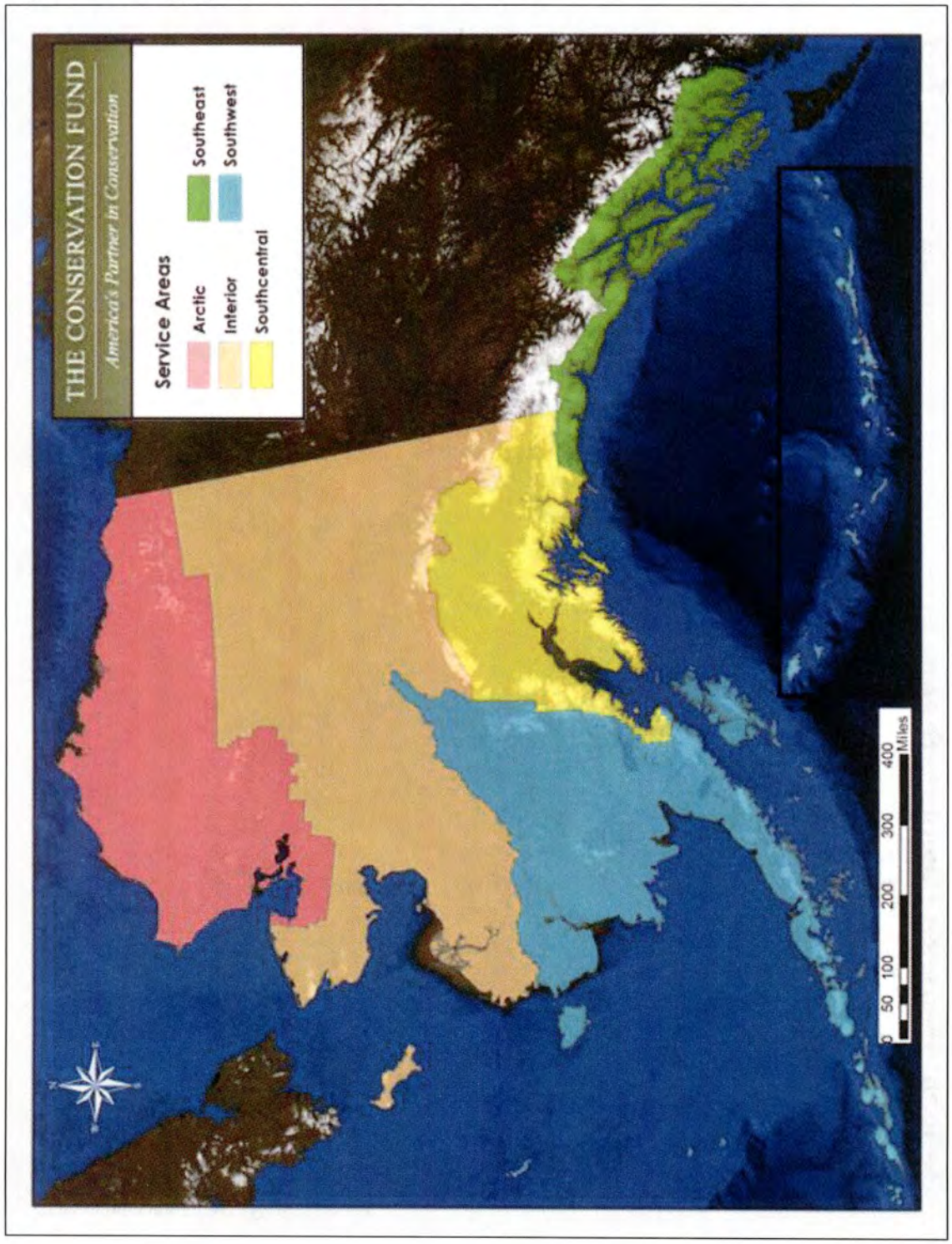

Figure 3. *Arctic Service Area with intersecting Level 3 hydrological unit codes*

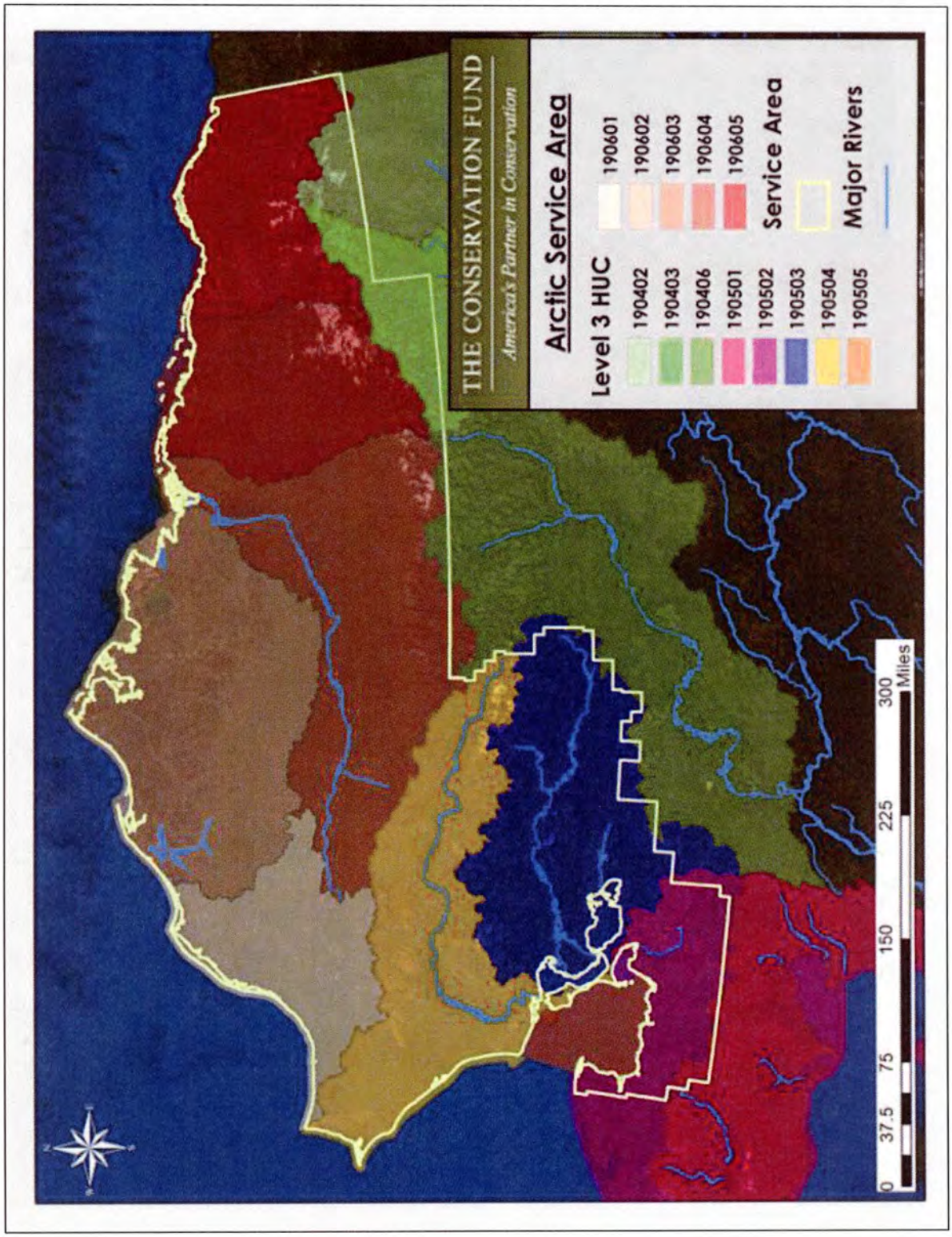

Figure 4. *Interior Service Area with Level 3 hydrological service codes*

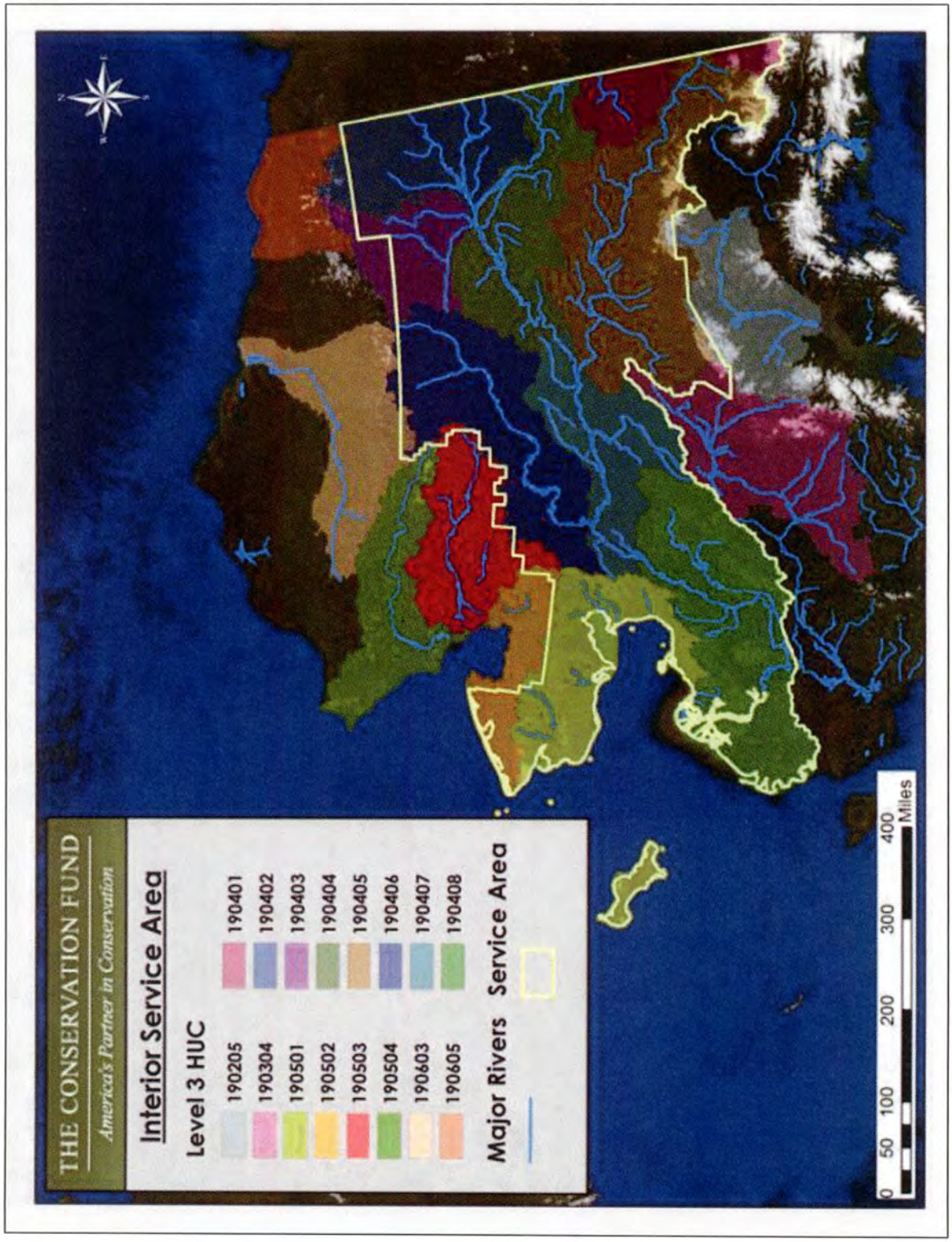

Figure 5. *Southcentral Service Area with Level 3 hydrological unit codes*

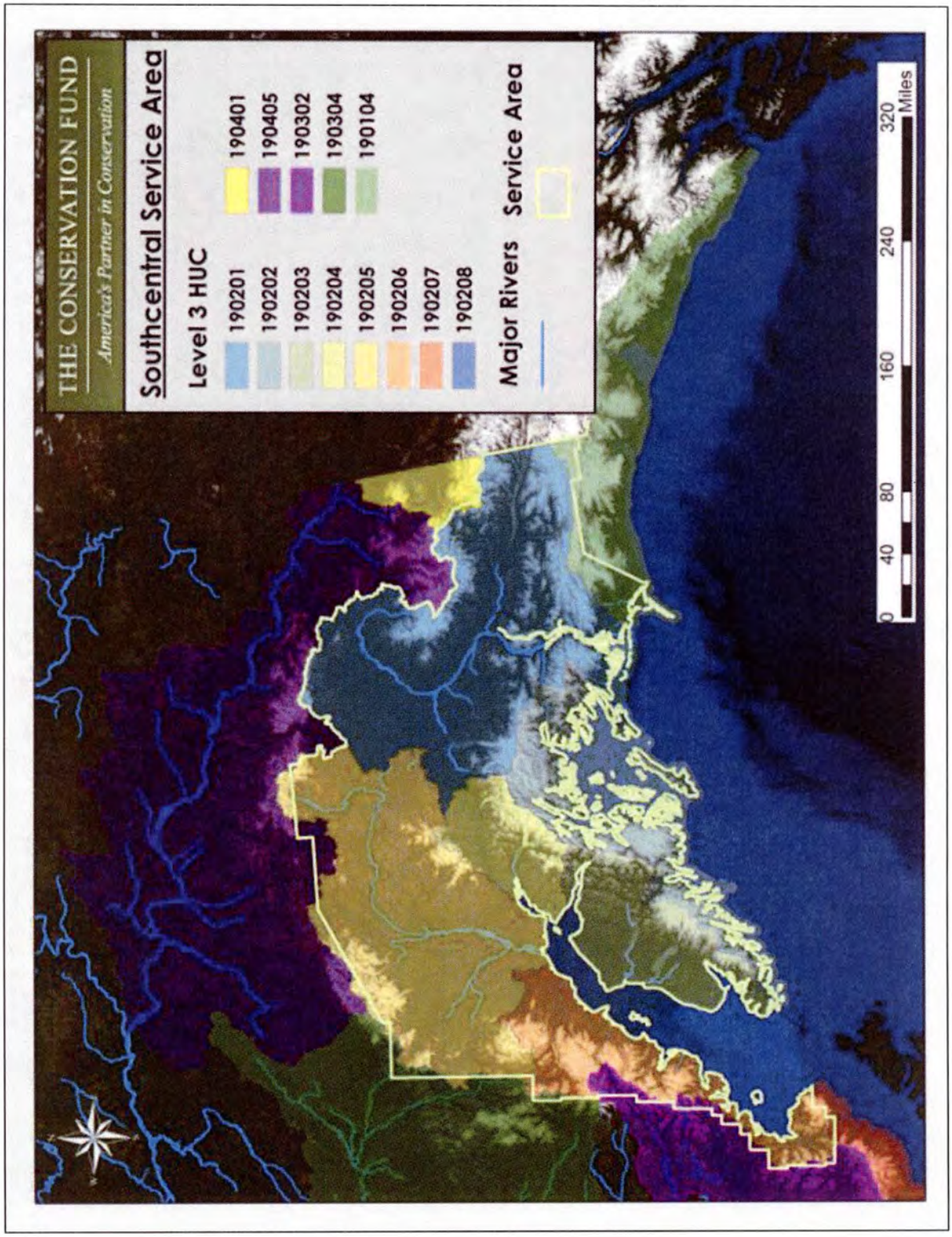

Figure 6. *Southwest Service Area with Level 3 hydrological unit codes*

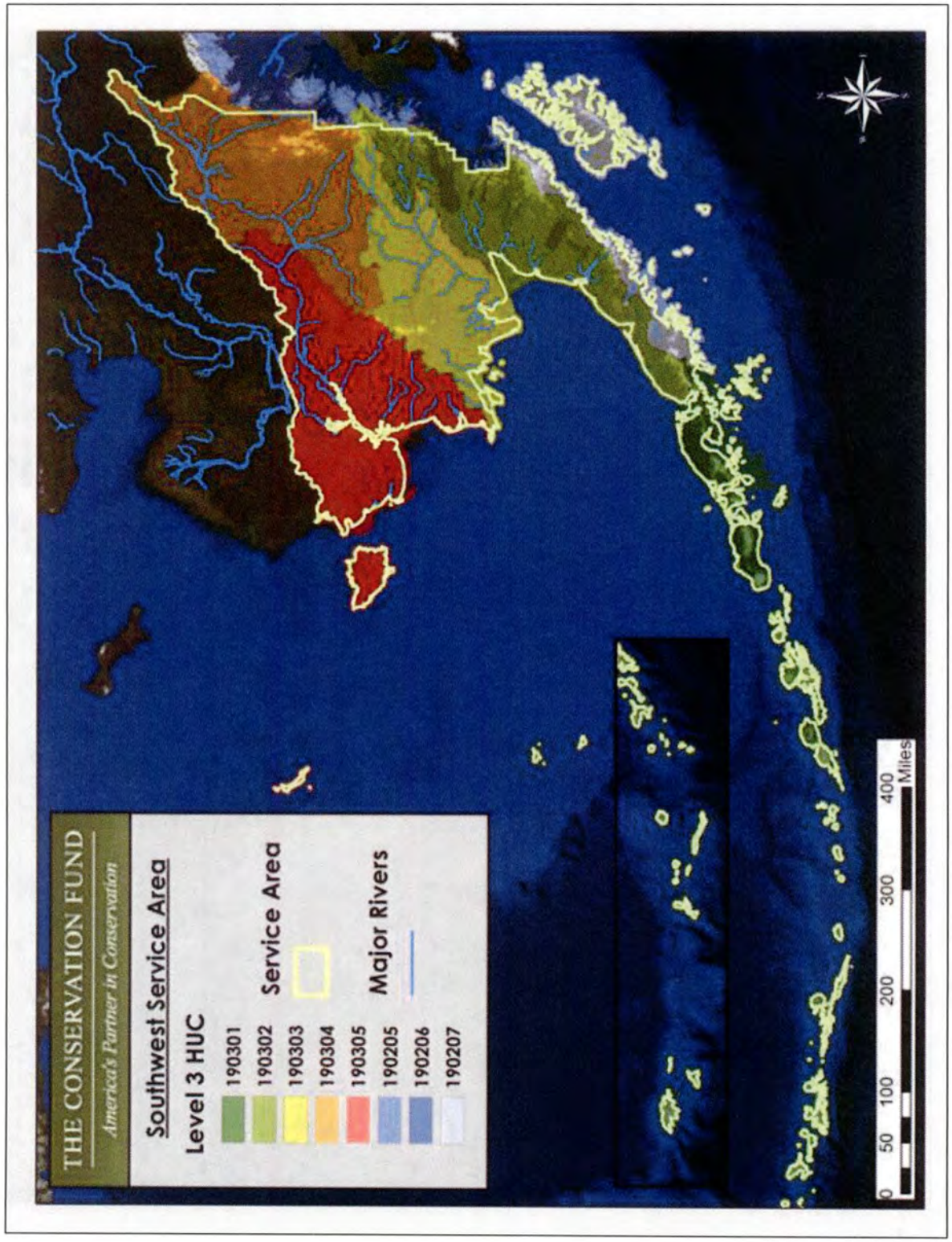

Figure 7. *Southeast Service Area with Level 3 hydrological unit codes*