STATE OF ALASKA REQUEST FOR PROPOSALS

RFP 2024-1000-0211

AS NEEDED COMPENSATORY MITIGATION CONSULTING SERVICES

ISSUED JANUARY 24, 2024

ISSUED BY:

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF SUPPORT SERVICES

PRIMARY CONTACT:

TAMRA M. CZERNY
PROCUREMENT OFFICER
TAMRA.CZERNY@ALASKA.GOV
1 (907) 269–8665

OFFERORS ARE NOT REQUIRED TO RETURN THIS FORM.

IMPORTANT NOTICE: IF YOU RECEIVED THIS SOLICITATION FROM THE STATE OF ALASKA'S "ONLINE PUBLIC NOTICE" WEB SITE, YOU MUST REGISTER WITH THE PROCUREMENT OFFICER LISTED IN THIS DOCUMENT TO RECEIVE NOTIFICATION OF SUBSEQUENT AMENDMENTS. FAILURE TO CONTACT THE PROCUREMENT OFFICER MAY RESULT IN THE REJECTION OF YOUR OFFER.

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SECTION 1. INTRODUCTION & INSTRUCTIONS

SEC. 1.01 PURPOSE OF THE RFP

The Department of Natural Resources (DNR), Office of Project Management and Permitting, is soliciting proposals for a qualified contractor to provide As Needed Consulting Services to review, analyze, and potentially advance Compensatory Mitigation options utilizing State of Alaska resources. Offerors will be evaluated to the extent their proposal answers the evaluation criteria established in Section 5. Evaluation Criteria. A detailed description of the scope of work is provided in Section 3. Scope of Work.

SEC. 1.02 BUDGET

DNR anticipates a five-year program to provide As Needed Compensatory Mitigation Consulting Services with total funding not to exceed $375,000.00 for contract services.

The services are as needed, and the budget amount is an estimate only and does not represent a work commitment. As funds become available, the Contractor selected from this RFP will be emailed a Task Order for each new project. The State does not guarantee a minimum or maximum number of services to be provided or a dollar amount to be spent under any contract resulting from this RFP.

Approval or continuation of a contract resulting from this RFP is contingent upon legislative appropriation.

SEC. 1.03 DEADLINE FOR RECEIPT OF PROPOSALS

Proposals must be received no later than 2:00 PM Alaska Time on February 14, 2024, as indicated by postmark or email timestamp and late proposals will not be considered.

SEC. 1.04 MINIMUM REQUIRMENTS

In order for offers to be considered responsive offerors must meet these minimum requirements:

- Demonstrate that project lead has extensive experience working with the US Army Corps of Engineers in relation to compensatory mitigation and an understanding of the process to develop an In-Lieu-Fee program and/or mitigation bank as required by section 404 of the Clean Water Act (minimum 5 years).
- GIS analyst/expert experience (minimum 3 years).

Offerors must detail in their proposal how they meet the minimum requirements above. Offerors that fail to identify in their proposal how they meet the minimum requirements will be deemed non-responsive.

SEC. 1.05 REQUIRED REVIEW

Offerors should carefully review this solicitation for defects and questionable or objectionable material. Comments concerning defects and questionable or objectionable material should be

made in writing and received by the procurement officer at least 10 days before the deadline for receipt of proposals. This will allow time for the issuance of any necessary amendments. It will also help prevent the opening of a defective proposal and exposure of the offeror's proposals upon which the award could not be made.

SEC. 1.06 QUESTIONS PRIOR TO DEADLINE FOR RECEIPT OF PROPOSALS

All questions must be in writing and directed to the procurement officer. The interested party must confirm telephone conversations in writing.

Two types of questions generally arise. One may be answered by directing the questioner to a specific section of the RFP. These questions may be answered over the telephone. Other questions may be more complex and may require a written amendment to the RFP. The procurement officer will make that decision.

Deadline to receive questions is **February 02, 2024**, by **2:00 PM** Alaska Time.

PROCUREMENT OFFICER: TAMRA M. CZERNY; PHONE 1 (907) 269–8665; TDD 711 (Alaska Relay); Email: tamra.czerny@alaska.gov

SEC. 1.07 RETURN INSTRUCTIONS

If submitting a proposal via email, the technical proposal and cost proposal must be saved as separate PDF documents and emailed to tamra.czerny@alaska.gov as separate, clearly labeled attachments, such as "Vendor A – Technical Proposal.pdf" and "Vendor A – Cost Proposal.pdf" (Vendor A is the name of the offeror). The email must contain the RFP number in the subject line.

The **maximum** size of a single email (including all text and attachments) that can be received by the State is **20mb (megabytes)**. If the email containing the proposal exceeds this size, the proposal must be sent in multiple emails that are each less than 20 megabytes and each email must comply with the requirements described above.

Please note that email transmission is not instantaneous. Similar to sending a hard copy proposal, if you are emailing your proposal, the State recommends sending it ahead of time to ensure the email is delivered by the deadline for receipt of proposals.

If submitting proposals using U.S. mail, or delivery service, offerors must submit one hard copy of their proposal, in writing, to the procurement officer in a sealed package. The cost proposal included in the package must be sealed separately from the rest of the proposal and must be clearly identified. The sealed proposal package(s) must be addressed as follows:

Department of Natural Resources
Office of Project Management and Permitting
Attention: TAMRA M. CZERNY
Request for Proposal (RFP) Number: 2024-1000-0211
RFP Title: As Needed Compensatory Mitigation Consulting Services
550 West 7th Avenue, Suite 1330
Anchorage, Alaska 99501

It is the offeror's responsibility to contact the issuing agency at 1 (907) 269–8665 to confirm that the proposal has been received. The State is not responsible for unreadable, corrupt, or missing attachments.

SEC. 1.08 ENROLLMENT IN IRIS

Offerors will be required to be enrolled in the State of Alaska's Integrated Resource Information System (IRIS) database prior to the award of a contract resulting from this RFP. Enrollment can be done online at the following link: https://iris-vss.alaska.gov. Offerors who are not enrolled prior to the award of a contract will be notified by DNR Procurement. Failure of an offeror to enroll in the IRIS database will delay award of the contract and may delay issuance of contract work.

SEC. 1.09 ASSISTANCE TO OFFERORS WITH A DISABILITY

Offerors with a disability may receive accommodation regarding the means of communicating this RFP or participating in the procurement process. For more information, contact the procurement officer no later than 10 days prior to the deadline for receipt of proposals.

SEC. 1.10 AMENDMENTS TO PROPOSALS

Amendments to or withdrawals of proposals will only be allowed if acceptable requests are received prior to the deadline that is set for receipt of proposals. No amendments or withdrawals will be accepted after the deadline unless they are in response to the State's request in accordance with 2 AAC 12.290.

SEC. 1.11 AMENDMENTS TO THE RFP

If an amendment is issued before the deadline for receipt of proposals, the amendment will be posted on the State of Alaska Online Public Notice (OPN) website. The link to the posting of the amendment will be provided to all who were notified of the RFP and to those who have registered with the procurement officer after receiving the RFP from the OPN.

After receipt of proposals, if there is a need for any substantial clarification or material change in the RFP, an amendment will be issued. The amendment will incorporate clarification or change, and a new date and time established for new or amended proposals. Evaluations may be adjusted as a result of receiving new or amended proposals.

SEC. 1.12 RFP SCHEDULE

The RFP schedule set out herein represents the State's best estimate of the schedule that will be followed. If a component of this schedule, such as the deadline for receipt of proposals, is delayed, the rest of the schedule may be shifted accordingly. All times are Alaska Time.

ACTIVITY	TIME	DATE
Issue Date / RFP Released		January 24, 2024
Deadline for Receipt of Questions	2:00 PM	February 02, 2024
Deadline for Receipt of Proposals / Proposal Due Date	2:00 PM	February 14, 2024
ANTICIPATED Proposal Evaluations Complete		Week of March 04, 2024
ANTICIPATED Notice of Intent to Award		Week of March 04, 2024
ANTICIPATED Contract Issued		March 15, 2024

This RFP does not, by itself, obligate the State. The State's obligation will commence when the contract is approved by the Commissioner of the Department of Natural Resources, or the Commissioner's designee. Upon written notice to the Contractor, the State may set a different starting date for the contract. The State will not be responsible for any work done by the Contractor, even work done in good faith, if it occurs prior to the contract start date set by the State.

SEC. 1.13 PRE-PROPOSAL CONFERENCE/TELECONFERENCE

Not applicable for this RFP.

SEC. 1.14 ALTERNATE PROPOSALS

Offerors may only submit one proposal for evaluation. In accordance with 2 AAC 12.830 alternate proposals (proposals that offer something different than what is asked for) will be rejected.

SEC. 1.15 NEWS RELEASES

News releases related to this RFP will not be made without prior approval of the project manager.

SECTION 2. BACKGROUND INFORMATION

SEC. 2.01 BACKGROUND INFORMATION

Background information for this RFP can be found in the attachments listed below.

1) Background Information Attachment 5 – SOA DNR ILFP Prospectus (19 pages);

2) Background Information Attachment 6 – Compensation Planning Framework (193 pages);

3) Background Information Attachment 7 – Prioritization Strategy for Compensatory Mitigation Site Selection 2021 (51 pages).

SECTION 3. SCOPE OF WORK & CONTRACT INFORMATION

SEC. 3.01 SCOPE OF WORK

The Department of Natural Resources, Office of Project Management and Permitting is requesting professional services for consultation, identifying, developing, and advancing DNR's compensatory mitigation efforts. The winning offeror will help identify new and different alternatives for the State of Alaska to run a compensatory mitigation program to generate "credits" as required by section 404 of the Clean Water Act. Most of the work will include the following "responsibilities" and need the "required skill sets" list below. Please note that specific tasks will depend on alternative analysis, stakeholder engagement, and US Army Corps of Engineers (USACE) feedback.

Responsibilities:

- Review State's last proposal for Statewide In-Lieu-Fee Program (ILFP) to the US Army Corps of Engineers (USACE) (see Attachment 5 - SOA DNR ILFP Prospectus and Attachment 6 - Compensatory Planning Framework).
- Propose new alternatives or data to collect for DNR to advance compensatory mitigation opportunities within the State of Alaska.
- Update mitigation site selection tool (GIS format) and mythology (see Attachment 7 - Prioritization Strategy for Compensatory Mitigation Site Selection 2021).
    - Tool used to identify potential projects/resources from desktop;
    - GIS license required;
    - Will require a GIS analyst/expert;
    - Work will include making sure data/layers are properly connected, rasterizing specific data layers, assuring that tool can run queries to identify potential resources and projects.
- Develop documents/data to advance the different methodologies as requested and as budget allows:
    - Could include drafting, collecting data needed for, or advancing future prospectus and Compensatory Planning Framework (CPF).
- Participate in regularly scheduled meetings to discuss strategy, next steps and other topics as funding allows.

Additional as needed consulting services for compensatory mitigation efforts may be required. If such services are required by DNR the Task Order Solicitation and delivery order process shall apply as outlined in SEC 3.05.

SEC. 3.02 CONTRACT TERM AND WORK SCHEDULE

The length of the contract will be from the date of award, for approximately five years.

Unless otherwise provided in this RFP, the State and the successful offeror/contractor agree: (1) that any extension of the contract excluding any exercised renewal options, will be considered as a month-to-month extension, and all other terms and conditions shall remain in full force and effect and (2) the procurement officer will provide notice to the Contractor of the intent to cancel such month-to-month extension at least 30 days before the desired date of cancellation. A month-to-month extension may only be executed by the procurement officer via a written contract amendment.

SEC. 3.03 DELIVERABLES

The Contractor will be required to provide the following deliverables for the initial work to be conducted as identified in SEC 3.01:

1. Set up bi-weekly strategy meetings with DNR.
2. Develop and give an informal presentation to the Project Manager on potential alternatives that would advance the State of Alaska's compensatory mitigation opportunities 30 days after the contract is awarded.

SEC. 3.04 CONTRACT TYPE

The resulting contract will be a Master Agreement (MA). The dollar amount shown on the MA will be the maximum dollar amount to be spent for all services provided under the agreement. The State does not guarantee a minimum or maximum number of services to be provided, or a dollar amount to be spent under any contract resulting from this RFP. Future projects will be awarded through Task Order Solicitations using the process set by section 3.05 Task Order Solicitation and Delivery Order Process.

SEC. 3.05 TASK ORDER SOLICITATION AND DEVLIVERY ORDER PROCESS

Once the MA is established this process will be used to issue Task Order Solicitation against the MA. When the State requires services under an MA the DNR Procurement Officer or Project Manager will issue a Task Order Solicitation to the Contractor. The solicitation will be a written document sent by email; will outline the required services to be provided; will inform the contractor and will set a deadline for receipt of a proposal. Responses will be evaluated solely on cost.

The Contractor shall provide a negotiable cost estimate within the designated timeframe for the services. Task Order Solicitations may require Contractors to return a Task Order Solicitation Response Form.

The State may negotiate the services or costs in the offered proposal within the parameters of the State Procurement Code. Once an agreement is reached the State will issue a written Delivery Order to the Contractor authorizing the work.

If a Contractor has a potential conflict of interest with providing required services or is otherwise unable or unavailable to do the required work within the required timeline the State reserves the right to acquire services off contract at its sole discretion under the provisions of the State Procurement Code.

The Contractor shall obtain State approval of each person assigned to work under a specific Delivery Order prior to beginning work. Should the Contractor provide services by a person not approved before work begins on the Delivery Order, those services may not be subsequently approved for payment. The State reserves the right to withdraw the approval of any person by written notice to the Contractor.

The total cost for a project will not exceed the amount authorized in the Delivery Order without prior written approval from the DNR Project Manager or Procurement Officer. If at any time during the performance of the Delivery Order the Contractor has reason to believe the amount authorized on the Task Order will be exceeded the Contractor will notify the DNR Project Manager and provide a justification and an estimate of the additional cost for completion of the work. Similarly, if at any time during the performance of the Delivery Order the State has reason to believe that the work required will exceed the total cost due to a change in conditions, or if additional work will be required, the DNR Project Manager will so advise the Contractor and will require revised cost estimates from the Contractor.

The State will not be obligated to pay any amount in excess of the total cost set forth in any Delivery Order. If condition changes increase the Delivery Order amount, the Contractor will not be obligated to continue performance resulting in charges exceeding the price unless and until the DNR Procurement Officer has authorized the increase in writing and a revised Delivery Order has been issued.

Revision of Delivery Orders will be issued when an extension of time is needed to complete the project, or when the scope of work has been modified by the State, which may cause a change in the project costs. The revised Delivery Order must be signed by both the DNR Project Manager and the firm's authorized signatory prior to performing any additional work incurring additional cost or working past the original time limit. The inability of a firm to follow these procedures may be grounds for dismissal from a project or termination of their contract(s) with the State.

No work will commence by the Contractor without prior authorization by DNR.

SEC. 3.06 PROPOSED PAYMENT PROCEDURES

The State will make payments based on a negotiated payment schedule. Each billing must consist of an invoice and progress report. No payment will be made until the progress report, and the invoice has been approved by the DNR Project Manager.

SEC. 3.07 PROMPT PAYMENT FOR STATE PURCHASES

Not applicable for this RFP.

SEC. 3.08 CONTRACT PAYMENT

No payment will be made until the contract is approved by the Commissioner of the Department of Natural Resources or the Commissioner's designee. Under no conditions will the State be liable for the payment of any interest charges associated with the cost of the contract. The State is not responsible for and will not pay federal, state, or local taxes. All costs associated with the contract must be stated in U.S. currency.

Payment for agreements under $500,000.00 for the undisputed purchase of goods or services provided to a state agency, will be made within 30 days of the receipt of a proper billing or the delivery of the goods or services to the location(s) specified in the agreement, whichever is later. A late payment is subject to 1.5% interest per month on the unpaid balance. Interest will not be paid if there is a dispute or if there is an agreement that establishes a lower interest rate or precludes the charging of interest.

Any single contract payment of $1 million or higher must be accepted by the Contractor via Electronic Funds Transfer (EFT).

SEC. 3.09 CONTRACT PRICE ADJUSTMENTS

Not applicable for this RFP.

SEC. 3.10 LOCATION OF WORK

The location the work is to be performed, completed, and managed is at the contractor’s designated work location.

The State will not provide workspace for the Contractor. The Contractor must provide its own workspace.

By signature on their proposal, the offeror certifies that all services provided under this contract by the Contractor shall be performed in the United States.

If the offeror cannot certify that all work will be performed in the United States, the offeror must contact the procurement officer in writing to request a waiver at least 10 days prior to the deadline for receipt of proposals.

The request must include a detailed description of the portion of work that will be performed outside the United States, where, by whom, and the reason the waiver is necessary.

Failure to comply with these requirements may cause the State to reject the proposal as non-responsive or cancel the contract.

SEC. 3.11 THIRD-PARTY SERVICE PROVIDERS

Not applicable for this RFP.

SEC. 3.12 SUBCONTRACTORS

Subcontractors will not be allowed.

SEC. 3.13 JOINT VENTURES

Joint ventures will not be allowed.

SEC. 3.14 RIGHT TO INSPECT PLACE OF BUSINESS

At reasonable times, the State may inspect those areas of the Contractor's place of business that are related to the performance of a contract. If the State makes such an inspection, the Contractor must provide reasonable assistance.

SEC. 3.15 CONTRACT PERSONNEL

Any change of the project team members named in the proposal must be approved, in advance and in writing, by the project manager or procurement officer. Changes that are not approved by the State may be grounds for the State to terminate the contract.

SEC. 3.16 INSPECTION & MODIFICATION - REIMBURSEMENT FOR UNACCEPTABLE DELIVERABLES

The Contractor is responsible for the completion of all work set out in the contract. All work is subject to inspection, evaluation, and approval by the project manager. The State may employ all reasonable means to ensure that the work is progressing and being performed in compliance with the contract. The project manager or procurement officer may instruct the Contractor to make corrections or modifications if needed in order to accomplish the contract's intent. The Contractor will not unreasonably withhold such changes.

The substantial failure of the Contractor to perform the contract may cause the State to terminate the contract. In this event, the State may require the Contractor to reimburse monies paid (based on the identified portion of unacceptable work received) and may seek associated damages.

SEC. 3.17 LIQUIDATED DAMAGES

Not applicable for this RFP.

SEC. 3.18 CONTRACT CHANGES - UNANTICIPATED AMENDMENTS

During the course of this contract, the Contractor may be required to perform additional work. That work will be within the general scope of the initial contract. When additional work is required, the project manager will provide the Contractor a written description of the additional work and request the Contractor to submit a firm time schedule for accomplishing the additional work and a firm price for the additional work. Cost and pricing data must be provided to justify the cost of such amendments per AS 36.30.400.

The Contractor will not commence additional work until the procurement officer has secured any required State approvals necessary for the amendment and issued a written contract amendment, approved by the Commissioner of the Department of Natural Resources or the Commissioner's designee.

SEC. 3.19 NONDISCLOSURE AND CONFIDENTIALITY

The Contractor agrees that all confidential information shall be used only for purposes of providing the deliverables and performing the services specified herein and shall not disseminate or allow dissemination of confidential information except as provided for in this section. The Contractor shall hold as confidential and will use reasonable care (including both facility physical security and electronic security) to prevent unauthorized access by, storage, disclosure, publication, dissemination to and/or use by third parties of, the confidential information. “Reasonable care” means compliance by the Contractor with all applicable federal and state law, including the Social Security Act and HIPAA. The Contractor must promptly notify the State in writing if it becomes aware of any storage, disclosure, loss, unauthorized access to or use of the confidential information.

Confidential information, as used herein, means any data, files, software, information or materials (whether prepared by the State or its agents or advisors) in oral, electronic, tangible or intangible form and however stored, compiled or memorialized that is classified confidential as defined by State of Alaska classification and categorization guidelines provided by the State to the Contractor or a contractor agent or otherwise made available to the Contractor or a contractor agent in connection with this contract, or acquired, obtained or learned by the Contractor or a contractor agent in the performance of this contract. Examples of confidential information include, but are not limited to: technology infrastructure, architecture, financial data, trade secrets, equipment specifications, user lists, passwords, research data, and technology data (infrastructure, architecture, operating systems, security tools, IP addresses, etc.).

If confidential information is requested to be disclosed by the Contractor pursuant to a request received by a third party and such disclosure of the confidential information is required under applicable federal or state law, regulation, governmental or regulatory authority, the Contractor may disclose the confidential information after providing the State with written notice of the requested disclosure (to the extent such notice to the State is permitted by applicable law) and giving the State opportunity to review the request. If the Contractor receives no objection from the State, it may release the confidential information within 30 days. Notice of the requested disclosure of confidential information by the Contractor must be provided to the State within a reasonable time after the Contractor’s receipt of notice of the requested disclosure and, upon request of the State, shall seek to obtain legal protection from the release of the confidential information.

The following information shall not be considered confidential information: information previously known to be public information when received from the other party; information freely available

to the general public; information which now is or hereafter becomes publicly known by other than a breach of confidentiality hereof; or information which is disclosed by a party pursuant to subpoena or other legal process and which as a result becomes lawfully obtainable by the general public.

SEC. 3.20 INDEMNIFICATION

The Contractor shall indemnify, hold harmless, and defend the Contracting Agency from and against any claim of, or liability for error, omission, or negligent act of the Contractor under this agreement. The Contractor shall not be required to indemnify the Contracting Agency for a claim of, or liability for, the independent negligence of the Contracting Agency. If there is a claim of, or liability for, the joint negligent error or omission of the Contractor and the independent negligence of the Contracting Agency, the indemnification and hold harmless obligation shall be apportioned on a comparative fault basis. “Contractor” and “Contracting Agency,” as used within this and the following article, include the employees, agents and other contractors who are directly responsible, respectively, to each. The term “independent negligence” is negligence other than in the Contracting Agency’s selection, administration, monitoring, or controlling of the Contractor and in approving or accepting the Contractor’s work.

SEC. 3.21 INSURANCE REQUIREMENTS

Without limiting Contractor's indemnification, it is agreed that Contractor shall purchase at its own expense and maintain in force at all times during the performance of services under this agreement the following policies of insurance. Where specific limits are shown, it is understood that they shall be the minimum acceptable limits. If the Contractor's policy contains higher limits, the State shall be entitled to coverage to the extent of such higher limits.

Certificates of Insurance must be furnished to the procurement officer prior to beginning work and must provide a notice of cancellation, non-renewal, or material change of conditions in accordance with policy provisions. Failure to furnish satisfactory evidence of insurance or lapse of the policy is a material breach of this contract and shall be grounds for termination of the Contractor's services. All insurance policies shall comply with and be issued by insurers licensed to transact the business of insurance under AS 21.

Workers' Compensation Insurance: The Contractor shall provide and maintain, for all employees engaged in work under this contract, coverage as required by AS 23.30.045, and where applicable, any other statutory obligations including but not limited to Federal U.S.L. & H. and Jones Act requirements. The policy must waive subrogation against the State.

Commercial General Liability Insurance: Covering all business premises and operations used by the Contractor in the performance of services under this agreement with minimum coverage limits of $300,000 combined single limit per claim.

Commercial Automobile Liability Insurance: Covering all vehicles used by the Contractor in the performance of services under this agreement with minimum coverage limits of $300,000 combined single limit per claim.

Professional Liability Insurance: Covering all errors, omissions, or negligent acts in the performance of professional services under this agreement. Limits required per the following schedule:

Contract Amount	Minimum Required Limits
$100,000-$499,999	$500,000 per Claim / Annual Aggregate

SEC. 3.22 TERMINATION FOR DEFAULT

If the project manager or procurement determines that the Contractor has refused to perform the work or has failed to perform the work with such diligence as to ensure its timely and accurate completion, the State may, by providing written notice to the Contractor, terminate the Contractor's right to proceed with part or all of the remaining work.

This clause does not restrict the State's termination rights under the contract provisions of Appendix A, attached in SECTION 7. ATTACHMENTS.

SECTION 4. PROPOSAL FORMAT AND CONTENT

SEC. 4.01 INTRODUCTION

Proposals must include the complete name and address of the offeror's firm and the name, mailing address, and telephone number of the person the State should contact regarding the proposal.

Proposals must confirm that the offeror will comply with all provisions in this RFP; and, if applicable, provide notice that the firm qualifies as an Alaskan bidder. Proposals must be signed by a company officer empowered to bind the company. An offeror's failure to include these items in the proposals may cause the proposal to be determined to be non-responsive and the proposal may be rejected.

The State discourages overly lengthy and costly proposals, however, in order for the State to evaluate proposals fairly and completely, offerors must follow the format set out in this RFP and provide all information requested.

SEC. 4.02 PROPOSAL CONTENTS

Technical proposals must not be greater than 20 pages. Technical proposals greater than 20 pages will be determined non-responsive and will not be evaluated. The following information must be included in all proposals.

(a) AUTHORIZED SIGNATURE

All proposals must be signed by an individual authorized to bind the offeror to the provisions of the RFP. Proposals must remain open and valid for at least 90-days from the date set as the deadline for receipt of proposals.

(b) OFFEROR'S CERTIFICATION

By signature on the proposal, offerors certify that they comply with the following:

A. the laws of the State of Alaska;

B. the applicable portion of the Federal Civil Rights Act of 1964;

C. the Equal Employment Opportunity Act and the regulations issued thereunder by the federal government;

D. the Americans with Disabilities Act of 1990 and the regulations issued thereunder by the federal government;

E. all terms and conditions set out in this RFP;

F. a condition that the proposal submitted was independently arrived at, without collusion, under penalty of perjury; and

G. that the offers will remain open and valid for at least 90 days.

If any offeror fails to comply with [a] through [g] of this paragraph, the State reserves the right to disregard the proposal, terminate the contract, or consider the Contractor in default.

(c) VENDOR TAX ID

A valid Vendor Tax ID must be submitted to the issuing office with the proposal or within five days of the State's request.

(d) CONFLICT OF INTEREST

Each proposal shall include a statement indicating whether or not the firm or any individuals working on the contract has a possible conflict of interest (e.g., currently employed by the State of Alaska or formerly employed by the State of Alaska within the past two years) and, if so, the nature of that conflict. The procurement officer reserves the right to consider a proposal non-responsive and reject it or cancel the award if any interest disclosed from any source could either give the appearance of a conflict or cause speculation as to the objectivity of the contract to be performed by the offeror.

(e) FEDERAL REQUIREMENTS

The offeror must identify all known federal requirements that apply to the proposal, the evaluation, or the contract.

SEC. 4.03 EXPERIENCE AND QUALIFICATIONS

Offerors must provide an organizational chart specific to the personnel assigned to accomplish the work called for in this RFP; illustrate the lines of authority; designate the individual responsible and accountable for the completion of each component and deliverable of the RFP.

Offerors must provide a narrative description of the organization of the project team and a personnel roster that identifies each person who will actually work on the contract and provide the following information about each person listed:

- title,
- resume,
- location(s) where work will be performed,

SEC. 4.04 UNDERSTANDING OF THE PROJECT

Offerors must provide comprehensive narrative statements that illustrate their understanding of the requirements of the project and the project schedule.

SEC. 4.05 METHODOLOGY USED FOR THE PROJECT

Offerors must provide comprehensive narrative statements that set out the methodology they intend to employ and illustrate how the methodology will serve to accomplish the work and meet the State’s project schedule.

SEC. 4.06 MANAGEMENT PLAN FOR THE PROJECT

Offerors must provide comprehensive narrative statements that set out the management plan they intend to follow and illustrate how the plan will serve to accomplish the work and meet the State's project schedule.

SEC. 4.07 COST PROPOSAL

Offerors must complete and submit this Submittal Form. Proposed costs must all direct and indirect costs associated with the performance of the contract, including, but not limited to, total number of hours at various hourly rates, direct expenses, payroll, supplies, overhead assigned to each person working on the project, percentage of each person's time devoted to the project, and profit. The costs identified on the cost proposal are the total amount of costs to be paid by the State. No additional charges shall be allowed.

SEC. 4.08 BID BOND – PERFORMANCE BOND – SURETY DEPOSIT

Not applicable for this RFP.

SEC. 4.09 EVALUATION CRITERIA

All proposals will be reviewed to determine if they are responsive. Proposals determined to be responsive will be evaluated using the criterion that is set out in SECTION 5. EVALUATION CRITERIA AND CONTRACTOR SELECTION.

SECTION 5. EVALUATION CRITERIA AND CONTRACTOR SELECTION

THE TOTAL NUMBER OF POINTS USED TO SCORE THIS PROPOSAL IS 100

SEC. 5.01 SUMMARY OF EVALUATION PROCESS

The State will use the following steps to evaluate and prioritize proposals:

1) Proposals will be assessed for overall responsiveness. Proposals deemed non-responsive will be eliminated from further consideration.

2) A Proposal Evaluation Committee (PEC), made up of at least three State employees or public officials, will evaluate the Technical portion of all responsive proposals.

3) Each responsive Technical Proposal will be sent to the PEC. No cost information will be shared or provided to the PEC.

4) The PEC will independently evaluate and score the proposals based on the degree to which they meet the stated evaluation criteria.

5) After independent scoring, the PEC will have a meeting, chaired by the procurement officer, where the PEC may have a group discussion prior to finalizing their scores.

6) The PEC will submit their final individual scores to the procurement officer, who will then compile the scores and calculate awarded points as set out in Section 5.03.

7) The procurement officer will calculate scores for cost proposals as set out in Section 5.08 and add those scores to the awarded points along with factoring in any Alaska preferences.

8) The procurement officer may ask for best and final offers from offerors susceptible for award and revise the cost scores accordingly.

9) The State will then conduct any necessary negotiations with the highest scoring offeror and award a contract if the negotiations are successful.

SEC. 5.02 EVALUATION CRITERIA

Proposals will be evaluated based on their overall value to the State, considering both cost and non-cost factors as described below. Note: An evaluation may not be based on discrimination due to the race, religion, color, national origin, sex, age, marital status, pregnancy, parenthood, disability, or political affiliation of the offeror.

SEC. 5.03 SCORING METHOD AND CALCULATION

Each Proposal Evaluation Committee (PEC) member will individually evaluate and score each responsive proposal using the criteria and percentage values set out in Section 5. Each percentage value will equal one point, with the total maximum points awarded, per PEC member, for all evaluation sections not to exceed 100 points. Using only whole numbers, PEC members will start with a median score for each evaluation section. The score may either increase or decrease depending on the offeror's response to each question for that section. As an example, if the Offeror provided responses over and above the evaluation questions in a section, they would receive a higher score. However, if the Offeror's response fails to address all questions of a section or demonstrates some lack of understanding or competency as it relates to a question for that section, the Offeror would then receive a lower score.

SEC. 5.04 EXPERIENCE AND QUALIFICATIONS (15%)

Proposals will be evaluated against the questions set out below:

1) Questions regarding the personnel:

a) Do the individuals assigned to the project have experience on similar projects?

b) Are resumes complete and do they demonstrate backgrounds that would be desirable for individuals engaged in the work the project requires?

c) How extensive is the applicable education and experience of the personnel designated to work on the project?

2) Questions regarding the firm:

a) How well has the firm demonstrated experience in completing similar projects on time and within budget?

b) How successful is the general history of the firm regarding timely and successful completion of projects?

c) Has the firm provided letters of reference from previous clients?

SEC. 5.05 UNDERSTANDING OF THE PROJECT (15%)

Proposals will be evaluated against the questions set out below:

1) How well has the offeror demonstrated a thorough understanding of the purpose and scope of the project?

2) How well has the offeror identified pertinent issues and potential problems related to the project?

3) To what degree has the offeror demonstrated an understanding of the deliverables the State expects it to provide?

4) Has the offeror demonstrated an understanding of the State's time schedule and can meet it?

SEC. 5.06 METHODOLOGY USED FOR THE PROJECT (10%)

Proposals will be evaluated against the questions set out below:

1) How comprehensive is the methodology and does it depict a logical approach to fulfilling the requirements of the RFP?

2) How well does the methodology match and achieve the objectives set out in the RFP?

3) Does the methodology interface with the time schedule in the RFP?

SEC. 5.07 MANAGEMENT PLAN FOR THE PROJECT (10%)

Proposals will be evaluated against the questions set out below:

1) How well does the management plan support all of the project requirements and logically lead to the deliverables required in the RFP?

2) How well is accountability completely and clearly defined?

3) Is the organization of the project team clear?

4) How well does the management plan illustrate the lines of authority and communication?

5) To what extent does the offeror already have the hardware, software, equipment, and licenses necessary to perform the contract?

6) Does it appear that the offeror can meet the schedule set out in the RFP?

7) Has the offeror gone beyond the minimum tasks necessary to meet the objectives of the RFP?

8) To what degree is the proposal practical and feasible?

9) To what extent has the offeror identified potential problems?

SEC. 5.08 CONTRACT COST (40%)

Overall, a minimum of 40% of the total evaluation points will be assigned to cost. After the procurement officer applies any applicable preferences, the offeror with the lowest total cost will receive the maximum number of points allocated to cost per 2 AAC 12.260(c). The point allocations for cost on the other proposals will be determined using the following formula:

[(Price of Lowest Cost Proposal) x (Maximum Points for Cost)] ÷ (Cost of Each Higher Priced Proposal).

Example (Max Points for Contract Cost = 40):

Step 1

List all proposal prices, adjusted where appropriate by the application of applicable preferences claimed by the offeror.

Offeror #1	$40,000
Offeror #2	$42,750
Offeror #3	$47,500

Step 2

In this example, the RFP allotted 40% of the available 100 points to cost. This means that the lowest cost will receive the maximum number of points.

Offeror #1 receives 40 points.

The reason they receive that amount is because the lowest cost proposal, in this case $40,000, receives the maximum number of points allocated to cost, 40 points.

Offeror #2 receives 37.43 points.

$40,000 lowest cost x 40 maximum points for cost = 1,600,000 ÷ $42,750 cost of Offeror #2's proposal = ***37.43***

Offeror #3 receives 33.68 points.

$40,000 lowest cost x 40 maximum points for cost = 1,600,000 ÷ $47,500 cost of Offeror #3's proposal = 33.68

SEC. 5.09 ALASKA OFFEROR PREFERENCE (10%)

Per 2 AAC 12.260, if an offeror qualifies for the Alaska Bidder Preference, the offeror will receive an Alaska Offeror Preference. The preference will be 10% of the total available points, which will be added to the offeror's overall evaluation score.

Example:

Step 1

Determine the number of points available to qualifying offerors under this preference:

100 Total Points Available in RFP x 10% Alaska Offeror preference = 10 Points for the preference.

Step 2

Determine which offerors qualify as Alaska bidders and thus, are eligible for the Alaska Offeror preference. For the purpose of this example, presume that all proposals have been completely evaluated based on the evaluation criteria in the RFP. The scores at this point are:

Offeror #1	83 points	No Preference	0 points
Offeror #2	74 points	Alaska Offeror Preference	10 points
Offeror #3	80 points	Alaska Offeror Preference	10 points

Step 3

Add the applicable Alaska Offeror preference amounts to the offerors' scores:

Offeror #1	83 points	
Offeror #2	84 points	(74 points + 10 points)
Offeror #3	**90 points**	**(80 points + 10 points)**

Offeror #3 is the highest scoring offeror and would get the award, provided their proposal is responsive and responsible.

SECTION 6. GENERAL PROCESS AND LEGAL INFORMATION

SEC. 6.01 INFORMAL DEBRIEFING

When the contract is completed, an informal debriefing may be performed at the discretion of the project manager or procurement officer. If performed, the scope of the debriefing will be limited to the work performed by the Contractor.

SEC. 6.02 ALASKA BUSINESS LICENSE AND OTHER REQUIRED LICENSES

Prior to the award of a contract, an offeror must hold a valid Alaska business license. However, in order to receive the Alaska Bidder Preference and other related preferences, such as the Alaska Veteran Preference and Alaska Offeror Preference, an offeror must hold a valid Alaska business license prior to the deadline for receipt of proposals. Offerors should contact the Department of Commerce, Community and Economic Development, Division of Corporations, Business, and Professional Licensing, PO Box 110806, Juneau, Alaska 99811-0806, for information on these licenses. Acceptable evidence that the offeror possesses a valid Alaska business license may consist of any one of the following:

- copy of an Alaska business license;
- certification on the proposal that the offeror has a valid Alaska business license and has included the license number in the proposal;
- a canceled check for the Alaska business license fee;
- a copy of the Alaska business license application with a receipt stamp from the State's occupational licensing office; or
- a sworn and notarized statement that the offeror has applied and paid for the Alaska business license.

You are not required to hold a valid Alaska business license at the time proposals are opened if you possess one of the following licenses and are offering services or supplies under that specific line of business:

- fisheries business licenses issued by Alaska Department of Revenue or Alaska Department of Fish and Game,
- liquor licenses issued by Alaska Department of Revenue for alcohol sales only,
- insurance licenses issued by Alaska Department of Commerce, Community and Economic Development, Division of Insurance, or
- Mining licenses issued by Alaska Department of Revenue.

Prior to the deadline for receipt of proposals, all offerors must hold any other necessary applicable professional licenses required by Alaska Statute.

SEC. 6.03 SITE INSPECTION

The State may conduct on-site visits to evaluate the offeror's capacity to perform the contract. An offeror must agree, at risk of being found non-responsive and having its proposal rejected, to provide the State reasonable access to relevant portions of its work sites. Individuals designated by the procurement officer at the State's expense will make site inspection.

SEC. 6.04 CLARIFICATION OF OFFERS

In order to determine if a proposal is reasonably susceptible for award, communications by the procurement officer or the proposal evaluation committee (PEC) are permitted with an offeror to clarify uncertainties or eliminate confusion concerning the contents of a proposal. Clarifications may not result in a material or substantive change to the proposal. The evaluation by the procurement officer or the PEC may be adjusted as a result of a clarification under this section.

SEC. 6.05 DISCUSSIONS WITH OFFERORS

The State may conduct discussions with offerors in accordance with AS 36.30.240 and 2 AAC 12.290. The purpose of these discussions will be to ensure full understanding of the requirements of the RFP and proposal. Discussions will be limited to specific sections of the RFP or proposal identified by the procurement officer. Discussions will only be held with offerors who have submitted a proposal deemed reasonably susceptible for award by the procurement officer. Discussions, if held, will be after initial evaluation of proposals by the procurement officer or the PEC. If modifications are made as a result of these discussions, they will be put in writing. Following discussions, the procurement officer may set a time for best and final proposal submissions from those offerors with whom discussions were held. Proposals may be reevaluated after receipt of best and final proposal submissions.

If an offeror does not submit a best and final proposal or a notice of withdrawal, the offeror's immediate previous proposal is considered the offeror's best and final proposal.

Offerors with a disability needing accommodation should contact the procurement officer prior to the date set for discussions so that reasonable accommodation can be made. Any oral modification of a proposal must be reduced to writing by the offeror.

SEC. 6.06 EVALUATION OF PROPOSALS

The procurement officer, or an evaluation committee made up of at least three State employees or public officials, will evaluate proposals. The evaluation will be based solely on the evaluation factors set out in SECTION 5. EVALUATION CRITERIA AND CONTRACTOR SELECTION.

After receipt of proposals, if there is a need for any substantial clarification or material change in the RFP, an amendment will be issued. The amendment will incorporate the clarification, or change, and a new date and time established for new or amended proposals. Evaluations may be adjusted as a result of receiving new or amended proposals.

SEC. 6.07 CONTRACT NEGOTIATION

After final evaluation, the procurement officer may negotiate with the offeror of the highest-ranked proposal. Negotiations, if held, shall be within the scope of the request for proposals and limited to those items which would not have an effect on the ranking of proposals. If the highest-ranked offeror fails to provide necessary information for negotiations in a timely manner, or fails to negotiate in good faith, the State may terminate negotiations and negotiate with the offeror of the next highest-ranked proposal. If contract negotiations commence, they will be held via teleconference. If the contract negotiations take place the procurement officer will provide a dial in teleconference number.

SEC. 6.08 FAILURE TO NEGOTIATE

If the selected offeror

- fails to provide the information required to begin negotiations in a timely manner; or
- fails to negotiate in good faith; or
- indicates they cannot perform the contract within the budgeted funds available for the project; or
- if the offeror and the State, after a good faith effort, simply cannot come to terms,

the State may terminate negotiations with the offeror initially selected and commence negotiations with the next highest ranked offeror.

SEC. 6.09 OFFEROR NOTIFICATION OF SELECTION

After the completion of contract negotiation, the procurement officer will issue a written Notice of Intent to Award and send copies of that notice to all offerors who submitted proposals. The notice will set out the names of all offerors and identify the offeror selected for the award.

SEC. 6.10 PROTEST

AS 36.30.560 provides that an interested party may protest the content of the RFP.

An interested party is defined in 2 AAC 12.990(a) (7) as "an actual or prospective bidder or offeror whose economic interest might be affected substantially and directly by the issuance of a contract solicitation, the award of a contract, or the failure to award a contract."

If an interested party wishes to protest the content of a solicitation, the protest must be received, in writing, by the procurement officer at least 10 days prior to the deadline for receipt of proposals.

AS 36.30.560 also provides that an interested party may protest the award of a contract or the proposed award of a contract.

If an offeror wishes to protest the award of a contract or the proposed award of a contract, the protest must be received, in writing, by the procurement officer within 10 days after the date the Notice of Intent to Award the contract is issued.

A protester must have submitted a proposal in order to have sufficient standing to protest the proposed award of a contract. Protests must include the following information:

- the name, address, and telephone number of the protester;
- the signature of the protester or the protester's representative;
- identification of the contracting agency and the solicitation or contract at issue;
- a detailed statement of the legal and factual grounds of the protest including copies of relevant documents; and the form of relief requested.

Protests filed by telex or telegram are not acceptable because they do not contain a signature. Fax copies containing a signature are acceptable.

The procurement officer will issue a written response to the protest. The response will set out the procurement officer's decision and contain the basis of the decision within the statutory time limit in AS 36.30.580. A copy of the decision will be furnished to the protester by certified mail, fax or another method that provides evidence of receipt.

All offerors will be notified of any protest. The review of protests, decisions of the procurement officer, appeals, and hearings, will be conducted in accordance with the State Procurement Code (AS 36.30), Article 8 "Legal and Contractual Remedies."

SEC. 6.11 APPLICATION OF PREFERENCES

Certain preferences apply to all State contracts, regardless of their dollar value. The Alaska Bidder, Alaska Veteran, and Alaska Offeror preferences are the most common preferences involved in the RFP process. Additional preferences that may apply to this procurement are listed below. Guides that contain excerpts from the relevant statutes and codes, explain when the preferences apply and provide examples of how to calculate the preferences are available at the following website: Application Of Preferences.

- Alaska Products Preference - AS 36.30.332
- Recycled Products Preference - AS 36.30.337
- Local Agriculture and Fisheries Products Preference - AS 36.15.050
- Employment Program Preference - AS 36.30.321(b)
- Alaskans with Disabilities Preference - AS 36.30.321(d)
- Alaska Veteran's Preference - AS 36.30.321(f)

The Division of Vocational Rehabilitation in the Department of Labor and Workforce Development keeps a list of qualified employment programs and individuals who qualify as persons with a disability. As evidence of a business' or an individual's right to the Employment Program or Alaskans with Disabilities preferences, the Division of Vocational Rehabilitation will issue a certification letter. To take advantage of these preferences, a business or individual must be on the appropriate Division of Vocational Rehabilitation list prior to the time designated for receipt of proposals. Offerors must attach a copy of their certification letter to the proposal. **An offeror's failure to provide this certification letter with their proposal will cause the State to disallow the preference.**

SEC. 6.12 ALASKA BIDDER PREFERENCE

An Alaska Bidder Preference of 5% will be applied to the price in the proposal. The preference will be given to an offeror who:

1) holds a current Alaska business license prior to the deadline for receipt of proposals;

2) submits a proposal for goods or services under the name appearing on the offeror's current Alaska business license;

3) has maintained a place of business within the state staffed by the offeror, or an employee of the offeror, for a period of six months immediately preceding the date of the proposal;

4) is incorporated or qualified to do business under the laws of the state, is a sole proprietorship and the proprietor is a resident of the state, is a Limited Liability Company (LLC) organized under AS 10.50 and all members are residents of the state, or is a partnership under AS 32.06 or AS 32.11 and all partners are residents of the state; and

5) if a joint venture, is composed entirely of ventures that qualify under (1)-(4) of this subsection.

Alaska Bidder Preference Certification Form

In order to receive the Alaska Bidder Preference, the proposal must include the Alaska Bidder Preference Certification Form attached to this RFP. An offeror does not need to complete the Alaska Veteran Preference questions on the form if not claiming the Alaska Veteran Preference. An offeror's failure to provide this completed form with their proposal will cause the State to disallow the preference.

SEC. 6.13 ALASKA VETERAN PREFERENCE

An Alaska Veteran Preference of 5%, not to exceed $5,000.00, will be applied to the price in the proposal. The preference will be given to an offeror who qualifies under AS 36.30.990(2) as an Alaska bidder and is a:

A. sole proprietorship owned by an Alaska veteran;

B. partnership under AS 32.06 or AS 32.11 if a majority of the partners are Alaska veterans;

C. limited liability company organized under AS 10.50 if a majority of the members are Alaska veterans; or

D. corporation that is wholly owned by individuals, and a majority of the individuals are Alaska veterans.

In accordance with AS 36.30.321(i), the bidder must also add value by actually performing, controlling, managing, and supervising the services provided, or for supplies, the bidder must have sold supplies of the general nature solicited to other state agencies, other government, or the general public.

Alaska Veteran Preference Certification

In order to receive the Alaska Veteran Preference, the proposal must include the Alaska Bidder Preference Certification Form attached to this RFP. An offeror's failure to provide this completed form with their proposal will cause the State to disallow the preference.

SEC. 6.14 STANDARD CONTRACT PROVISIONS

The Contractor will be required to sign and submit the State's Standard Agreement Form for Professional Services Contracts (form SAF.DOC/Appendix A). This form is attached with the RFP for your review. The Contractor must comply with the contract provisions set out in this attachment. No alteration of these provisions will be permitted without prior written approval from the Department of Law, and the State reserves the right to reject a proposal that is non-compliant or takes exception with the contract terms and conditions stated in the Agreement. Any requests to change language in this document (adjust, modify, add, delete, etc.), must be set out in the offeror's proposal in a separate document. Please include the following information with any change that you are proposing:

1) Identify the provision that the offeror takes exception to.

2) Identify why the provision is unjust, unreasonable, etc.

3) Identify exactly what suggested changes should be made.

SEC. 6.15 QUALIFIED OFFERORS

Per 2 AAC 12.875, unless provided for otherwise in the RFP, to qualify as an offeror for award of a contract issued under AS 36.30, the offeror must:

1) Add value in the contract by actually performing, controlling, managing, or supervising the services to be provided; or

2) Be in the business of selling and have actually sold on a regular basis the supplies that are the subject of the RFP.

If the offeror leases services or supplies or acts as a broker or agency in providing the services or supplies in order to meet these requirements, the procurement officer may not accept the offeror as a qualified offeror under AS 36.30.

SEC. 6.16 PROPOSAL AS PART OF THE CONTRACT

Part of or all of this RFP and the successful proposal may be incorporated into the contract.

SEC. 6.17 ADDITIONAL TERMS AND CONDITIONS

The State reserves the right to add terms and conditions during contract negotiations. These terms and conditions will be within the scope of the RFP and will not affect the proposal evaluations.

SEC. 6.18 HUMAN TRAFFICKING

By signature on their proposal, the offeror certifies that the offeror is not established and headquartered or incorporated and headquartered in a country recognized as Tier 3 in the most recent United States Department of State's Trafficking in Persons Report.

The most recent United States Department of State's Trafficking in Persons Report can be found at the following website: https://www.state.gov/trafficking-in-persons-report/

Failure to comply with this requirement will cause the State to reject the proposal as non-responsive or cancel the contract.

SEC. 6.19 RIGHT OF REJECTION

Offerors must comply with all of the terms of the RFP, the State Procurement Code (AS 36.30), and all applicable federal, state, and local laws, codes, and regulations. The procurement officer may reject any proposal that does not comply with all of the material and substantial terms, conditions, and performance requirements of the RFP.

Offerors may not qualify the proposal nor restrict the rights of the State. If an offeror does so, the procurement officer may determine the proposal to be a non-responsive counteroffer and the proposal may be rejected.

Minor informalities that:

- do not affect responsiveness;
- are merely a matter of form or format;
- do not change the relative standing or otherwise prejudice other offers;
- do not change the meaning or scope of the RFP;
- are trivial, negligible, or immaterial in nature;
- do not reflect a material change in the work; or
- do not constitute a substantial reservation against a requirement or provision;

may be waived by the procurement officer.

The State reserves the right to refrain from making an award if it determines that it is not in the best interest of the State.

A proposal from a debarred or suspended offeror shall be rejected.

SEC. 6.20 STATE NOT RESPONSIBLE FOR PREPARATION COSTS

The State will not pay any cost associated with the preparation, submittal, presentation, or evaluation of any proposal.

SEC. 6.21 DISCLOSURE OF PROPOSAL CONTENTS

All proposals and other material submitted become the property of the State of Alaska and may be returned only at the State's option. AS 40.25.110 requires public records to be open to reasonable inspection. All proposal information, including detailed price and cost information, will be held in confidence during the evaluation process and prior to the time a Notice of Intent to Award is issued. Thereafter, proposals will become public information.

The Office of Procurement and Property Management (OPPM), or their designee recognizes that some information an offeror submits might be confidential under the United States or the State of Alaska Constitution, a federal statute or regulation, or a State of Alaska statute: i.e., might be Confidential Business Information (CBI). *See, e.g.*, article 1, section 1 of the Alaska Constitution; AS 45.50.910 – 45.50.945 (the Alaska Uniform Trade Secrets Act); *DNR v. Arctic Slope Regional Corp.,* 834 P.2d 134, 137-39 (Alaska 1991). For OPPM or their designee to treat information an offeror submits with its proposal as CBI, the offeror must do the following when submitting their proposal: (1) mark the specific information it asserts is CBI; and (2) for each discrete set of such information, identify, in writing, each authority the offeror asserts make the information CBI. If the offeror does not do these things, the information will become public after the Notice of Intent to Award is issued. If the offeror does these things, OPPM or their designee will evaluate the offeror's assertion upon receiving a request for the information. If OPPM or their designee rejects the assertion, they will, to the extent permitted by federal and State of Alaska law, undertake reasonable measures to give the offeror an opportunity to object to the disclosure of the information.

SEC. 6.22 ASSIGNMENT

Per 2 AAC 12.480, the Contractor may not transfer or assign any portion of the contract without prior written approval from the procurement officer.

SEC. 6.23 DISPUTES

A contract resulting from this RFP is governed by the laws of the State of Alaska. If the Contractor has a claim arising in connection with the agreement that it cannot resolve with the State by mutual agreement, it shall pursue the claim, if at all, in accordance with the provisions of AS 36.30.620 – AS 36.30.632. To the extent not otherwise governed by the preceding, the claim shall be brought only in the Superior Court of the State of Alaska and not elsewhere.

SEC. 6.24 SEVERABILITY

If any provision of the contract or agreement is declared by a court to be illegal or in conflict with any law, the validity of the remaining terms and provisions will not be affected; and the rights and obligations of the parties will be construed and enforced as if the contract did not contain the particular provision held to be invalid.

SEC. 6.25 SUPPLEMENTAL TERMS AND CONDITIONS

Proposals must comply with Section 6.19 Right of Rejection. However, if the State fails to identify or detect supplemental terms or conditions that conflict with those contained in this RFP or that diminish the State's rights under any contract resulting from the RFP, the term(s) or condition(s) will be considered null and void. After award of contract:

If conflict arises between a supplemental term or condition included in the proposal and a term or condition of the RFP, the term or condition of the RFP will prevail; and

If the State's rights would be diminished as a result of application of a supplemental term or condition included in the proposal, the supplemental term or condition will be considered null and void.

SEC. 6.26 SOLICITATION ADVERTISING

Public notice has been provided in accordance with 2 AAC 12.220.

SEC. 6.27 FEDERALLY IMPOSED TARIFFS

Changes in price (increase or decrease) resulting directly from a new or updated federal tariff, excise tax, or duty, imposed after contract award may be adjusted during the contract period or before delivery into the United States via contract amendment.

- Notification of Changes: The Contractor must promptly notify the procurement officer in writing of any new, increased, or decreased federal excise tax or duty that may result in either an increase or decrease in the contact price and shall take appropriate action as directed by the procurement officer.
- After-imposed or Increased Taxes and Duties: Any federal excise tax or duty for goods or services covered by this contract that was exempted or excluded on the contract award date but later imposed on the Contractor during the contract period, as the result of legislative, judicial, or administrative action may result in a price increase provided:
    a) The tax or duty takes effect after the contract award date and isn’t otherwise addressed by the contract.
    b) The Contractor warrants, in writing, that no amount of the newly imposed federal excise tax or duty or rate increase was included in the contract price, as a contingency or otherwise.

- After-relieved or Decreased Taxes and Duties: The contract price shall be decreased by the amount of any decrease in federal excise tax or duty for goods or services under the contract, except social security or other employment taxes, that the Contractor is required to pay or bear, or does not obtain a refund of, through the Contractor's fault, negligence, or failure to follow instructions of the procurement officer.
- State's Ability to Make Changes: The State reserves the right to request verification of federal excise tax or duty amounts on goods or services covered by this contract and increase or decrease the contract price accordingly.
- Price Change Threshold: No adjustment shall be made in the contract price under this clause unless the amount of the adjustment exceeds $250.

SECTION 7. ATTACHMENTS

SEC. 7.01 ATTACHMENTS

Attachments:

1) Standard Agreement Form for Professional Services with Appendix A – General Provisions;
2) Certification of Entitlement to the Alaska Bidder Preference;
3) Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion;
4) Cost Proposal.
5) Background Information Attachment 5 – SOA DNR ILFP Prospectus (19 pages);
6) Background Information Attachment 6 – Compensation Planning Framework (193 pages);
7) Background Information Attachment 7 – Prioritization Strategy for Compensatory Mitigation Site Selection 2021 (51 pages).

ATTACHMENT 1

STANDARD AGREEMENT FORM FOR PROFESSIONAL SERVICES

The parties' contract comprises this Standard Agreement Form, as well as its referenced Articles and their associated Appendices

1. Agency Contract Number	2. Contract Title	3. Agency Fund Code	4. Agency Appropriation Code
5. Vendor Number	6. IRIS GAE Number (if used)	7. Alaska Business License Number	

This contract is between the State of Alaska,

8. Department of	Division	hereafter the State, and
9. Contractor		hereafter the Contractor
Mailing Address Street or P.O. Box	City	State ZIP+4

10. **Article 1. Appendices:**

Appendices referred to in this contract and attached to it are considered part of it.

Article 2. Performance of Service:

2.1 Appendix A (General Provisions), Articles 1 through 16, governs the performance of services under this contract.

2.2 Appendix B sets forth the liability and insurance provisions of this contract.

2.3 Appendix C sets forth the services to be performed by the Contractor.

Article 3. Period of Performance:

The period of performance for this contract begins _____, and ends _____.

Article 4. Considerations:

4.1 In full consideration of the Contractor's performance under this contract, the State shall pay the Contractor a sum not to exceed $_____ in accordance with the provisions of Appendix D.

4.2 When billing the State, the Contractor shall refer to the Authority Number or the Agency Contract Number and send the billing to:

11. Department of	Attention: Division of
Mailing Address	Attention:

12. CONTRACTOR		14. **CERTIFICATION:** I certify that the facts herein and on supporting documents are correct, that this voucher constitutes a legal charge against funds and appropriations cited, that sufficient funds are encumbered to pay this obligation, or that there is a sufficient balance in the appropriation cited to cover this obligation. I am aware that to knowingly make or allow false entries or alternations on a public record, or knowingly destroy, mutilate, suppress, conceal, remove or otherwise impair the verity, legibility or availability of a public record constitutes tampering with public records punishable under AS 11.56.815-.820. Other disciplinary action may be taken up to and including dismissal.	
Name of Firm			
Signature of Authorized Representative	Date		
Typed or Printed Name of Authorized Representative			
Title			
13. CONTRACTING AGENCY		Signature of Head of Contracting Agency or Designee	Date
Department/Division	Date		
Signature of Project Manager		Typed or Printed Name	
Typed or Printed Name of Project Manager		Title	
Title			

NOTICE: This contract has no effect until signed by the head of contracting agency or designee.

APPENDIX A
GENERAL PROVISIONS

Article 1. Definitions

1.1 In this contract and appendices, "Project Manager" or "Agency Head" or "Procurement Officer" means the person who signs this contract on behalf of the Requesting Agency and includes a successor or authorized representative.

1.2 "State Contracting Agency" means the department for which this contract is to be performed and for which the Commissioner or Authorized Designee acted in signing this contract.

Article 2. Inspections and Reports

2.1 The department may inspect, in the manner and at reasonable times it considers appropriate, all the Contractor's facilities and activities under this contract.

2.2 The Contractor shall make progress and other reports in the manner and at the times the department reasonably requires.

Article 3. Disputes

3.1 If the Contractor has a claim arising in connection with the contract that it cannot resolve with the State by mutual agreement, it shall pursue the claim, if at all, in accordance with the provisions of AS 36.30.620 – 632.

Article 4. Equal Employment Opportunity

4.1 The Contractor may not discriminate against any employee or applicant for employment because of race, religion, color, national origin, or because of age, disability, sex, marital status, changes in marital status, pregnancy, or parenthood when the reasonable demands of the position(s) do not require distinction on the basis of age, disability, sex, marital status, changes in marital status, pregnancy, or parenthood. The Contractor shall take affirmative action to ensure that the applicants are considered for employment and that employees are treated during employment without unlawful regard to their race, color, religion, national origin, ancestry, disability, age, sex, marital status, changes in marital status, pregnancy, or parenthood. This action must include, but need not be limited to, the following: employment, upgrading, demotion, transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training including apprenticeship. The Contractor shall post in conspicuous places, available to employees and applicants for employment, notices setting out the provisions of this paragraph.

4.2 The Contractor shall state, in all solicitations or advertisements for employees to work on State of Alaska contract jobs, that it is an equal opportunity employer and that all qualified applicants will receive consideration for employment without regard to race, religion, color, national origin, age, disability, sex, marital status, changes in marital status, pregnancy, or parenthood.

4.3 The Contractor shall send to each labor union or representative of workers with which the Contractor has a collective bargaining agreement or other contract or understanding a notice advising the labor union or workers' compensation representative of the Contractor's commitments under this article and post copies of the notice in conspicuous places available to all employees and applicants for employment.

4.4 The Contractor shall include the provisions of this article in every contract and shall require the inclusion of these provisions in every contract entered into by any of its subcontractors, so that those provisions will be binding upon each subcontractor. For the purpose of including those provisions in any contract or subcontract, as required by this contract, “Contractor” and “subcontractor” may be changed to reflect appropriately the name or designation of the parties of the contract or subcontract.

4.5 The Contractor shall cooperate fully with State efforts which seek to deal with the problem of unlawful discrimination, and with all other State efforts to guarantee fair employment practices under this contract, and promptly comply with all requests and directions from the State Commission for Human Rights or any of its officers or agents relating to prevention of discriminatory employment practices.

4.6 Full cooperation in paragraph 4.5 includes, but is not limited to, being a witness in any proceeding involving questions of unlawful discrimination if that is requested by any official or agency of the State of Alaska; permitting employees of the Contractor to be witnesses or complainants in any proceeding involving questions of unlawful discrimination, if that is requested by any official or agency of the State of Alaska; participating in meetings; submitting periodic reports on the equal employment aspects of present and future employment; assisting inspection of the Contractor's facilities; and promptly complying with all State directives considered essential by any office or agency of the State of Alaska to ensure compliance with all federal and state laws, regulations, and policies pertaining to the prevention of discriminatory employment practices.

4.7 Failure to perform under this article constitutes a material breach of contract.

Article 5. Termination

The Project Manager, by written notice, may terminate this contract, in whole or in part, when it is in the best interest of the State. In the absence of a breach of contract by the Contractor, the State is liable only for payment in accordance with the payment provisions of this contract for services rendered before the effective date of termination.

Article 6. No Assignment or Delegation

The Contractor may not assign or delegate this contract, or any part of it, or any right to any of the money to be paid under it, except with the written consent of the Project Manager and the Agency Head.

Article 7. No Additional Work or Material

No claim for additional services, not specifically provided in this contract, performed, or furnished by the Contractor, will be allowed, nor may the Contractor do any work or furnish any material not covered by the contract unless the work or material is ordered in writing by the Project Manager and approved by the Agency Head.

Article 8. Independent Contractor

The Contractor and any agents and employees of the Contractor act in an independent capacity and are not officers or employees or agents of the State in the performance of this contract.

Article 9. Payment of Taxes

As a condition of performance of this contract, the Contractor shall pay all federal, state, and local taxes incurred by the Contractor and shall require their payment by any subcontractor or any other persons in the performance of this contract. Satisfactory performance of this paragraph is a condition precedent to payment by the State under this contract.

Article 10. Ownership of Documents

All designs, drawings, specifications, notes, artwork, and other work developed in the performance of this agreement are produced for hire and remain the sole property of the State of Alaska and may be used by the State for any other purpose without additional compensation to the Contractor. The Contractor agrees not to assert any rights and not to establish any claim under the design patent or copyright laws. Nevertheless, if the Contractor does mark such documents with a statement suggesting they are trademarked, copyrighted, or otherwise protected against the State's unencumbered use or distribution, the Contractor agrees that this paragraph supersedes any such statement and renders it void. The Contractor, for a period of three years after final payment under this contract, agrees to furnish and provide access to all retained materials at the request of the Project Manager. Unless otherwise directed by the Project Manager, the Contractor may retain copies of all the materials.

Article 11. Governing Law; Forum Selection

This contract is governed by the laws of the State of Alaska. To the extent not otherwise governed by Article 3 of this Appendix, any claim concerning this contract shall be brought only in the Superior Court of the State of Alaska and not elsewhere.

Article 12. Conflicting Provisions

Unless specifically amended and approved by the Department of Law, the terms of this contract supersede any provisions the Contractor may seek to add. The Contractor may not add additional or different terms to this contract; AS 45.02.207(b)(1). The Contractor specifically acknowledges and agrees that, among other things, provisions in any documents it seeks to append hereto that purport to (1) waive the State of Alaska's sovereign immunity, (2) impose indemnification obligations on the State of Alaska, or (3) limit liability of the Contractor for acts of Contractor negligence, are expressly superseded by this contract and are void.

Article 13. Officials Not to Benefit

The Contractor must comply with all applicable federal or state laws regulating ethical conduct of public officers and employees.

Article 14. Covenant Against Contingent Fees:

The Contractor warrants that no person or agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage or contingent fee except employees or agencies maintained by the Contractor for the purpose of securing business. For the breach or violation of this warranty, the State may terminate this contract without liability or in its discretion deduct from the contract price or consideration the full amount of the commission, percentage, brokerage, or contingent fee.

Article 15. Compliance:

In the performance of this contract, the Contractor must comply with all applicable federal, state, and borough regulations, codes, and laws, and be liable for all required insurance, licenses, permits and bonds.

Article 16. Force Majeure:

The parties to this contract are not liable for the consequences of any failure to perform, or default in performing, any of their obligations under this Agreement, if that failure or default is caused by any unforeseeable Force Majeure, beyond the control of, and without the fault or negligence of, the respective party. For the purposes of this Agreement, Force Majeure will mean war (whether declared or not); revolution; invasion; insurrection; riot; civil commotion; sabotage; military or usurped power; lightning; explosion; fire; storm; drought; flood; earthquake; epidemic; quarantine; strikes; acts or restraints of governmental authorities affecting the project or directly or indirectly prohibiting or restricting the furnishing or use of materials or labor required; inability to secure materials, machinery, equipment or labor because of priority, allocation or other regulations of any governmental authorities.

ATTACHMENT 2

CERTIFICATION OF ENTITLEMENT TO THE ALASKA BIDDER PREFERENCE

I am the offeror or a duly authorized agent of the offeror, and I certify that the offeror is entitled to the Alaska Bidder Preference. I know and understand that the Alaska Bidder Preference provides substantial benefits which could be favorable to the offeror, and which could affect the award of the Request for Proposals to the offeror's benefit. I am aware that falsely claiming the Alaska Bidder Preference is a violation of the State of Alaska Procurement Code (AS 36.30) and may be cause for felony prosecution and conviction.

I offer the following evidence or statements in support of my Certification of Entitlement to the Alaska Bidder Preference:

1. As of the deadline for receipt of the proposal, the offeror possesses a valid Alaska business license in any one of the following forms:

    - a copy of an Alaska business license;
    - certification on the proposal that the offeror has a valid Alaska business license and has included the license number in the proposal;
    - a canceled check for the Alaska business license fee;
    - a copy of the Alaska business license application with a receipt stamp from the State's occupational licensing office; *OR*
    - a sworn notarized affidavit that the offeror has applied and paid for the Alaska business license.

2. In addition to holding a current Alaska business license prior to the deadline for receipt of proposals, the offeror:

    (a) is submitting a proposal for goods or services under the name appearing on the offeror's current Alaska business license;

    (b) has maintained a place of business within the state staffed by the offeror, or an employee of the offeror, for a period of six months immediately preceding the date of the bid;

    (c) is incorporated or qualified to do business under the laws of the state, is a sole proprietorship, and the proprietor is a resident of the state, is a Limited Liability Company (LLC) organized under AS 10.50 and all members are residents of the state, or is a partnership under AS 32.06 or AS 32.11 and all partners are residents of the state*; AND*

    (d) if a joint venture, is composed entirely of ventures that qualify under items (a)-(c) of this subsection.

_____ _____

Signature of Offeror or Offeror's Authorized Agent Date

_____

Printed Name

ATTACHMENT 3

CERTIFICATION REGARDGING DEBARMENT, SUSPENSION, INELIGIBILITY, AND VOLUNTARY EXCLUSION LOWER TIER COVERED TRANSATCTIONS

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 29 CFR Part 98, Section 98.510, Participant's responsibilities. The regulations were published as Part VII of the May 26, 1988, Federal Register (pages 19160-19211).

(BEFORE COMPLETING CERTIFICATION, READ THE INSTRUCTIONS ON THE FOLLOWING PAGE WHICH ARE AN INTEGRAL PART OF THE CERTIFICATION)

The prospective recipient of federal assistance funds certifies, by submission of this bid, that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

Where the prospective recipient of federal assistance funds is unable to certify to any of the Statements in this certification, such prospective participant shall attach an explanation to this Proposal.

Name of Representative: _____.

Title of Representative: _____.

Signature: _____.

Date: _____.

1. Is this company enrolled in the Federal System for Awards Management (SAM)? YES NO

2. If Yes, please provide either the DUNS Number _____ or the Cage Code _____.

3. If No, the company must be enrolled in SAM before a contract can be signed or payment made on a contract involving federal funds. Failure to do so will result in cancellation of the contract.

INSTRUCTIONS FOR CERTIFICATION

1. By signing and submitting this Proposal, the prospective recipient of federal assistance funds is providing the certification as set out below.

2. The certification in this class is a material representation of the fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective recipient of federal assistance funds knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the Department of Labor (DOL) may pursue available remedies, including suspension and/or debarment.

3. The prospective recipient of federal assistance funds shall provide immediate written notice to the person to whom this Proposal is submitted if at any time the prospective recipient of federal assistance funds learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

4. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "Proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this Proposal is submitted for assistance in obtaining a copy of those regulations.

5. The prospective recipient of federal assistance funds agrees by submitting this Proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the DOL.

6. The prospective recipient of federal assistance funds further agrees by submitting this Proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may but is not required to check the List of Parties Excluded from Procurement or Non-procurement Programs.

8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the DOL may pursue available remedies, including suspension and/or debarment.

ATTACHMENT 4
COST PROPOSAL FORM

Offerors are to submit their cost using this Cost Proposal Form. Costs offered are to remain firm for the duration of the contract and are to include all costs associated with providing required services, including, but not limited to, direct and indirect costs, payroll, supplies, equipment, overhead, and profit. **The Average Hourly Rate shown on this form in table "6. Total – For Evaluation Purposes Only" is the cost that will be used for evaluation and award purposes**. Failure to complete and submit this Cost Proposal Form will result in rejection of the offer as being non-responsive.

As stated in this RFP, the quantities of goods and/or services are as needed. The State will only pay for actual goods and/or services provided. The amount of goods and/or services needed may vary based upon the actual needs of the State. The State does not guarantee a minimum or maximum amount of goods and/or services under any contract resulting from this RFP. **If services are required, hourly rates for listed years will be paid at the Hourly Rate shown on the offeror's Cost Proposal Form.**

Offerors must be aware this is a Request for Proposal process. Cost is only one of the factors that will be used to evaluate proposals submitted in response to this RFP. Other factors that will be evaluated are outlined in Section 5.

1. Year 1 – Approximately March 15, 2024 – March 31, 2025

ITEM	DESCRIPTION	Enter Hourly Rate
1.	Position #1 (Enter Title):	$_____
2.	Position #2 (Enter Title):	$_____
3.	Position #3 (Enter Title):	$_____
4.	Position #4 (Enter Title):	$_____
5.	Position #5 (Enter Title):	$_____
6.	Position #6 (Enter Title):	$_____

7.	Position #7 (Enter Title):	$_____
8.	Position #8 (Enter Title):	$_____
9.	Position #9 (Enter Title):	$_____
10.	Position #10 (Enter Title):	$_____
11.	Total Hourly Rates in Items (1) through (10) above for each Position entered:	$_____
12.	Total number of personnel in Items (1) through (10) above for which both a position title and hourly rate was entered:	(Enter Number of Positions) _____
13.	Divide Total Hourly Rate in Item (11) by the Number of Positions in Item (12) to calculate the Average Hourly Rate:	$_____

2. Year 2 – Approximately April 01, 2025 – March 31, 2026

ITEM	DESCRIPTION	Enter Hourly Rate
1.	Position #1 (Enter Title):	$_____
2.	Position #2 (Enter Title):	$_____
3.	Position #3 (Enter Title):	$_____
4.	Position #4 (Enter Title):	$_____
5.	Position #5 (Enter Title):	$_____
6.	Position #6 (Enter Title):	$_____

7.	Position #7 (Enter Title):	$_____
8.	Position #8 (Enter Title):	$_____
9.	Position #9 (Enter Title):	$_____
10.	Position #10 (Enter Title):	$_____
11.	Total Hourly Rates in Items (1) through (10) above for each Position entered:	$_____
12.	Total number of personnel in Items (1) through (10) above for which both a position title and hourly rate was entered:	(Enter Number of Positions) _____
13.	Divide Total Hourly Rate in Item (11) by the Number of Positions in Item (12) to calculate the Average Hourly Rate:	$_____

3. Year 3 – Approximately April 01, 2026 – March 31, 2027

ITEM	DESCRIPTION	Enter Hourly Rate
1.	Position #1 (Enter Title):	$_____
2.	Position #2 (Enter Title):	$_____
3.	Position #3 (Enter Title):	$_____
4.	Position #4 (Enter Title):	$_____
5.	Position #5 (Enter Title):	$_____
6.	Position #6 (Enter Title):	$_____

7.	Position #7 (Enter Title):	$_____
8.	Position #8 (Enter Title):	$_____
9.	Position #9 (Enter Title):	$_____
10.	Position #10 (Enter Title):	$_____
11.	Total Hourly Rates in Items (1) through (10) above for each Position entered:	$_____
12.	Total number of personnel in Items (1) through (10) above for which both a position title and hourly rate was entered:	(Enter Number of Positions) _____
13.	Divide Total Hourly Rate in Item (11) by the Number of Positions in Item (12) to calculate the Average Hourly Rate:	$_____

4. Year 4 – Approximately April 01, 2027 – March 31, 2028

ITEM	DESCRIPTION	Enter Hourly Rate
1.	Position #1 (Enter Title):	$_____
2.	Position #2 (Enter Title):	$_____
3.	Position #3 (Enter Title):	$_____
4.	Position #4 (Enter Title):	$_____
5.	Position #5 (Enter Title):	$_____
6.	Position #6 (Enter Title):	$_____

7.	Position #7 (Enter Title):	$_____
8.	Position #8 (Enter Title):	$_____
9.	Position #9 (Enter Title):	$_____
10.	Position #10 (Enter Title):	$_____
11.	Total Hourly Rates in Items (1) through (10) above for each Position entered:	$_____
12.	Total number of personnel in Items (1) through (10) above for which both a position title and hourly rate was entered:	(Enter Number of Positions) _____
13.	Divide Total Hourly Rate in Item (11) by the Number of Positions in Item (12) to calculate the Average Hourly Rate:	$_____

5. Year 5 – Approximately April 01, 2028 – March 31, 2029

ITEM	DESCRIPTION	Enter Hourly Rate
1.	Position #1 (Enter Title):	$_____
2.	Position #2 (Enter Title):	$_____
3.	Position #3 (Enter Title):	$_____
4.	Position #4 (Enter Title):	$_____
5.	Position #5 (Enter Title):	$_____
6.	Position #6 (Enter Title):	$_____

7.	Position #7 (Enter Title):	$_____
8.	Position #8 (Enter Title):	$_____
9.	Position #9 (Enter Title):	$_____
10.	Position #10 (Enter Title):	$_____
11.	Total Hourly Rates in Items (1) through (10) above for each Position entered:	$_____
12.	Total number of personnel in Items (1) through (10) above for which both a position title and hourly rate was entered:	(Enter Number of Positions) _____
13.	Divide Total Hourly Rate in Item (11) by the Number of Positions in Item (12) to calculate the Average Hourly Rate:	$_____

6. TOTAL – For Evaluation Purposes Only

ITEM	DESCRIPTION	Average Hourly Rate
1.	Add Item Lines 13 from Years 1 through 5:	$_____

7. OFFEROR CERTIFICATION:

Company Name:
Authorized Representative's Printed Name:
Authorized Representative's Signature:
Date Cost Proposal Signed:

8. PREFERENCE CERTIFICATION:

ITEM	QUESTION	YES	NO
1.	Does your company qualify for the Alaska Bidder's Preference?		
2.	Does your company qualify for the Alaska Veteran's Preference? If yes, provide a copy of your DD 214 with your service/social security number, date of birth, and other Privacy Act protected information redacted or "inked" out.		
3.	Does your company qualify for the Alaskans with Disabilities preference? If yes, you must provide a copy of your certification letter issued by the Division of Vocational Rehabilitation to receive this preference.		
4.	Does your company qualify for the Employment Program Preference? If yes, you must provide a copy of your certification letter issued by the Division of Vocational Rehabilitation to receive this preference.		

END OF COST PROPOSAL FORM

THE STATE of ALASKA
GOVERNOR MIKE DUNLEAVY

Department of Natural Resources

OFFICE OF THE COMMISSIONER

550 West 7th Avenue, Suite 1400
Anchorage, AK 99501-3561
Main: 907.269-8431
Fax: 907-269-8918

BACKGROUND INFORMATION ATTACHMENT 5

SOA DNR ILFP PROSPECTUS

September 3, 2021

Mr. Hobbie,

The State of Alaska (SOA), Department of Natural Resources (DNR) is submitting the attached Prospectus and Compensation Planning Framework (CPF) to establish a statewide in-lieu-fee program (ILFP) as required by Section 404 of the Clean Water Act. This IFLP would focus primarily on SOA owned resources to provide compensatory mitigation for unavoidable adverse impacts to waters of the United States.

This prospectus is being submitted under the Phase 1 - Preliminary Review (33 CFR §332.8(d)(3)). We look forward to working with you and your team moving forward. Please have your team reach out to me for any questions or future coordination.

Thank you,

Jeff Bruno

Jeff Bruno
Office of Project Management and Permitting
Program Coordinator
907-269-7476
jeff.bruno@alaska.gov

cc: *Corri Feige, DNR Commissioner*
Sara Longan, DNR Deputy Commissioner
Kyle Moselle, Executive Director, OPMP

STATE OF ALASKA
COMPENSATORY MITIGATION
IN-LIEU-FEE PROGRAM
PROSPECTUS

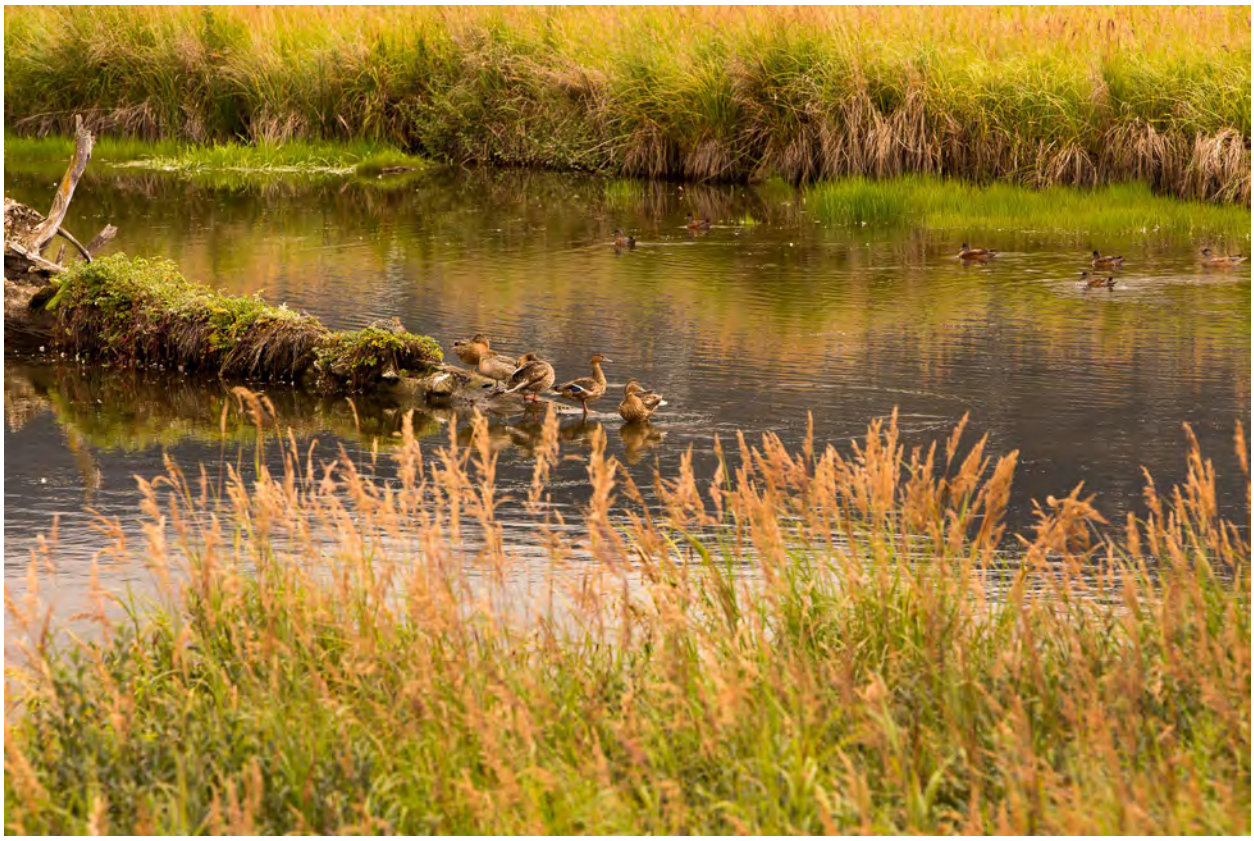

PHOTO CREDIT JIM RYPKEMA

ALASKA DEPARTMENT OF NATURAL RESOURSES
PROGRAM SPONSER

SEPTEMBER, 2021

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Acronyms

CFR	Code of Federal Regulations
CMP	Compensatory Mitigation Plan
CPF	Compensation Planning Framework
DE	District Engineer
DNR	Alaska Department of Natural Resources
HTL	High Tide Line
ILFP	In-Lieu Fee Program
IRT	Interagency Review Team
LME	Large Marine Ecosystems
NOAA	National Oceanic and Atmospheric Administration
SA	Service Area
SOA	State of Alaska
UNEP	United Nations Environmental Program
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFS	United State Forest Service
USGS	United States Geological Survey

I. Introduction and Program Overview

This in-lieu fee program (ILFP) will establish a statewide ILFP for the State of Alaska (SOA) to be established and administered by the Alaska Department of Natural Resources (DNR) in accordance with the United States Army Corps of Engineers (USACE) requirements under 33 Code of Federal Regulations (CFR) §332 ("Mitigation Rule"). This will be the first statewide ILFP to be administered by DNR in Alaska and will focus primarily on utilizing SOA owned resources and lands. This program will provide compensatory mitigation for unavoidable adverse impacts to waters of the United States, including wetlands and other aquatic resources, that result from activities authorized under Section 404 of the Clean Water Act.

Once DNR has completed the USACE's review process for the Prospectus, in consultation with the Interagency Review Team (IRT), the USACE will notify DNR that they can proceed with the development of a Draft ILFP Instrument for submission to USACE.

II. Objectives of the In-Lieu Fee Program (33 CFR §332.8(d)(2)(i))

Credits generated through this ILFP will sustain and/or improve aquatic resources throughout Alaska. As the largest land manager in the state besides the federal government (Figure 1), this ILFP will offer mainly State-owned resources in order to create new meaningful mitigation options for prospective permittees. Creation of restoration and enhancement opportunities on State-owned land will greatly increase the overall number of mitigation opportunities and resources available and their overall chances of success. Per requirements of the 2008 Mitigation Rule, this ILFP will protect aquatic resources, above and beyond any protections already planned or currently in place.

The primary goals of this ILFP is to restore, enhance, create, and preserve Alaska's aquatic resources and habitat to generate, offer, and sell credits that offset unavoidable wetland impacts as authorized under Section 404 of the Clean Water Act and to ensure that there are viable mitigation options throughout all regions of the state. Other goals include the following:

- Expand the geographic reach and effectiveness of resources, lands, and projects available for compensatory mitigation
- Identify and prioritize mitigation projects toward high-value aquatic resources and wildlife habitat that offset impacts as required to meet the compensatory mitigation obligations under Section 404 of the Clean Water Act
- Make SOA resources available for implementation of projects related to restoration, enhancement, and establishment of wetlands and other aquatic resources
- Reduce the extent of cumulative adverse impacts to aquatic resources in Alaska

- Preserve essential ecologically important aquatic resources and habitats that improve the overall ecological health and sustainability of a watershed
- Preserve, restore, and enhance aquatic resources that provide important wetland functions, including habitat for migratory birds, anadromous fish, and species of conservation concern
- Increase the types of aquatic resources available for compensatory mitigation within each Service Area (SA)
- Ensure that every Alaskan community will have resources available to mitigate community projects and needed infrastructure

III. In-Lieu Fee Program Establishment and Operation (33 CFR §332.8(d)(2)(ii))

Establishment

Inter-Agency Review Team

Upon submittal of the Prospectus, USACE will form an IRT that will advise USACE on establishment and management of the DNR SOA ILFP. The IRT will be comprised of USACE (Alaska District); United States Environmental Protection Agency (USEPA); United States Fish and Wildlife Service; and representatives from other federal, State, or local resource agencies that would have a substantive interest in the establishment and management of the DNR SOA ILFP. USACE may designate different representatives of these agencies and invite additional members to serve on the IRT for individual mitigation projects (33 CFR §332.8(b)).

In-Lieu Fee Program Instrument

This Prospectus initiates the process to develop an ILFP Instrument for the DNR SOA ILFP. This Instrument will be the legal document for the establishment, operation, and use of the ILFP. The Compensation Planning Framework (CPF; see Appendix A) was created in accordance with 33 CFR §332.8(c) and will also be included as part of the ILFP Instrument. The CPF will guide the site selection of projects to appropriately compensate for impacted aquatic resources. The draft Instrument will be developed following the process outlined in 33 CFR §332.8(d)(6), and the final Instrument will be approved by the District Engineer (DE) in consultation with the IRT.

Operation

Advance Credits

The number of advance credits available for each SA will be proposed in the draft Instrument in accordance with 33 CFR §332.8(d)(6)(iv)(B).

Upon approval of the DNR SOA ILFP, DNR will be permitted to sell advance credits. Once DNR has sold all the advance credits, no more advance credits may be sold until they have been fulfilled by an equivalent number of credits released in accordance with the approved credit release schedule outlined in the ILFP project-specific Compensatory Mitigation Plan (CMP). Once advance credits are fulfilled, they will be available to be sold again.

Sold advance credits will be fulfilled with released credits when milestones and performance standards in a project-specific CMP are achieved. Credit production and performance goal achievement will be detailed in each project-specific CMP, which will be approved by the DE in consultation with the IRT. Credit release schedules may vary between project-specific CMP monitoring timelines as well as between restoration, establishment, enhancement, and preservation actions.

DNR will complete land protection and initial physical and biological improvements for a project-specific CMP by the end of the third full growing season after the sale of the first advance credit in a SA. If DNR fails to meet the deadline, the DE will either (1) make a determination that more time is needed to plan and implement an in-lieu fee project or (2) direct DNR to disperse funds from the DNR SOA ILFP account to provide alternative compensatory mitigation to fulfill those compensation obligations.

Advance Credit Fees

The fee schedule for advance credits will be proposed in the draft Instrument in accordance with 33 CFR §332.8(d)(6)(iv)(B).

Fees for the DNR SOA ILFP will be determined by DNR and will be adjusted at their discretion to match current and projected costs. Fees will be based on a full cost accounting analysis of the expected costs associated with the restoration, establishment, enhancement, and/or preservation of aquatic resources in the SAs. Some of the program costs in this analysis may include land acquisition or appraised cost, project planning and design, construction, plant materials, labor, legal and real estate fees, monitoring, adaptive management measures, program implementation, contingency costs over the life of the project, establishment of a long-term management and protection fund, financial assurances, and administrative fees.

Project–Specific Compensatory Mitigation Plan

Each DNR SOA ILFP project will have a detailed project-specific CMP that will be reviewed by the DE in consultation with the IRT and will be added through amendment to the SOA DNR ILFP Instrument. Project-specific CMPs will be developed and implemented in accordance with 33 CFR §332.4(c)(2-14) and in consultation with the IRT. Project-specific CMPs will include a ledger connecting mitigation credits to the permits that provided funding to the ILFP. Project-specific CMPs will include the following elements:

1. Project
2. Objectives
3. Site selection factors
8. Maintenance plan
9. Performance standards
10. Monitoring requirements

4. Site protection instrument
5. Baseline information
6. Determination of credits
7. Mitigation work plan
11. Long-term management plan
12. Adaptive management plan
13. Financial assurances
14. Other information required by the DE

Aquatic resource delineations and functional assessments will be completed using USACE-approved methods and will be included in the project-specific CMPs to guide plan development and as a baseline for performance standards. DNR will be responsible for the implementation of project-specific CMPs under the DNR SOA ILFP, whether performed by DNR staff or others, and will report to USACE and the IRT on the work conducted programmatically. Legal responsibility for providing compensatory mitigation lies with the DNR, as the program sponsor, once a permittee secures credits from the DNR SOA ILFP. Monitoring reports will be submitted to USACE and the IRT as required by each project-specific CMP.

IV. Proposed Service Areas (33 CFR §332.8(d)(2)(iii))

The SOA has developed 11 distinct SAs under the ILFP (Figure 2). Combined, these SAs will cover the entire SOA, including submerged lands extending 3 miles offshore from the high tide line (HTL). Seven SAs comprise the terrestrial portions and four SAs comprise the marine portions of the SOA. The CPF will provide a general description of each SA, as well as the current condition of aquatic resources, historic losses and trends, threats, and goals and objectives for compensatory mitigation within each SA.

The 2008 Mitigation Rule defines a SA as "the watershed, ecoregion, physiographic province, and/or other geographic area within which the ILFP is authorized to provide compensatory mitigation credits" (33 CFR §332.8(d)). The SAs selected for inclusion in this CPF are based on a long-standing scientific consensus of areas with ecologically similar features.

The seven terrestrial SA boundaries generally follow the Level II ecoregions within the Ecoregion of Alaska mapping (Nowacki et al. 2001). This ecoregion mapping was developed by the United States Geological Survey (USGS) Alaska Science Center in cooperation with the United States Forest Service (USFS), the National Park Service, and The Nature Conservancy.

The boundaries of the marine SAs constitute Large Marine Ecosystems (LMEs) developed by the National Oceanic and Atmospheric Administration (NOAA) and described by the United Nations Environmental Program (UNEP 2009). The LME boundaries are based on four linked ecological criteria: (1) bathymetry, (2) hydrography, (3) productivity, and (4) trophic relationships.

The line separating the terrestrial and marine SAs will be delineated by the HTL. For tidally influenced rivers and streams, a line will be drawn across the mouth of the river to determine the appropriate SA of the credit- or debit-producing activity. This process will be done on a case-by-case basis. Estuarine wetlands extending landward of the HTL will be included in the appropriate terrestrial SA.

DNR's key considerations for delineating SAs include:

- SAs are defined in the 2008 Mitigation Rule as the watershed, ecoregion, physiographic province, and/or other geographic area within which the ILFP is authorized to provide compensatory mitigation required by USACE permits (33 CFR §332.8(d)(6)(ii)(A)).

- Alaska ecoregions use several characteristics to delineate their regional extent. These include hydraulic functions of a geographic region as well as physiography, geology, extent of glaciation and permafrost, and hydrology. The use of these concepts and variables is inherent in a watershed-based rationale, which is required by the 2008 Mitigation Rule.

- Ecoregions are developed by analyzing patterns within a given geographic area that correlate both physical and biological patterns. Ecoregions are not limited to watershed-based variables but do incorporate those variables into their delineations. Ecoregions consider numerous other factors that will help address the current and future needs of a given region and support the watershed-based approach for SA delineation and site selection.

- Ecoregions are critical tools for structuring and implementing ecosystem management strategies across federal agencies, State agencies, and nongovernmental organizations responsible for different types of resources within the same geographic areas (Omernik and Griffith 2014, McMahon et al. 2001).

- Ecoregions have been delineated using watershed characteristics and are integral to DNR's watershed approach to compensatory site selection, because they set the boundaries of where the prioritization and site selection can occur (more detailed discussion is included in the CPF; Appendix A).

- SAs must be appropriately sized to ensure that adequate aquatic resources are available to provide effective and meaningful compensation for adverse environmental impacts across the entire SA.

- SA sizes were selected to ensure that State-owned resources were available in each SA. Larger amounts of State-owned aquatic resources in a given SA create more opportunity for DNR's ILFP to offer a variety of mitigation options as required by USACE permits. When smaller SAs were reviewed, there was a strong potential to have limited to no State-owned resources in a given region. Because Alaska is primarily pristine and remote, the ILFP is required to have large SAs in order to find similar aquatic resources with impacts similar to those permitted by USACE. SAs smaller than what has been proposed would result in SA's with no State resources or limit the types of mitigation projects that could be proposed by this ILFP and would limit the types of impacts that could be mitigated.

- Portions of Alaska historically have limited compensatory mitigation needs; however, these areas also have the potential for resource development, community infrastructure, State infrastructure, and other development needs that may require compensatory mitigation (Figure 3). In general, these areas are remote, and the timing of these developments/impacts depends on a variety of factors, including but not limited to commodity prices for specific

resources (e.g., gold), infrastructure funding, population growth, safety considerations, access/travel constraints, available grants, and more. These factors have the potential to make it economically or logistically infeasible to establish a mitigation bank. Where these circumstances exist, DNR's ILFP will fulfill an important role in providing effective compensatory mitigation.

- Currently there is no statewide mitigation provider offering credits, which has left large portions of the state with no compensatory mitigation provider, resources, or options.

The process for selection of SAs involved consideration of all of the above factors. When DNR reviewed these key considerations, it was determined that the proposed configuration of SAs met the criteria laid out in the 2008 Mitigation Rule, allowed the greatest potential for a successful ILFP, and offered the most opportunity to offset a wide variety of aquatic resource impacts using State of Alaska resources.

First, DNR reviewed what was permissible under the 2008 Mitigation Rule. Considerations within the 2008 Mitigation Rule that most directly influenced this part of the analysis were that ecoregions were described as potential SAs and that SAs must use a watershed-based rationale to delineate SA boundaries (33 CFR §332.8(d)(6)(ii)(A)). In reviewing potential SAs, Alaska ecoregions were selected because they were developed and delineated using a variety of tools and analysis that are inherent in selection of SAs using a watershed-based rationale. The SAs based on ecoregions enable DNR's watershed approach to compensatory mitigation site selection to have the greatest positive impact on specific aquatic resource types and increases the ILFP's ability to offset impacts similar to those permitted by USACE. SAs provide the confines to which the DNR's watershed approach to compensatory mitigation site selection will operate, and are an integral part of the site selection process (more detailed discussion is included in the CPF; Appendix A).

Next, DNR reviewed statewide resources, historical mitigation needs (over both 3-year and 15-year time frames; Figure 4), planned or proposed projects that may require compensatory mitigation, and potential resource development and long-range plans for State and community development projects. Two facts became apparent: (1) compensatory mitigation has been required for projects throughout all regions of the state (Figure 4), and (2) there is a need for compensatory mitigation throughout all regions of the state (see Figure 3). One of DNR's main goals with the ILFP is to ensure statewide coverage. Upon review of this information, DNR acknowledges that several of these areas are remote and the instances when compensatory mitigation might be needed are speculative. These areas, as discussed above, are important to the State's program, as projects in these areas may require mitigation by USACE under Section 404, but it would not be economically or logistically feasible to develop a mitigation bank for a single project. A DNR ILFP will ensure that if USACE does require compensatory mitigation in one of these remote regions, there would be a provider available to mitigate for USACE Section 404 permitted impacts.

Finally, SAs were reviewed and modified to ensure that the types and amounts of State-owned aquatic resources within each SA were viable for the ILFP. Maximizing the presence of State-owned aquatic resources within each SA ensures that DNR has optimum potential for State-owned aquatic resources to offset impacts that are most closely associated with the permitted impact. It is also important to

maximize State-owned aquatic resources in each SA, considering that much of Alaska is pristine and undeveloped, which limits the aquatic resources that may be eligible for future mitigation projects. DNR also considered the fact that large portions of Alaska are owned by the federal government (large continuous tracks of land), which limits the ability to ensure that meaningful mitigation/resources are available using smaller SAs (e.g., some federal tracts of land encompass all or most of the smaller SAs reviewed). SAs, as proposed, maximize State resources within each SA, which in turn maximizes the ability of the DNR ILFP to find mitigation projects that offset permitted impacts yet still benefit the SA as a whole. Ecoregions are necessary tools when implementation of aquatic goals across multiple landowners and resources managers is considered, and they allow for more comprehensive analysis of SA needs and considerations when site selection occurs.

More detail on SA specific information and methodology can be found in the CPF (Appendix A).

V. General Need and Technical Feasibility (33 CFR §332.8(d)(2)(iv))

The purpose of this ILFP is to offset unavoidable impacts to waters of the United States authorized under Section 10 and Section 404 by providing credits from State-owned aquatic resources. To date, less than 1 percent of the State of Alaska is privately owned and, in most cases, the State and federal government have retained ownership of waterbodies, waterways, adjacent lands, and other aquatic resources below the ordinary high-water mark (e.g., rivers, creeks, and lakes). Considering that a majority of private land has focused on development of uplands for settlement purposes, even less than 1 percent of the aquatic resources within the State have been conveyed to the private sector. This has limited the market for viable mitigation projects on private lands. Without a statewide program that can utilize State-owned or federal lands/resources, options for mitigating a wide variety of aquatic resources are limited, especially in cases such as stream restoration. A DNR-operated statewide ILFP will enable a variety of new opportunities for compensatory mitigation that will include restoration, enhancement, establishment, or preservation of aquatic resources.

Development of Alaska's natural resources plays an important role in Alaska's past, present, and future. The State has a variety of large-scale projects currently being proposed throughout the state (more detailed discussion is included in the CPF; Appendix A) and as technologies improve and additional data are collected, new resource potential is continuously being discovered. Considering that Alaska is a young state with regard to infrastructure development, many of these proposed and potential projects are remote and off the road system, limiting the amount of mitigation opportunities available, especially with little to no State of federal resources available. A statewide ILFP, which focuses on projects using State-owned resources, will ensure that if USACE requires mitigation, there are viable options and resources for permittees in regions of the state where it is economically and logistically infeasible to set up a mitigation bank.

DNR has reviewed the previous projects throughout the state where USACE has required compensatory mitigation (Figure 4). Each SA has illustrated not only a historical need for compensatory mitigation, but also a need within the last 5 years. Additionally, proposed projects such as a large-diameter natural gas

pipeline from the North Slope to the Kenai Peninsula, the Pebble Project, SOA's Department of Transportation and Public Facilities Statewide Long-Range Transportation Plans, community development plans, and a variety of other infrastructure, resource development, and community projects have been identified throughout the state, including in remote areas where there are currently no mitigation banks or options. By making SOA resources available, this ILFP will offer potential mitigation options and resources in areas of the state that have limited or no viable resources on private lands.

DNR's ILFP will help ensure that there is coverage in remote areas (and communities) that cannot economically support mitigation banks but still have the potential to require mitigation. The 2008 Mitigation Rule recommends ILFPs for remote regions, like Alaska, where mitigation banks and permittee-responsible mitigation are not economically viable but still require mitigation (Preamble to the Mitigation Rule, pages 19599 and 19615). This ILFP will actively support a watershed approach to compensatory mitigation site selection through its prioritization strategy and will help advance the protection and restoration of aquatic resources by offsetting unavoidable permitted impacts, especially in remote areas where there are no mitigation banks/options. The CPF (Appendix A) includes the ILFP watershed-based prioritization strategy and provides a summary of the historic and current threats to the State's aquatic resources. This ILFP is set up to offset unavoidable impacts as required by the Clean Water Act and to ensure a sustainable and meaningful mitigation program in Alaska.

In summary, there is a general need for an ILFP of this nature, given the State of Alaska's historical mitigation needs statewide, the number of large-scale projects being proposed, the lack of aquatic resources currently available for mitigation projects, the current economic infeasibility of establishing speculative mitigation banks in remote areas of Alaska, the lack of statewide coverage for mitigation banks, and the flexibility required to efficiently address new and unforeseen development and mitigation needs.

VI. Ownership and Long-Term Management of the ILFP Project Sites (33 CFR §332.8(d)(2)(v))

DNR will provide USACE with a detailed CMP for each mitigation project that will include a Long-Term Protection and Management Plan. USACE will deliver the CMP to the appropriate IRT members for their consideration. Each project will be managed by DNR in accordance with an approved CMP.

Ownership

DNR will be the responsible party for ownership and long-term management responsibilities associated with each approved project. DNR may transfer the long-term management responsibilities associated with certain mitigation projects to a qualified third party. Qualifications will be determined on a project-by-project basis and will be subject to USACE approval. If approved, the responsible third party will be subject to carrying forward the responsibilities set forth by the Mitigation Rule; the project-specific CMP; and/or any applicable resource management plan, real estate plan, or other legal instrument.

Long-Term Management

Consistent with the Mitigation Rule, each CMP will include a Long-Term Protection and Management Plan describing the management of the project subsequent to achievement of the performance standards to ensure the long-term sustainability of the resource.

Each Long-Term Protection and Management Plan will address the following issues:

- **Responsible Party:** DNR will be the party responsible for ownership and all long-term protection and management of each mitigation project; however, upon approval from USACE, DNR may transfer project ownership or contract for long-term protection and management.

- **Long-Term Management Costs and Financing:** Each project will include a description of long-term management needs, with annual cost estimates and funding mechanisms that will be used to meet those needs. These may include SOA established programs, contractual agreements with future responsible parties, endowments, trusts, or other financial instruments/mechanisms. Each financial instrument/mechanism will need to be specified and approved by USACE.

As a public mitigation provider, DNR already holds title to the resources that will primarily be used for this ILFP (33 CFR §332.7(a)) and will provide a detailed long-term management and protection plan for each proposed mitigation site within the CMP (33 CFR §332.7(a)). DNR has a long history of managing lands and conservation/mitigation sites. Projects developed through this ILFP will be protected through a wide range of land protection mechanisms that satisfy ILFP requirements and result in long-term protection of aquatic resources. Regardless of the mechanism, DNR will restrict any uses or activities that are incompatible with a proposed mitigation site under this ILFP. DNR has a variety of tools at our disposal to use for this program including conservation easements, deed restrictions, site-specific management plans (i.e., inclusion into adjacent State Parks or Refuges), DNR Area Plans (e.g., these plans will restrict incompatible activities through land use designations [using primary or co-designations] and/or land classification) or federal facility management plan (33 CFR §332.7(a)). Long-term protection tools will be selected and utilized as appropriate for each mitigation project developed under this ILFP. Each mitigation project, including a long-term management plan, will need to be approved by USACE in consultation with the IRT.

DNR will propose a monitoring schedule after performance standards have been achieved in each long-term management plan. Monitoring schedules will vary depending on variability of resources, location, cost to monitor, and stakeholder feedback. These long-term activities will be paid for from the account described in Section VIII of this document (Accounting Procedures).

VII. Qualifications of the Program Sponsor (33 CFR §332.8(d)(2)(vi))

Alaska became a state in 1959 under the Alaska Statehood Act. As a result, the SOA was granted the right to fee title to slightly more than 105 million acres, including the rights to most of the aquatic

resources and subsurface rights. Alaska is the second largest land manager (the federal government is the first) in Alaska. Additionally, the SOA owns lands under navigable waters within federal conservation system units established after statehood. The total freshwater resources owned by the SOA equals approximately 40 percent of the entire nation's freshwater flow. The SOA holds fee title to more than 100 million acres and has the authority to manage lands in the best interest of the public. The SOA has the ability, authority, and expertise to utilize a multitude of tools for preservation, to authorize, permit and construct restoration and enhancement projects, and to manage aquatic resources and lands as required by this ILFP Instrument.

The SOA is unique in that this ILFP will not need to acquire the rights to aquatic resources or the authority to manage them. These lands and rights were given to the SOA by the federal government, and the SOA is recognized by the federal government as a governing body. The SOA has the responsibility to manage and conserve these resources in the best interest of the State.

The SOA is well versed in permitting; collaborating; designing; and, in some cases, constructing a wide variety of mitigation projects that require particular skill sets for successful completion. These projects include, but are not limited to, stream rehabilitation, reclamation of aquatic resources associated with mining and other resource development projects, culvert replacement, bank stabilization, preservation, and other restrictions on SOA land (e.g., Exxon Valdez Oil Spill, area plans, conservation easements, deed restrictions, land classification).

The SOA has a wide variety of disciplines at their disposal to help manage this ILFP, including (but not limited to) land managers, planners, biologists, hydrologists, appraisers, financial analysts, geographic information system experts, engineers, title experts, and more. Each project/credit will be unique and will require a specific combination of disciplines and resources to be evaluated and approved by USACE.

VIII. Accounting Procedures (33 CFR §332.8(i)(1-4))

Program Account (33 CFR §332.8(i)(1))

After approval of the ILFP Instrument, DNR will establish an interest-bearing account. All interest and earnings accruing in the ILFP account must remain in the account for use by the ILFP for the purposes of providing compensatory mitigation for USACE permits. Only funds from permittees will be deposited in the account.

Funds from this account will be used for work and services associated with DNR's ILFP. Activities will include, but are not limited to, site selection, acquisition of rights, design, project review and development, implementation of projects, program and project management and requirements, and administrative costs. Absent a method required by the Department of Defense or USACE, the DNR ILFP will use the same administration cost percentage that is approved annually in accordance with 2 CFR §225, which is the process established by the Department of Interior to ensure that responsible State administrative costs are justified, reviewed, and approved.

Disbursements (33 CFR §332.8(i)(2))

Disbursements from the ILFP account will be made only upon receipt of written authorization from the DE in consultation with the IRT. As required by 33 CFR §332.8(i)(2), DNR must submit proposed mitigation projects to the DE for funding approval. The DE has the authority to direct funds to alternative compensatory mitigation projects if DNR does not provide compensatory mitigation in accordance with the Mitigation Rule, the DNR SOA ILFP Instrument, or the time frame specified for advanced credits (3 years; 33 CFR §332.8 (n)(4)).

Reporting (33 CFR §332.8(i)(3))

Annual Reports will be submitted to the DE after the first credit is sold and will include:

1) A breakdown of all income received, disbursements, and interest earned in the ILFP account

2) A list of all permits for which the ILFP accepted funds that includes the USACE permit number, the SA for which the funds were accepted, the amount of authorized impacts, the amount of required compensatory mitigation, the amount paid to the ILFP, and the date the funds were received from the permittee

3) A description of ILFP expenditures from the account, including costs associated with land acquisition, planning, construction, monitoring, maintenance, contingencies, adaptive management, and administration

4) The balance of advance credits and released credits for each SA

Audits (33 CFR §332.8(i)(4))

The DE may audit accounting records pertaining to the program account. All books, accounts, reports, files, and other records relating to the ILFP account will be made available at reasonable times for inspection and audit by the DE.

IX. References

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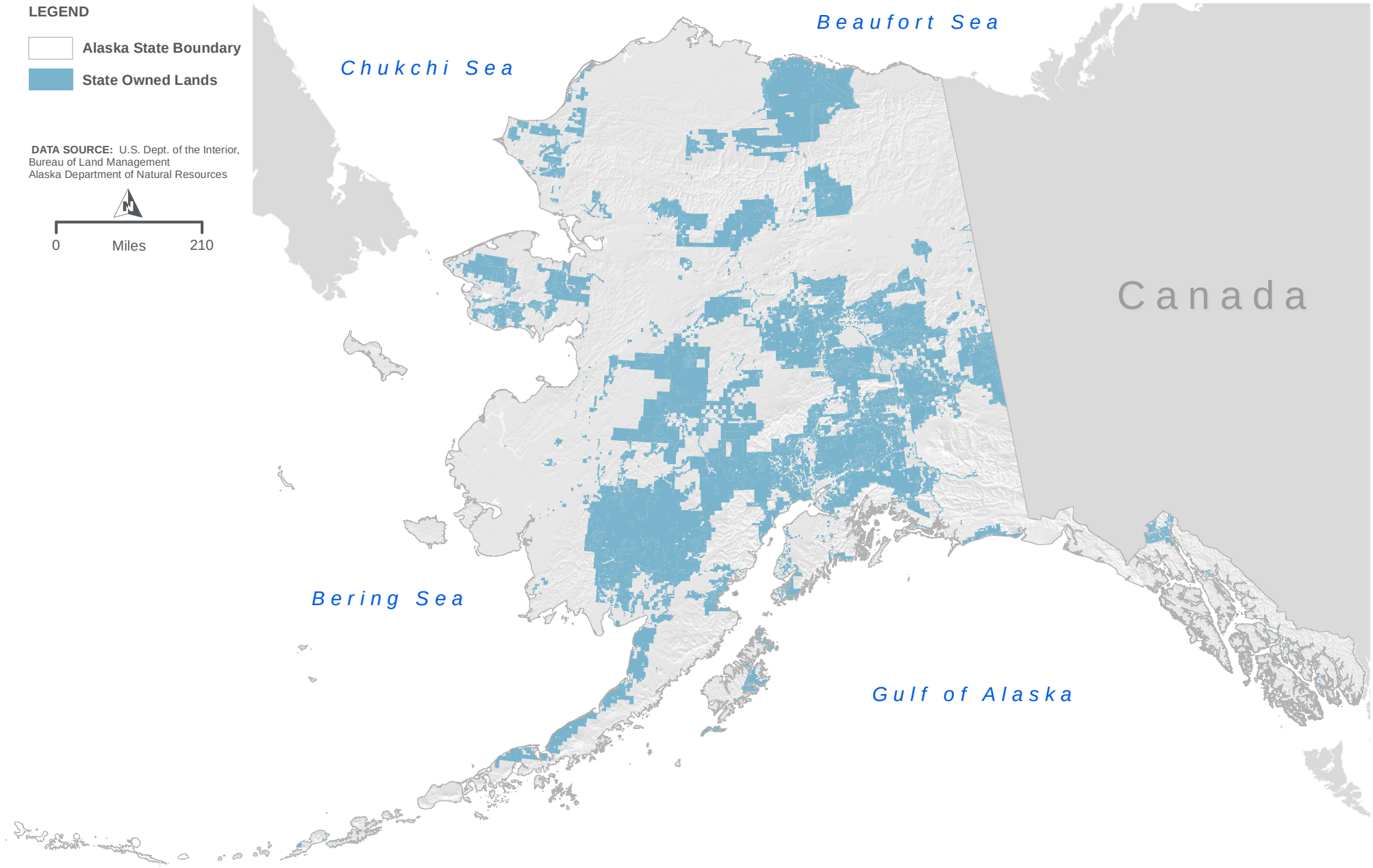


STATE OF ALASKA IN-LIEU FEE PROGRAM

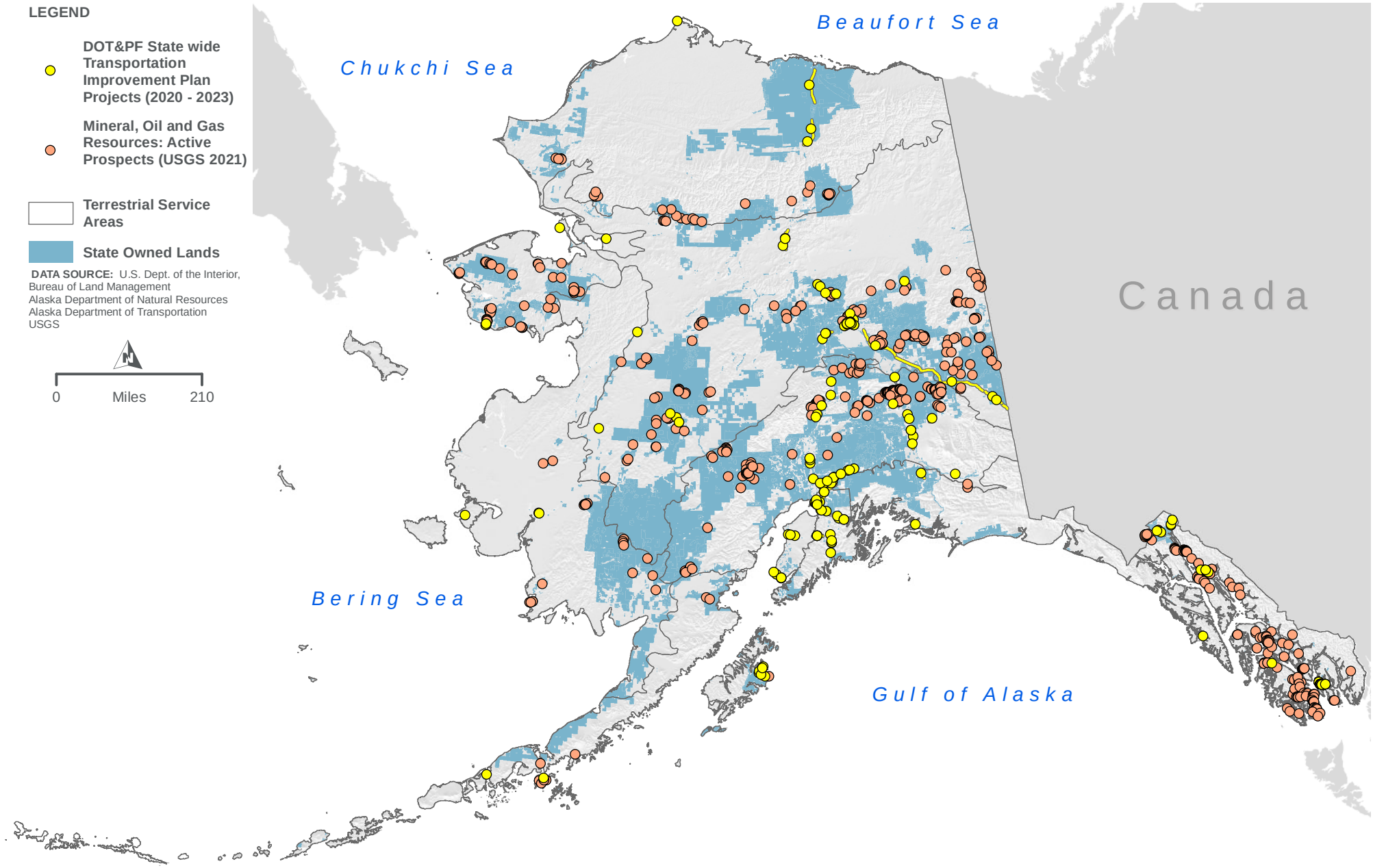
STATE OF ALASKA OWNERSHIP

FIGURE 1

STATE OF ALASKA IN-LIEU FEE PROGRAM

PROPOSED SERVICE AREAS

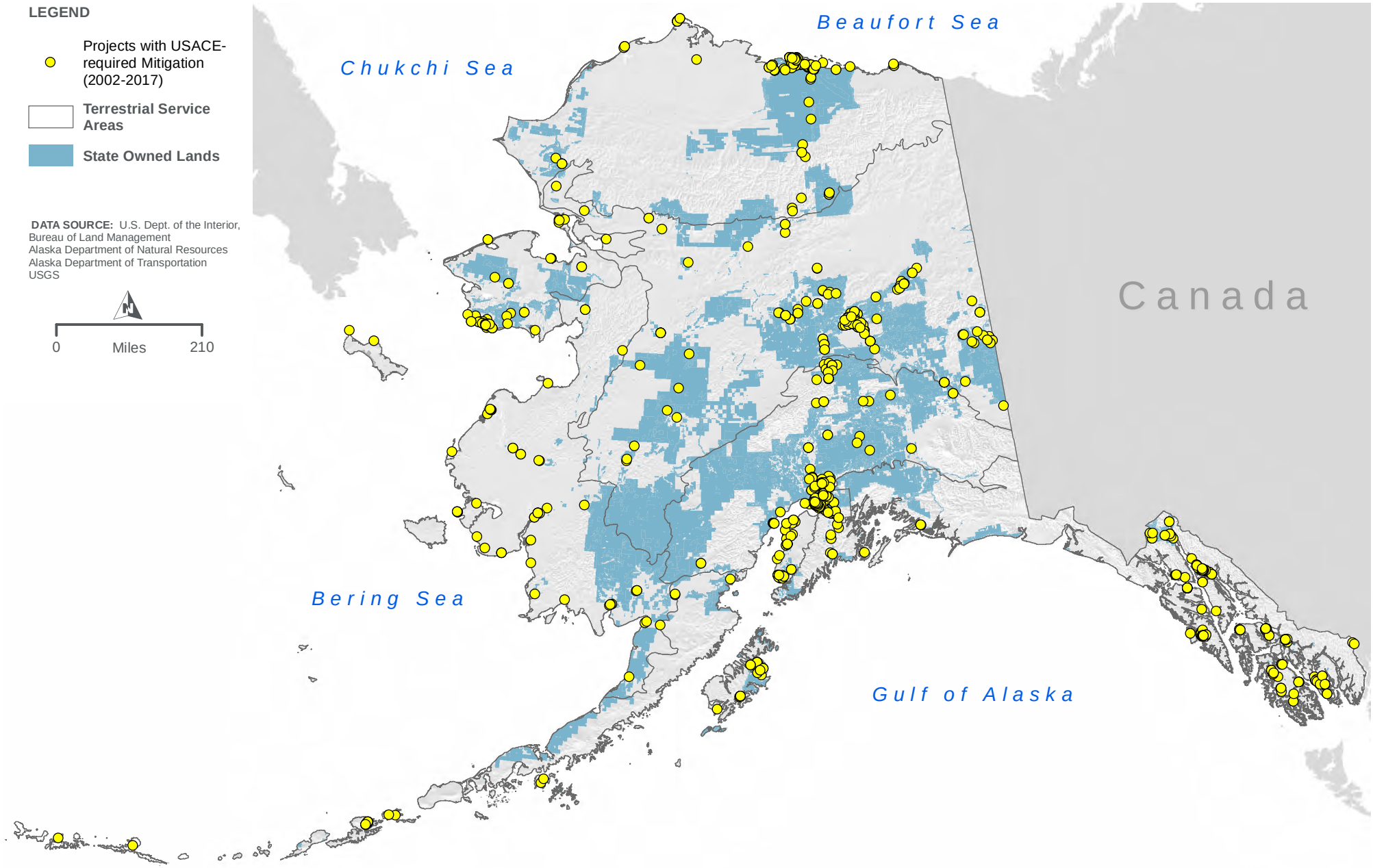
FIGURE 2



STATE OF ALASKA IN-LIEU FEE PROGRAM

POTENTIAL PROJECTS, SERVICE AREAS, AND STATE OF ALASKA OWNERSHIP

FIGURE 3



STATE OF ALASKA IN-LIEU FEE PROGRAM

PROJECTS REQUIRING MITIGATION 2002-2017

FIGURE 4

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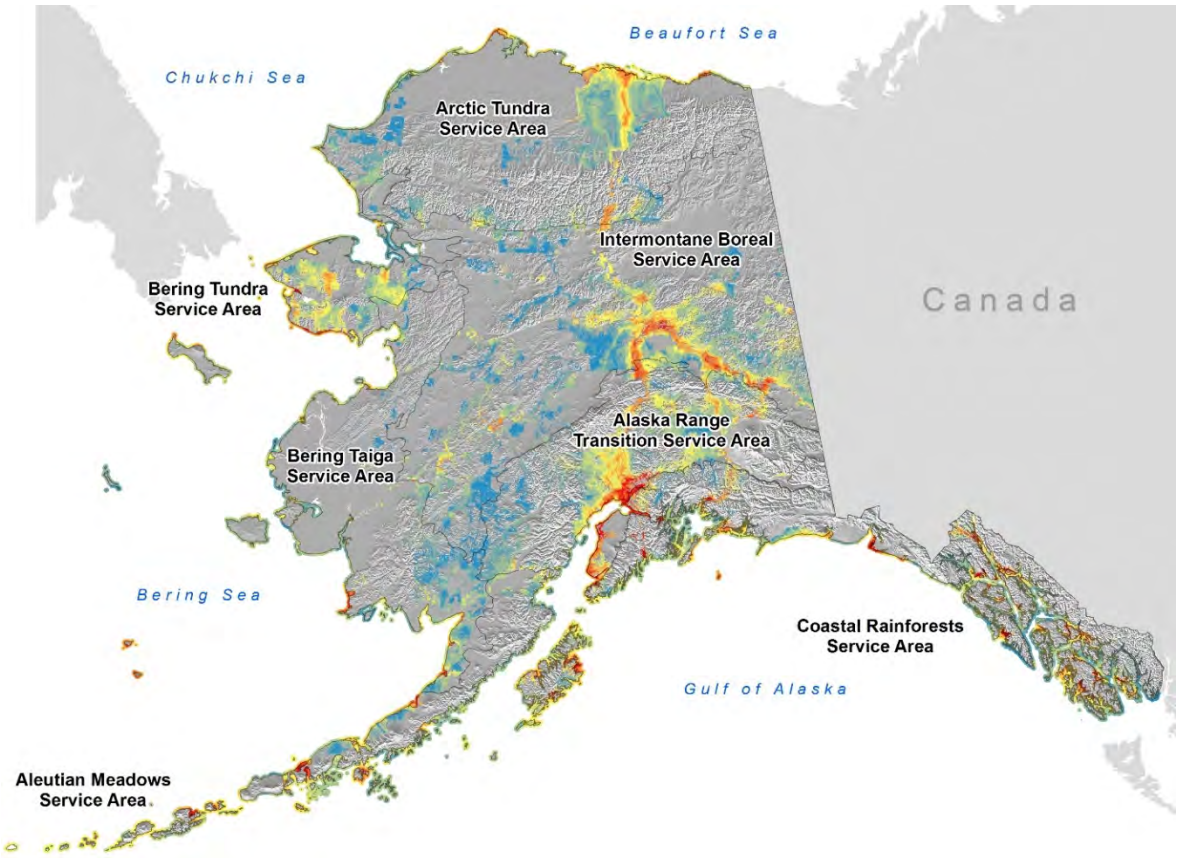

Compensation Planning Framework

for the Alaska In-Lieu Fee Compensatory Mitigation Program

Alaska Department of Natural Resources

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Contents

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Figures

Appendix

Acronyms

ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
AGC	Alaska Geospatial Council
AMD	Acid mine drainage
AMHS	Alaska Marine Highway System
APDES	Alaska Pollutant Discharge Elimination System
ATV	all-terrain vehicle
AWC	Anadromous Waters Catalog
AWI	Alaska Wetlands Initiative
AWMP	Anchorage Wetlands Management Plan
BLM	Bureau of Land Management
BOEM	Bureau of Ocean Energy Management
CFR	Code of Federal Regulations
CHA	Critical Habitat Area
ConocoPhillips	ConocoPhillips Alaska, Inc.
CPF	Compensation Planning Framework
DE	district engineer
DNR	Alaska Department of Natural Resources
DOT&PF	Alaska Department of Transportation and Public Facilities
EFH	Essential Fish Habitat
ESA	Endangered Species Act
ESI	Environmental Sensitivity Index
FAA	Federal Aviation Administration
FERC	Federal Energy Regulatory Commission
FNSB	Fairbanks North Star Borough
FUDS	Formerly Used Defense Sites
GIS	Geographic Information System
HTL	High Tide Line
IBA	Important Bird Area
ILFP	In-Lieu Fee Program
IRT	Interagency Review Team
LME	Large Marine Ecosystem
LNG	liquefied natural gas
Mat-Su	Matanuska-Susitna
MSBWMP	Matanuska-Susitna Borough Wetlands Management Plan
MOA	Municipality of Anchorage
NHD	National Hydrography Dataset
NLCD	National Landcover Dataset
NOAA	National Oceanic and Atmospheric Administration
NPR-A	National Petroleum Reserve-Alaska
NPS	National Park Service

NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
OCS	outer continental shelf
PCB	Polychlorinated biphenyl
SA	service area
Shell	Royal Dutch Shell
STIP	Statewide Transportation Improvement Program
UNEP	United Nations Environmental Programme
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WSR	Wild and Scenic River

1.0 Introduction

The Alaska Department of Natural Resources (DNR) is developing a statewide In-Lieu Fee Program (ILFP) to mitigate losses of terrestrial and marine aquatic resources. This Compensation Planning Framework (CPF) was developed in accordance with the 2008 Federal Final Rule on *Compensatory Mitigation for Losses of Aquatic Resources* (2008 Mitigation Rule) for inclusion in the State of Alaska's Prospectus for a statewide ILFP (33 Code of Federal Regulations [CFR] §332.8). This CPF establishes service areas (SAs) and guides the methods used to select, secure, and implement aquatic resource restoration, establishment, enhancement, and/or preservation activities under the State of Alaska's ILFP.

Alaska's broad range of terrestrial and marine aquatic resources and dispersed population support the establishment of a flexible and transparent mitigation instrument that targets important aquatic resources within the landscape/watershed context.

This CPF uses Alaska ecoregions (33 CFR §332.8(d)) and Large Marine Ecosystems (LMEs) as the basis for developing 11 SAs. The process for compensatory mitigation site selection and prioritization (33 CFR §332.3(c)) within the SAs is described in Sections 2.0 and 3.0.

2.0 Service Areas

The State of Alaska will operate 11 distinct SAs under the ILFP (**Figure 1**). Combined, these SAs will cover the entire State of Alaska, including submerged lands extending 3 miles offshore from the mean high tide line (HTL). Seven SAs compose the terrestrial portion of the state and four SAs compose the marine portions. **Sections 2.1** to **2.11** of this CPF provide a general description of each SA as well as the current condition of aquatic resources, historic losses and trends, threats, and the goals and objectives for compensatory mitigation within each SA.

The 2008 Mitigation Rule defines a SA as "the watershed, ecoregion, physiographic province, and/or other geographic area within which the mitigation bank or ILFP is authorized to provide compensatory mitigation credits" (33 CFR §332.8(d)). The SAs selected for inclusion in this CPF are based on a long-standing scientific consensus of areas with ecologically similar features.

The seven terrestrial SA boundaries largely follow the Level II ecoregions within the Ecoregion of Alaska[1] mapping (Nowacki et al. 2001). This ecoregion mapping was developed by the U.S. Geological Survey (USGS) Alaska Science Center cooperatively with the U.S. Forest Service (USFS), the National Park Service (NPS), and The Nature Conservancy. The Level II ecoregions are based on watershed characteristics, as well as many other biotic and abiotic factors including,

[1] Ecoregion of Alaska mapping combines the ecoregion mapping approaches of Bailey (1998) and Omernick (Gallant et al. 1995). The Bailey ecoregion mapping was used in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (USACE 2007) to group areas with similar growing seasons.

vegetation, soils, climate parameters, surficial geology, topography, lithology, fire regime, and glaciation. Ecoregions are defined as areas where environmental resources, including aquatic resources, are similar in type, quality, and quantity. Alaska ecoregions were selected because watershed characteristics are an inherent factor in the delineation of each ecoregion. The ecoregion approach to SAs uses watershed-based rationale for the delineation of each SA, as required by the 2008 Mitigation Rule. Using additional variables along with watershed characteristics as the basis of the delineation of the SA boundaries ensures that the aquatic resources provided within the SA will effectively compensate for adverse environmental impacts across the entire SA. For example, this will prevent wetland impacts on the flat coastal plain of the Yukon-Kuskokwim Delta within a polar bio-climatic regime being offset by mitigation projects further up the Yukon River watershed in interior forested areas with a temperate bio-climatic regime. Additionally, ecoregions are critical tools for structuring and implementing ecosystem management strategies across Federal agencies, State agencies, and nongovernmental organizations that are responsible for different types of resources within the same geographic areas (Omernik and Griffith 2014, McMahon et al. 2001).

The seven terrestrial SAs used in this CPF are:

- Arctic Tundra SA
- Bering Tundra SA
- Bering Taiga SA
- Intermontane Boreal SA
- Aleutian Meadows SA
- Alaska Range Transition SA
- Coastal Rainforests SA

Minor modifications were incorporated into the terrestrial ecoregion mapping to develop the SAs for this CPF. The Alaska Range Transition SA was modified to incorporate all of the Municipality of Anchorage (MOA) and to include a relatively small portion of the Coast Mountains Transition ecoregion that borders Canada near Wrangell-St. Elias National Park.

The boundaries of the four marine SAs constitute LMEs developed by the National Oceanic and Atmospheric Administration (NOAA) and described by the United Nations Environmental Programme (UNEP 2009). The LME boundaries are based on four linked ecological criteria: (1) bathymetry, (2) hydrography, (3) productivity, and (4) trophic relationships. The four marine SAs covered in this CPF are:

- Chukchi Sea SA
- Beaufort Sea SA
- Bering Sea SA
- Gulf of Alaska SA

Modifications to the marine SA boundaries include limiting the extent to areas owned by the State of Alaska; a boundary extending 3 miles from the mean HTL. Also, the Bering Sea SA is composed of the East Bering Sea LME and a small portion of the West Bering Sea LME. Portions of the West Bering Sea LME included in the Bering Sea SA include marine areas adjacent to the western half of St. Lawrence Island and the waters adjacent to the Near Islands (Attu Island, Agattu Island, and the Semichi Islands) located at the western end of the Aleutian chain.

The line separating the terrestrial and marine SAs will be delineated by the HTL. For tidally influenced rivers and streams, a line will be drawn across the mouth of the river in order to determine the appropriate SA of the credit- or debit-producing activity. This process will be done on a case-by-case basis. Estuarine wetlands extending landward of the HTL will be included in the appropriate terrestrial SA.

While the SAs are large, they are appropriately sized to ensure that the aquatic resources preserved, enhanced, established, or restored will effectively compensate for environmental impacts across the entire SA[2] while maintaining economic viability[3] as a mitigation instrument. Utilizing large and geographically distinct SAs, in combination with a robust prioritization strategy, affords the State of Alaska ILFP the ability to identify a large assortment of potential mitigation options that are more likely to offset impacts to specific habitat types and achieve the stated aquatic resource goals and objectives of the SA.

[2] The 2008 Mitigation Rule states that the SA must "be appropriately sized to ensure that the aquatic resources provided will effectively compensate for adverse environmental impacts across the entire service area (33 CFR §332.8(d)(2)(ii)(A))."
[3] 33 CFR §332.8(d)(6)(ii)(A)

2.1 Coastal Rainforests SA

Inset 1. Coastal Rainforests Service Area

The Coastal Rainforests SA (Inset 1) covers 70,885 square miles and stretches 1,000 miles from Kodiak Island to the southern edge of Southeast Alaska. Approximately 100,000 people inhabit in this SA, with the most people residing in the state capital of Juneau (see **Table 1**). Nine other cities have populations above 1,000 people (U.S. Census Bureau 2012). This SA contains the Kenai Peninsula Borough, Kodiak Island Borough, Yakutat Borough, City and Borough of Sitka, Haines Borough, Municipality of Skagway, City and Borough of Juneau, Petersburg Borough, City and Borough of Wrangell, and the Ketchikan Gateway Borough. This SA has been modified from the ecoregion mapping to exclude all of the MOA. The USFS is the primary landowner, holding almost half of all the land within this SA (see **Table 2**).

Table 1. Population Centers within the Coastal Rainforests SA

Major Cities (Population >1,000)	Population
Juneau	31,275
Sitka	8,881
Ketchikan	8,050
Kodiak	6,130
Valdez	3,976
Petersburg	2,948
Seward	2,693
Wrangell	2,369
Cordova	2,239
Craig	1,201

The Coastal Rainforests SA contains the Kodiak Island, Chugach-St. Elias Mountains, Gulf of Alaska Coast, Boundary Ranges, and Alexander Archipelago ecoregions (Nowacki et al. 2001). These mountains and forested fringes arc around the north and east shores of the Gulf of Alaska. Coastal areas were carved by retreating glaciers and are marked with steep bedrock fjords, tidewater glaciers, and numerous rocky islands. Dominant weather patterns start in the Aleutian Islands and curl up into the Gulf of Alaska, causing heavy precipitation at low elevations and snow at higher altitudes. The Gulf of Alaska flows east to west along the coast, bringing relatively warmer temperatures throughout the year (Spencer et

al. 2002). The average annual precipitation for the SA varies greatly between 12 and 220 inches. The average annual temperature ranges from 24 to 46°F (ADF&G 2006).

Table 2. Major Land Owners within the Coastal Rainforests SA

Land Owner	Percent of SA
Federal – U.S. Forest Service	46.5
Federal – National Park Service	20.3
State of Alaska	16.1
Private	9.8
Federal – U.S. Fish and Wildlife Service	4.4
Federal – Bureau of Land Management	2.7
Federal – Department of Defense	0.1

Rivers within this SA originate out of glaciers and are relatively short flowing in braided floodplains or off rocky mountainsides in waterfalls. All five species of Pacific salmon migrate into these fast-flowing streams to spawn. Dolly Varden, arctic char, and steelhead trout live in larger clear-water streams along the coast and on Kodiak Island (Spencer et al. 2002).

The warm coastal environment supports old-growth coniferous forests. The Alexander Archipelago is covered by Sitka spruce, hemlock, and cedar. The presence of cedar extends toward the west to include Prince William Sound, and hemlock extends slightly farther to the end of the Kenai Peninsula. Wetlands are formed on shallow, poorly drained soils on bedrock. At higher elevations, vegetation communities transition to alder and herbaceous meadows and then to alpine tundra and bedrock or ice (Spencer et al. 2002).

Wildlife found in this region include black and brown bears, Sitka-black-tailed deer, moose, mountain goats, Dall sheep, pikas, snowshoe hares, wolves, wolverines, coyotes, foxes, lynx, martens, mink, beavers, weasels, red squirrels, voles, marmots, wood frogs, and western toads. Bald eagles, murres, Bonaparte's gulls, Steller sea lions, harbor seals, and sea otters are common along the shoreline (ADF&G 2006).

2.1.1 Current Aquatic Resource Conditions

Wetlands

Much of the terrain of the Coastal Rainforests SA is mountainous; wetlands occur primarily along river systems, in valley bottoms and lowlands, and in coastal areas. Freshwater wetland types are primarily forested and scrub-shrub wetlands (Hall et al. 1994). Coastal wetland types include estuaries, salt marshes, and sparsely vegetated tidal flats.

National Wetlands Inventory (NWI) mapping is available for over 82 percent of the Coastal Rainforests SA (USFWS 2021). Within this coverage area, 6,618,566 acres are mapped as wetlands. NWI habitat types occurring within the SA are shown in **Table 3**.

Table 3. Acres of NWI Mapping within the Coastal Rainforests SA by Habitat Type		
NWI Habitat Type	**Acres**	**Percent of Wetland Area**
Estuarine and Marine Deepwater Habitat	99,658	2
Estuarine and Marine Wetland	164,626	3
Freshwater Emergent Wetland	1,586,797	24
Freshwater Forested/Shrub Wetland	3,703,178	56
Freshwater Pond	111,473	2
Lake	465,570	7
Freshwater Moss/Lichen Wetland	4,872	<1
Riverine	482,392	7
TOTAL	**6,618,566**	

Approximately three-quarters of the mapped wetlands within the SA occur in the Alexander Archipelago and Boundary Ranges ecoregions (south of Yakutat), primarily as forested wetlands.

Although estuarine wetlands are only 3 percent of the mapped wetlands within the SA, approximately 40 percent of Alaska's estuarine wetlands occur in this region (Hall et al. 1994). This is due to the high degree of sinuosity and protection of the coastline, which provides low-energy environments in which estuarine wetlands can form.

Rivers and Streams

Rivers and streams within the SA range from small mountain streams to large braided rivers, and contain freshwater and estuarine environments. Major river systems include the Chilkat, Chilkoot, Karluk, upper Kenai, and lower Copper rivers. There are 95,022 miles of streams within the National Hydrography Dataset (NHD; USGS 2016) in the SA. Of these, approximately 11,265 miles of streams (as well as 758 lakes) are included within the Anadromous Waters Catalog (AWC; ADF&G 2015a).

Essential Fish Habitat (EFH) refers to areas federally designated as habitat for species that are federally managed under the Magnuson-Stevens Fishery Conservation and Management Act. Rivers and streams within the Coastal Rainforests SA that support salmon are EFH, as all five species of Pacific salmon are managed under the Alaska Stocks of Pacific Salmon Fishery Management Plan. Estuarine areas within the SA also provide important support to marine species that directly utilize estuarine habitat for feeding or portions of their lifecycle, or that benefit indirectly from other functions performed by estuarine areas. Federally managed marine species that are supported directly or indirectly by estuarine areas in the SA include Alaska plaice, arrowtooth flounder, Atka mackerel, Chinook salmon, chum salmon, coho salmon, pink salmon, sockeye salmon, dover sole, dusty rockfish, flathead sole, northern rockfish, Pacific cod, Pacific ocean perch, rex sole, rock sole, sablefish, sculpin, shortraker, rougheye rockfish, skate, squid, thornyhead rockfish, walleye pollock, yelloweye rockfish, and yellowfin sole.

Protected and/or Conservation Areas

Approximately 80 percent of the Coastal Rainforests SA is covered by land within the federal conservation system. These areas are managed to varying degrees for protection and conservation of natural resources, including wildlife habitat and populations, recreational and subsistence uses, and wilderness values. Some of these areas allow a higher level of development and extraction of resources, such as National Forest land. Almost half of the Coastal Rainforests SA is National Forest land. The SA contains the largest and second-largest National Forests in the United States, the Tongass and the Chugach, respectively.

In addition to federally protected areas, nine State wildlife refuges/sanctuaries/critical habitat areas and seven State parks are within the SA. Mendenhall Wetlands State Game Refuge protects estuarine wetlands along Gastineau Channel in Juneau that support migrating and breeding waterfowl and shorebirds. This area was threatened by surrounding developments prior to conservation. The area protected by the refuge is part of one of the largest vegetated tidal salt marshes in Southeast Alaska.

Protected and/or Conservation Areas

ADF&G

- Chilkat River Critical Habitat Area (CHA)
- Copper River Delta CHA
- Dude Creek CHA
- Fox River Flats CHA
- Kachemak Bay CHA
- Tugidak Island CHA
- Mendenhall Wetlands State Game Refuge
- Yakataga State Game Refuge
- Stan Price State Wildlife Sanctuary

DNR

- Alaska Chilkat Bald Eagle Preserve
- Caines Head State Recreation Area
- Caribou Creek Recreational Mining Area
- Afognak Island State Park
- Chilkat State Park
- Chugach State Park
- Kachemak Bay State Park and Kachemak Bay State Wilderness Park
- Point Bridget State Park
- Shuyak Island State Park
- Ernie Haugen Public Use Area
- Haines State Forest Resource Management Area
- Kenai River Special Management Area

USFWS

- Kenai National Wildlife Refuge (NWR)
- Kodiak NWR
- Alaska Maritime NWR

NPS

- Glacier Bay National Park and Preserve
- Kenai Fjords National Park
- Klondike Gold Rush National Historical Park
- Sitka National Historical Park
- Wrangell-St. Elias National Park and Preserve

USFS

- Chugach National Forest
- Tongass National Forest
- Misty Fjords National Monument
- Admiralty Island National Monument

Threatened and Endangered Species

The Alexander Archipelago wolf, a subspecies of grey wolf endemic to Southeast Alaska, has been previously considered for listing. In January 2016, the U.S. Fish and Wildlife Service (USFWS) determined that at this time the wolf does not warrant protection as endangered or threatened under the Endangered Species Act (ESA; 50 CFR §17).

Kittlitz's murrelets, which have been considered for listing, nest on coastal cliffs and rock ledges near glaciers within the SA (AKNHP 2021a).

Important Bird Areas

Many state, continent, and globally recognized Important Bird Areas (IBAs) occur within the SA. These areas represent high concentrations of birds, colonies of species of conservation concern, and critical breeding and migratory habitat.

The Copper River Delta contains the largest remaining contiguous wetlands along the Pacific coast of North America, and is the tenth largest river delta in the world. Many freshwater and estuarine habitat types occur in this area, such as intertidal mudflats, intertidal sedge marshes, intertidal sloughs, freshwater sloughs, freshwater ponds, freshwater wetlands, sand beaches, and estuaries. The Copper River Delta is a globally recognized IBA, as it is an important stopover for migrating shorebirds, notably western sandpipers and dunlins. It is also an important breeding area for many species, including species of concern such as the red-throated loon and rusty blackbird.

Important Bird Areas

Coastal IBAs
- Alitak Bay*
- Berners Bay
- Chiniak Bay
- Copper River Delta
- Fox River Flats
- Frederick Sound to Duncan Canal*
- Mendenhall Wetlands
- Northern Montague Island
- Northwest Afognak Island
- Sitkinak Strait*
- Stikine River Delta
- Uganik Bay & Viekoda Bay

Interior IBAs
- Chilkat Bald Eagle Preserve
- Jim Creek Basin

Colonies
- Barren Islands Colonies
- Blacksand Spit Colony
- East Copper River Delta Colonies
- Egg Island Colonies
- Flat Island Colony
- Marmot Bay Colonies
- Middleton Island Colony
- Riou Spit Colony
- St. Lazaria Island Colony
- Tideman Slough Colony

*Potential Global IBA

2.1.2 Historic Loss of Aquatic Resources

Losses of aquatic resources in the Coastal Rainforests SA have generally occurred in and around settled areas largely driven by the fishing, mining, and logging industries. The construction of infrastructure and the conversion of native habitats to urban developments are limited relative to the total area. Based on remote sensing data (Xian et al. 2011), approximately 65,000 acres of land is developed within the Coastal Rainforests SA, which represents less than 1 percent of the total land area. However, important wetland and stream functions have been degraded or lost within developed areas (Albert and Shoen 2007). For example, Adamus (1987) estimated that 13 percent of the wetland acreage in the Juneau area had been lost between 1948 and 1984.

The logging and mining industries have played a large role in the settlement of the Coastal Rainforests SA. Mining development has followed a boom-and-bust cycle, largely tracking the price of gold. Placer mining dominated throughout the SA during the Klondike Gold Rush of the late 19th and early 20th century. This technique resulted in large stream diversions and impacts to streambeds. Open pits to mine lode gold deposits, particularly in Southeast Alaska, were associated with aquatic habitat loss, changes in natural water chemistry, and changes in biodiversity. More than 200 sites within the Tongass and Chugach National Forests are listed in the DNR Abandoned and Inactive Mine Inventory (Bruder 2002).

Prior to the creation of the USFS, logging was performed solely in support of the booming mining and fishing industries. On the Knowles Head Peninsula there were numerous clearcuts and logging roads prior to the establishment of the Chugach National Forest. Other large logging operations have occurred on Eyak Corporation, Afognak Native Corporation, Tatitlek Corporation, and State of Alaska land.

Management of federal forest lands under the USFS brought about sustained yield principles and the practice of clearcutting to promote forest growth. Throughout Southeast Alaska, a network of more than 5,000 miles of logging roads have been cut through valuable, high-quality timber that generally lies in low-elevation areas where there are aquatic resources that provide and support valuable fish and wildlife habitat. Logging roads have fragmented habitats and compressed soils, are a source of surface runoff, and have altered natural stream flows. The practice of removing large woody debris from riparian areas and streams has caused impaired stream functions such as reduced habitat structure and the loss of high-quality salmonid habitat (Albert et al. 2008). Landslides, soil erosion, and altered stream courses have caused sedimentation effects on anadromous streams and degraded aquatic habitats that continue into the present.

The Alaska Department of Fish and Game (ADF&G) lists 319 culverts as “Red” (known to impede fish passage) or “Gray” (may impede fish passage) in their Fish Passage Inventory Database (ADF&G 2015b) within the Coastal Rainforests SA. Many of these culverts are deficient because they are perched on the downstream side, are too small in diameter, do not match natural slopes, or lack adequate substrate for effective fish movement. Upstream portions of these streams represent a loss of spawning and rearing habitat.

According to the USGS, there have been 320 producing mines operating within the SA (USGS 2015). Acid mine drainage (AMD) from abandoned mines is a potential source of water pollution. Chemical reactions from AMD dissolve heavy metals such as copper, lead, and mercury into surface and groundwater. These metals have the potential to contaminate drinking water, disrupt the growth of aquatic plants, degrade or destroy fish and wildlife habitat, and corrode infrastructure over time. AMD can be mitigated on small scales through the creation of wetlands, where natural processes can effectively neutralize the impact of the heavy metals if the wetlands are actively monitored and managed.

The Alaska Department of Environmental Conservation (ADEC) Contaminated Sites Database contains 594 contaminated site cases within the Coastal Rainforests SA (ADEC 2015a). The dominant sources of impact are long-term facility usage, leaks from hazardous waste storage, and spills of petrochemicals that contaminate soils and local groundwater. Other sources of

degradation include polychlorinated biphenyls (PCBs), waste from pulp mills, and mine tailings. **Table 4** lists the 12 impaired waterbodies within the Coastal Rainforests SA and the sources of impairment for each.

Table 4. ADEC Category 4a, 4b, and 5 Impaired Waterbodies[1]

Waterbody Name	Source of Impairment	Community/Landmark
Duck Creek	Urban Runoff, Landfill, Road Runoff, Land Development	Juneau
Granite Creek	Gravel Mining	Sitka
Jordan Creek	Land Development, Road Runoff	Juneau
Lemon Creek	Urban Runoff, Gravel Mining	Juneau
Pederson Hill Creek	Septic Tanks	Juneau
Pullen Creek	Industrial – Toxic and Deleterious Substances	Skagway
Vanderbilt Creek	Urban Runoff - Turbidity	Juneau
Fubar Creek	Timber Harvest - Sediment	Prince of Wales Island
Eyak Lake	Storage Tanks – Petroleum Spill	Cordova
Red Lake Anton Road Ponds	Urban Runoff – Toxic and Deleterious Substances	Kodiak
Katlian River	Timber Harvest – Sediment, Turbidity	Sitka
Unnamed Creek, Sweetwater Lake	Road Construction - Metals	Prince of Wales Island

1. (ADEC 2018).

World War II and the Cold War brought about an increase in the construction of military sites throughout Alaska. The Department of Defense database lists 179 Formerly Used Defense Sites (FUDS) within the Coastal Rainforests SA that vary in size (USACE 2013a). Many of these sites require remediation associated with the presence of hazardous, radioactive, or toxic waste that may have impacted local water quality.

The National Landcover Dataset (NLCD; Xian et al. 2011) produced by USGS shows a total 58,361 acres of development in 2011 within the Coastal Rainforests SA. This represents 0.13 percent of the entire SA.

2.1.3 Threats to Aquatic Resources

Urbanization and Development

The population of this SA decreased by approximately 1,900 people between the 2000 and 2010 censuses (U.S. Census Bureau 2012). While populations in most boroughs and census areas in Southeast Alaska decreased, Juneau, Haines, Sitka, and Skagway experienced moderate population growth. This is consistent with the trend toward urbanization among Alaska's population. As more of Alaska's population becomes concentrated in cities and towns, increased development and infrastructure will impact aquatic resources near population hubs.

Wetlands and aquatic resources within population hubs are at the most risk for conversion, degradation, and fragmentation. In 2015, the City and Borough of Juneau prepared a draft update to the *Juneau Land Management Plan*, including a draft update to the *Juneau Wetlands Management Plan*. The *Juneau Wetlands Management Plan* includes mapping and assessment of aquatic resources within priority areas of the City and Borough of Juneau, and ranks assessed wetlands by functional performance (CBJ 2015). The *Juneau Land Management Plan* was adopted in 2016, and proposes three options for implementation as a tool for city planning and wetland mitigation, it does not provide any protection to wetlands within the City and Borough of Juneau.

Based on the NLCD, 599 acres of undeveloped land within the SA were converted to developed uses between 2001 and 2011 (Xian et al. 2011). This trend is expected to continue, with development occurring primarily within or near communities, including Seward, Cordova, Juneau, Wrangell, Sitka, and Ketchikan. The largest single area developed was on Annette Island, where 175 acres were converted for the construction of Walden Point Road. The 15-mile road from the village of Metlakatla to a ferry dock on Annette Bay was constructed between 1997 and 2007 by the U.S. military (Hall 2008). Of the area developed between 2001 and 2011, NLCD characterized 62 acres as converted from wetland and open water (Xian et al. 2011).

Transportation

In 2020, the Alaska Department of Transportation and Public Facilities (DOT&PF) updated the Statewide Transportation Improvement Program (STIP), a 4-year program that identifies priority transportation projects and improvements across the state. The 2020-2023 STIP includes many projects within the Coastal Rainforests SA, including ferry terminal improvements for the Alaska Marine Highway System (AMHS), road resurfacing, bridge replacements, and safety improvements (DOT&PF 2020). Improvements and modifications are planned for ferry terminals in Gustavus, Ketchikan, Haines, Auke Bay, and Skagway. These projects will involve construction in coastal waters and will have impacts to terrestrial and nearshore aquatic environments. Several large projects are also planned to improve existing highways and construct new highways that would involve impacts to freshwater and marine wetlands and waters. These include planned upgrades to the Haines Highway and the Glacier Highway.

Aviation is a primary mode of transportation in Southeast Alaska, where many communities are not connected to the road system. Airport construction projects, particularly improvements and expansions to existing airports for which facility siting is limited by existing runways and buildings and by safety requirements, are likely to impact wetlands. The Federal Aviation Administration (FAA) will continue to plan for and fund airport improvement projects for the communities of Haines, Juneau, Kodiak, Petersburg, Seldovia, Yakutat, and other Southeast communities as needed. Additionally, Angoon received funds for the construction of a new airport.

The Coastal Rainforests SA receives the Haines Highway, which is one of only three major surface connections from Alaska to Canada and the Lower 48 states. Roads are the primary vector for the spread of invasive species. Invasive species have been documented throughout the SA, most prevalently within communities and along the limited road system (AKNHP 2021b). Invasive species of particular concern are those that colonize river floodplains and riparian areas

or are particularly insidious wetland invaders, including reed canary grass, purple loosestrife, yellow toadflax, white sweetclover, and narrowleaf hawksbeard. Floatplanes can also spread aquatic invasive species between waterbodies over large distances.

Resource Development

The primary threats to aquatic resources within the SA from resource development include mining and timber harvest. Expansion of existing mines presents the most likely source of impacts to aquatic resources from mining within the SA. Continued exploration of deposits occurs concurrently with active mining operations, as the mining infrastructure already in place reduces the high cost of exploring new deposits. Two of the five major operating hardrock mines in Alaska are located within the SA: Kensington gold mine, in the Berners Bay Mining District, 45 miles north of Juneau; and Greens Creek Mine, a zinc-silver-lead-gold mine in the Admiralty Mining District, 15 miles south of Juneau.

Mining exploration projects represent sources of likely future impacts to aquatic resources, although development of prospects depends strongly on commodities prices and market conditions. Within the SA, several mining projects are currently in the exploration phase. These include the Palmer Volcanogenic Massive Sulphide Project outside Haines; a gold-silver-copper-zinc-lead-tungsten deposit recently exposed by the retreating Herbert Glacier 20 miles north of Juneau; Port Snettisham iron deposit, 30 miles southeast of Juneau; Bokan Mountain, a rare earth elements prospect on Prince of Wales Island; Niblack Mine, a copper-gold-zinc-silver prospect on Prince of Wales Island; and Salt Chuck Mine, a copper-palladium-gold-silver mine on Prince of Wales Island.

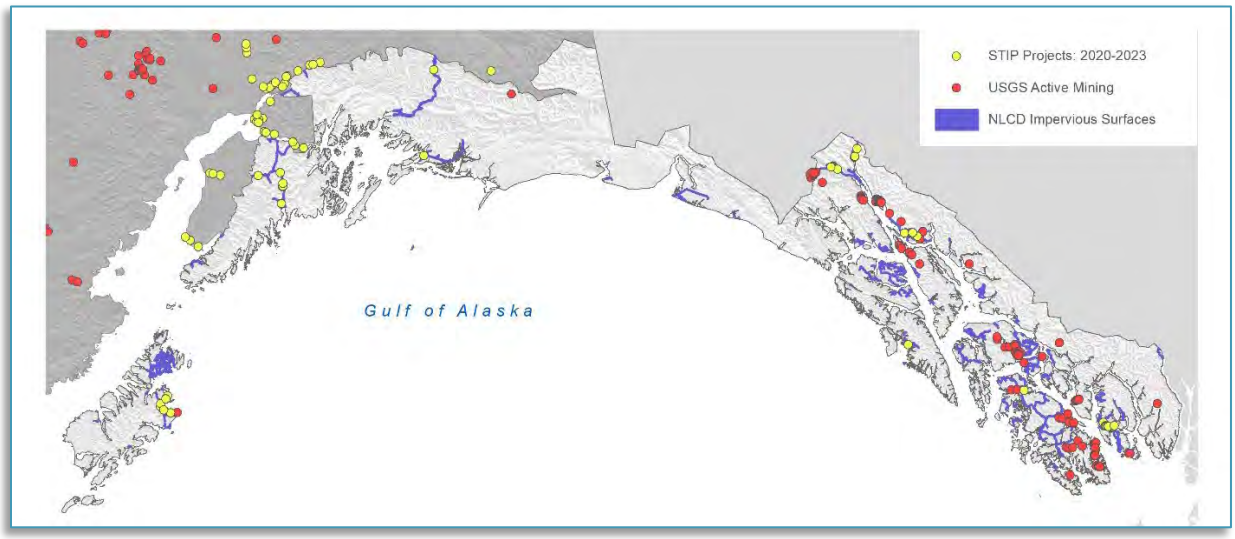
Logging activities within the SA are concentrated in Southeast Alaska. Although the logging industry in Alaska has contracted significantly in recent decades, the USFS, Native corporations, and the State of Alaska continue to manage timber harvests on their lands. Land clearing, construction of new logging roads, and operation of associated machinery pose threats to aquatic resources, particularly forested wetlands, which are more prevalent in the Southeast Alaska region.

In 2015, the USFS prepared an amendment to the *Tongass Forest Management Plan* that includes new direction for managing timber within the Tongass National Forest (USFS 2015). The amendment recommends transitioning from harvesting primarily old-growth trees to harvesting younger, second-growth trees from previously logged areas. This change would result in fewer new clear cuts and less new road construction and minimize new impacts.

The Alaska Mental Health and Trust Authority negotiated a 100-million board foot timber sale with Viking Lumber near Naukati in Southeast Alaska. This sale incorporated timberlands obtained through conveyance of lands from the Alaska Mental Trust Land Exchange Act of 2017. Phase 1 of the land exchange was completed in January 2019 (Alaska Mental Health and Trust Authority – Forestry 2021). The mission of the Trust is to maximize revenue from Trust land and assets.

This ILFP will offset these threats to aquatic resources by protecting and restoring wetlands and waters that function similarly within the same ecoregion, in accordance with the goals and objectives stated below.

Some of the threats described are shown in Inset 2.



Inset 2. Threats to Aquatic Resources within the Coastal Rainforests SA

2.1.4 Aquatic Resource Goals and Objectives

Of the 5,328,000 acres of state lands within the Coastal Rainforests SA, approximately 82 percent is covered by NWI mapping. **Table 5** displays the types and amounts of aquatic resources on State of Alaska land within the SA that have been mapped by the NWI and could potentially be used for restoration, enhancement, and/or preservation mitigation activities.

Table 5. State-Owned Aquatic Resources within the Coastal Rainforests SA[1]

Aquatic Resource Type	Acres
Estuarine and Marine Deepwater	10,684
Estuarine and Marine Wetland	24,171
Freshwater Emergent Wetland	138,599
Freshwater Forested/Shrub Wetland	337,824
Freshwater Pond	19,107
Lake	70,508
Freshwater Moss/Lichen Wetland	46
Riverine	102,095
TOTAL	**703,037**

[1]. Based on NWI Mapping (USFWS 2021).

The aquatic resource types presented in **Table 5** represent the aquatic resource types likely to be impacted within the SA and the types that will be preserved, restored, or enhanced through this ILFP. Descriptions of these categories and representative NWI codes are presented below:

- **Estuarine Waters** include deepwater habitats and estuarine shorelines landward of the HTL. Representative NWI codes include E1UBL and E2USN.
- **Estuarine Wetlands** include vegetated wetlands that are influenced by the presence of salt water. These include salt marshes and salt-tolerant sedge meadows. E2EM1P is a representative NWI code.
- **Riverine Waters** include freshwater rivers and streams and associated shorelines below the Ordinary High Water Mark. Representative NWI codes include R2UBH, R3UBH, and R4SBC.
- **Riverine Tidal Waters** include tidally influenced rivers upstream of the river mouth. Representative NWI codes include R1UBV and R1USR.
- **Palustrine Wetlands** include nontidal wetlands dominated by trees, shrubs, emergents, mosses, or lichens. This type also includes tidally influenced wetlands that have a very low salinity. Representative NWI codes include PFO4B, PSS1C, and PEM1F.
- **Palustrine and Lacustrine Waters** include deep, open-water habitat inundated by freshwater. Lacustrine waterbodies are those that are greater than 20 acres in size or more than 6.6 feet (2 meters) deep at low water. Representative NWI codes include L1UBH and PUBH.

Within the Coastal Rainforests SA, the State of Alaska will work to achieve the following goals and objectives:

- Use the State's resources and partnerships to select, secure, and implement aquatic resource restoration, establishment, enhancement, and/or preservation activities to improve watershed health.
- Ensure a greater level of certainty in the outcome of restoration and enhancement mitigation projects through coordinated efforts by State conservation professionals who are deeply familiar with the SA.
- Remove threats to important aquatic resources through preservation.
- Reduce the extent of cumulative adverse impacts to aquatic resources throughout the Coastal Rainforests SA.
- Preserve, restore, and enhance aquatic resources that provide important habitat for migratory birds, anadromous fish, and species of conservation concern.
- Increase the types of aquatic resources available for compensatory mitigation in the SA.

2.2 Alaska Range Transition SA

Inset 3. Alaska Range Transition Service Area

The Alaska Range Transition SA (Inset 3) covers 77,040 square miles and stretches from the Canadian border to Lake Iliamna. Approximately 430,000 people live within its boundaries, primarily in 7 cities (U.S. Census Bureau 2012; see **Table 6**). This region contains the MOA, the Matanuska-Susitna (Mat-Su) Borough, and portions of the Kenai Peninsula Borough and the Lake and Peninsula Borough. Major landowners include the State of Alaska and the NPS (see **Table 7**). The boundaries of this SA have been modified slightly from the Level II Ecoregion mapping to include a portion of the Coast Mountains Transition ecoregion and the entirety of the MOA.

Table 6. Population Centers within the Alaska Range Transition SA

Major Cities (Population >1,000)	Population
Anchorage	291,826
Wasilla	7,831
Kenai	7,100
Palmer	5,937
Homer	5,003
Soldotna	4,163
Houston	1,912

The Alaska Range Transition SA represents the transition from the boreal forest of the Intermontane Boreal SA to the coastal marine rainforests of the Coastal Rainforests SA. This area has shorter winters than Interior Alaska (the Interior) and warmer, drier summers than the coastal rainforests. As moisture-rich air travels up the Alaska Range, large amounts of snow are released at higher elevations. Glaciers heavily influenced the entire area, and many glacial features and glacier remnants are still present. The Alaska Range Transition SA includes the Alaska Range, Cook Inlet Basin, Copper River Basin, Lime Hills, Kluane Range, and Wrangell Mountains ecoregions (Nowacki et al. 2001). The mean annual temperatures within this region range from 26 to 32°F and the average annual precipitation ranges from 10 to 40 inches, with some areas receiving between 120 and 240 inches of snowfall (ADF&G 2006).

Table 7. Major Land Owners within the Alaska Range Transition SA

Land Owner	Percent of SA
State of Alaska	55.8
Federal – National Park Service	25.6
Private	12.8
Federal – Bureau of Land Management	3.4
Federal – U.S. Fish and Wildlife Service	1.8
Federal – Department of Defense	0.4

This SA forms the headwaters for rivers and streams flowing into all oceans surrounding Alaska except the Arctic Ocean. Glacial rivers are silty and braided, with broad, gravelly floodplains. Clear streams are generally smaller with narrow floodplains that eventually flow into the larger glacial river systems (Spencer et al. 2002). All five species of Alaska salmon are found within this SA, and Dolly Varden, Arctic char, rainbow trout, whitefish, and Arctic grayling also occur in the freshwater rivers and streams.

Permafrost is limited within this SA and does not have a significant influence on vegetation. Boreal forests are distributed throughout much of the lowlands. Vegetation consists of white spruce and birch on higher ground and a combination of black spruce, low shrubs, sedges, and mosses growing on low-lying wetlands. The lower slopes of the Talkeetna Mountains and Alaska Range are covered with dense thickets of alders that transition to low shrubs in the subalpine and alpine tundra. Vegetation is typically absent at 4,000 feet and above, with only bare rock, talus, and ice present (Spencer et al. 2002).

Moose, brown bear, black bear, Dall sheep, mountain goats, wolverines, wolves, foxes, beavers, caribou, and shrews are all found within this SA. The wide variety of habitats also supports many species of resident and migratory birds (ADF&G 2006).

2.2.1 Current Aquatic Resource Conditions

Wetlands

NWI mapping is available for approximately 58 percent of the Alaska Range Transition SA (USFWS 2021). Within this coverage area, 6,484406 acres are mapped as wetlands. NWI habitat types occurring within the SA are shown in **Table 8**.

Table 8. Acres of NWI Mapping within the Alaska Range Transition SA by Habitat Type		
NWI Habitat Type	**Acres**	**Percent of Wetland Area**
Estuarine and Marine Deepwater Habitat	8,799	<1
Estuarine and Marine Wetland	94,007	1
Freshwater Emergent Wetland	874,056	13
Freshwater Forested-Shrub Wetland	4,234,144	65
Freshwater Pond	134,860	2
Lake	536,326	8
Freshwater Moss/Lichen Wetland	803	<1
Riverine	601,409	9
TOTAL	**6,484,406**	

Rivers and Streams

Rivers and streams that originate in the mountains within the SA flow into the Gulf of Alaska, Cook Inlet, and the Bering Sea. There are 92,701 miles of streams included in the NHD within the SA (USGS 2016). Of these, approximately 11,230 miles of streams, in addition to 357 lakes, are included in the AWC (ADF&G 2015a). Major river systems in the SA include the Susitna, upper Aniak, upper Copper, and lower Kenai rivers.

Rivers and streams within the Alaska Range Transition SA that support salmon are EFH. Estuarine areas within the SA also provide important support to marine species that directly utilize estuarine habitat for feeding or portions of their lifecycle, or that benefit indirectly from other functions performed by estuarine areas. Federally managed marine species that are supported directly or indirectly by estuarine areas in the SA include Chinook salmon, chum salmon, coho salmon, pink salmon, sockeye salmon, flathead sole, Pacific cod, sculpin, and skate.

The lower Kenai River, located within the SA, supports Chinook, coho, sockeye, and pink salmon, as well as rainbow trout and Dolly Varden. It is the most popular sport fishery in the state, largely due to its accessibility on the road system and proximity to Anchorage and the Mat-Su Valley. The lower section of the river is surrounded by residential and commercial developments as it flows through the communities of Cooper Landing, Funny River, Sterling, Soldotna, and Kenai.

The Susitna River is a large glacial river originating at the Susitna Glacier in the Alaska Range. It receives many large and small tributaries, including the Yentna, Talkeetna, and Chulitna rivers. The Susitna supports all five species of salmon and is a prime sport fishery.

Many large rivers within the SA, including the Susitna, Matanuska, Knik, Placer, Twentymile, Kenai, Kasilof, Beluga, Chakachatna, and Chuitna rivers drain into Cook Inlet. These rivers drain large glacial landscapes and carry water laden with silt into the inlet. Turnagain Arm of Cook Inlet experiences the largest tidal range in the United States and is the only waterbody in the U.S. that regularly exhibits a tidal bore. In spite of the high energy environment in the inlet, prominent estuarine wetlands occur in the Susitna Flats at the head of the inlet, in Trading and Redoubt bays, and on the Chickaloon Flats on the south side of Turnagain Arm.

At 128 square miles, Lake Clark is the sixth largest lake in Alaska. The lake is located near the headwaters of the Kvichak watershed and flows into Lake Iliamna via the Newhalen River. Lake Clark is a stopover for migrating swans and supports the only known salmon-dependent wolf pack.

Protected and/or Conservation Areas

Portions of three of the largest national parks in the country are within the SA: Lake Clark on the western shore of Cook Inlet, Wrangell-St. Elias on the eastern border with Canada, and Denali to the north. These areas are managed by the NPS for wilderness values, habitat preservation, and subsistence and recreation uses. While subsistence hunting is permitted within National Parks by qualified rural Alaska residents, sport hunting is only permitted within areas designated as National Preserve.

Five National Wild and Scenic Rivers (WSR) are located within the SA. The Delta River Wild and Scenic Watershed includes Upper and Lower Tangle Lakes, the Tangle River, and the Delta River. This designation protects habitat for migrating birds and waterfowl, grayling, whitefish, lake trout, burbot, and longnose suckers. Caribou also migrate through the area. The Gulkana WSR is a popular sportfishing river that supports rainbow trout, arctic grayling, king salmon, red salmon, whitefish, longnose suckers, and lamprey.

The many State-managed recreation areas located within the SA provide recreational opportunities to the residents of Anchorage, Kenai, and the Mat-Su Borough. These areas allow varying degrees and intensities of activities such as hunting, motorized vehicle use (snowmachines, all-terrain vehicles [ATVs], motorboats), and recreational mining.

Protected and/or Conservation Areas

ADF&G

- Anchor River-Fritz Creek CHA
- Clam Gulch CHA
- Fox River Flats CHA
- Homer Airport CHA
- Kalgin Island CHA
- Kachemak Bay CHA
- Redoubt Bay CHA
- Willow Mountain CHA
- Anchorage Coastal Wildlife Refuge
- Goose Bay State Game Refuge
- Palmer Hay Flats State Game Refuge
- Susitna Flats State Game Refuge
- Trading Bay State Game Refuge
- Matanuska Valley Moose Range

DNR

- Chugach State Park
- Kachemak Bay State Park
- Denali State Park
- Captain Cook State Recreation Area
- Nancy Lake State Recreation Area
- Willow Creek State Recreation Area
- Alexander Creek Recreation River
- Kroto and Moose Creek Recreation River
- Lake Creek Recreation River
- Little Susitna Recreation River
- Nelchina Public Use Area
- Talachulitna Recreation River
- Talkeetna Recreation River
- Kenai River Special Management Area
- Tanana Valley State Forest
- Business Park Wetlands Special Management Area
- Hatcher Pass Public Use Area
- Caribou Creek Recreational Mining Area
- Petersville Recreational Mining Area

USFWS

- Alaska Maritime NWR
- Kenai NWR
- Tetlin NWR

NPS

- Denali National Park and Preserve
- Lake Clark National Park and Preserve
- Wrangell-St. Elias National Park and Preserve
- Chilikadrotna WSR
- Mulchatna WSR
- Tlikakila WSR

USFS

- Chugach National Forest

BLM

- Delta WSR
- Gulkana WSR

Threatened and Endangered Species

Cook Inlet is home to a genetically isolated population of beluga whales that is listed as endangered under the ESA. Cook Inlet belugas feed on anadromous fish including Pacific salmon and eulachon that depend on freshwater habitat within the SA. Belugas are known to follow prey upstream into freshwater (as far as 620 miles in the Yukon River; NOAA 2015), and likely directly use freshwater rivers within the SA as feeding habitat.

Important Bird Areas

IBAs in the SA occur primarily along the shore of Cook Inlet, where extensive tidal flats, marsh communities, and riparian forests support a wide diversity of migrating and breeding waterfowl and shorebirds, including species of conservation concern such as peregrine falcon, olive-sided flycatcher, trumpeter swan, surfbird, rock sandpiper, western sandpiper, Hudsonian godwit, red-throated loon, whimbrel, and golden plover.

The Swanson Lakes IBA, on the northwest Kenai Peninsula, contains many rivers and streams that meander through ponds, swamps, and muskeg flats. This area supports high densities of nesting waterfowl.

Important Bird Areas

Coastal IBAs
- Anchorage Coastal
- Clam Gulch
- Fox River Flats
- Goose Bay
- Homer Spit
- Kasilof River Flats
- Kenai River Flats
- Palmer Hay Flats
- Redoubt Bay
- Susitna Flats
- Trading Bay
- Tuxedni Bay

Interior IBAs
- Alaska Range Foothills
- Anchor River
- Campbell Creek
- Chistochina*
- Copper Basin*
- Jim Creek Basin
- Sheep Mountain
- Swanson Lakes
- Turquoise Lake
- Upper Tanana River Valley

Colonies
- Tuxedni Island Colony

*Potential Global IBA

2.2.2 Historic Loss of Aquatic Resources

The Alaska Range Transition SA includes the MOA, with the largest population and urban area in Alaska. The Mat-Su Borough, which has recently experienced rapid growth, is also within the SA boundaries. Development within these urban centers is the largest source of losses or degradation of aquatic resources within the SA. According to the *Anchorage Wetlands Management Plan* (AWMP; MOA 2014), 18,903 acres of wetlands existed in the Anchorage Bowl in 1950. By 1990, more than half of the wetland area in Anchorage — approximately 10,000 acres — was filled or altered. This loss and conversion of wetlands has impacted wildlife. The USFWS has documented the cumulative loss of shorebird habitat and other sensitive species, and vegetation studies have showed a general drying trend that has converted bog habitats into scrub-shrub habitats (USFWS 1993).

Other less-documented but probable cumulative impacts from wetland fills since the 1950s include trends toward reduced water quality and flood storage capacity in Anchorage Bowl streams. In past decades, ADF&G has documented reduced anadromous fish populations in

several Anchorage Bowl streams, which initiated a fish habitat enhancement program and policy for the Anchorage Bowl. Local hydrologic changes within individual wetlands, such as blocked surface and subsurface drainages, have resulted in local flooding within area floodplains during marginal storm events.

Mining of gold, copper, coal, and zinc has also played an important role in development trends within the SA. According to the USGS (USGS 2015), 183 producing mines have operated within the SA. AMD is a potential source of water pollution from abandoned mines. Chemical reactions from AMD could dissolve heavy metals such as copper, lead, and mercury into surface and groundwater. These metals have the potential to contaminate drinking water, disrupt the growth of aquatic plants, impact fish and wildlife habitat, and corrode infrastructure over time. AMD can be mitigated on small scales through the creation of wetlands, where natural processes can effectively neutralize the impact of the heavy metals if the wetlands are actively monitored and managed.

The ADEC Contaminated Sites Program Database contains 1,155 contaminated site cases within the Alaska Range Transition SA (ADEC 2015a). The dominant sources of impact are fecal coliform bacteria from urban centers, runoff of petroleum products, and mining runoff. **Table 9** lists the 19 impaired waterbodies within the Alaska Range Transition SA and the sources of impairment for each.

Table 9. ADEC Category 4a, 4b, and 5 Impaired Waterbodies[1]

Waterbody Name	Source of Impairment	Community/Landmark
Campbell Creek	Urban Runoff - Fecal Coliform	Anchorage
Campbell Lake	Urban Runoff - Fecal Coliform	Anchorage
Eagle River	Wastewater Treatment Facility – Toxic and Deleterious Substances	Eagle River
Fish Creek	Urban Runoff - Fecal Coliform	Anchorage
Furrow Creek	Urban Runoff - Fecal Coliform	Anchorage
Lake Lucille	Urban Runoff - Dissolved Gas	Wasilla
Little Campbell Creek	Urban Runoff - Fecal Coliform	Anchorage
Little Rabbit Creek	Urban Runoff - Fecal Coliform	Anchorage
Little Survival Creek	Urban Runoff - Fecal Coliform	Anchorage
Ship Creek	Urban Runoff - Fecal Coliform	Anchorage
University Lake	Urban Runoff - Fecal Coliform	Anchorage
Westchester Lagoon	Urban Runoff - Fecal Coliform	Anchorage
Cabin Creek	Mining - Toxic and Deleterious Substances	Nabesna
Slate Creek	Mining - Turbidity	Denali National Park
Big Lake	Watercrafts - Hydrocarbons	Wasilla
Cottonwood Creek	Urban Runoff - Fecal Coliform	Wasilla
Hood/Spenard Lake	Urban Runoff - Dissolved Gas	Anchorage
Matanuska River	Landfill Debris	Palmer
Ship Creek	Urban Runoff – Oil and Grease	Anchorage

1. (ADEC 2018).

Additional aquatic resource losses have occurred due to rail and highway construction connecting coastal ports and communities to the Interior. The Alaska Railroad passes through many estuarine areas, seasonally flooded alluvial fans, and palustrine wetlands. The portion of track south of Portage Valley requires constant maintenance and construction within riverine areas that provide anadromous fish and bald eagle habitat. The Seward Highway similarly runs through estuarine areas south of Anchorage, potentially altering the hydrology of low-lying wetlands.

The NLCD shows 166,685 acres of development within the Alaska Range Transition SA for 2011 (Xian et al. 2011). This represents 0.34 percent of the entire SA. The Alaska Range Transition SA is the most developed of all the SAs.

2.2.3 Threats to Aquatic Resources

Urbanization and Development

Between the 2000 and 2010 censuses, the population of the SA increased by approximately 66,600 people (U.S. Census Bureau 2012). This SA experienced the largest increase in population of the seven terrestrial SAs during this time frame. Anchorage and the Mat-Su Borough are the largest and fastest-growing population centers in the state, and population growth trends are expected to continue.

Wetlands and aquatic resources within population hubs are at the most risk for conversion, degradation, and fragmentation. The MOA maintains the AWMP, which was most recently revised in 2012 and adopted in 2014. The AWMP includes an inventory and assessment of wetlands within the MOA and provides guidance on the management of the MOA's wetland resources (MOA 2014). The AWMP notes that development of wetlands within the MOA has led to loss of habitat for sensitive waterbird species, reduced water quality in streams, reduced anadromous fish populations in streams, and more extensive and regular flooding problems in urban watersheds. The now-obsolete *Anchorage Coastal Management Plan* listed as specific concerns "encroachment into sensitive wetlands, into the upper reaches of the watersheds, improper development within floodplains, and inadequate construction setbacks from shorelines and stream banks," which can directly and secondarily impact water quality and habitat (MOA 2007). The AWMP is solely a guidance document and, while it identifies high-functioning wetlands best suited for preservation and includes enforceable policies regarding development, the AWMP does not prohibit development of wetlands within the MOA.

The Mat-Su Borough developed the *Mat-Su Borough Wetlands Management Plan* (MSBWMP) in 2012 to "help conserve and protect wetland resources through the Mat-Su for the lifestyle, economic, and environmental benefits they provide" (Mat-Su Borough 2012). The MSBWMP is only a guidance document and encourages voluntary practices to conserve and protect wetlands. The MSBWMP identifies nine key issues that impact wetlands in the Mat-Su Borough, including rapid population growth, water pollution and impaired water quality, invasive plant species, and major development projects.

Based on the NLCD, 15,171 acres of undeveloped land within the SA were converted to developed uses between 2001 and 2011. Almost all of this development occurred in population

centers (49 percent in Palmer and Wasilla; 31 percent in Anchorage; and 17 percent in Kenai, Soldotna, and Nikiski). Of the recently developed area, NLCD characterized 1,016 acres as being converted from wetland and water habitat to developed (Xian et al. 2011).

Recreation

Increases in human population lead to increased use of aquatic resources for recreational purposes. The Kenai River is the most popular sportfishing river in Alaska due to its substantial salmon runs, accessibility on the road system, and proximity to population centers in Anchorage and the Mat-Su. Sport fishers accessing the river impact riparian habitat along the banks and shoreline vegetation, as well as contribute to increased bank erosion. Construction of structures along the river impacts habitat and affects hydraulics and bank erosion, which in turn affect salmon habitat (Dorava and Moore 1997). Increased human traffic within waterbodies can also contribute to the spread of invasive species, such as *Elodea* and reed canary grass, which are species of particular concern in Southcentral Alaska (Kenai Watershed Forum 2021).

Recreational and utilitarian ATV use is prevalent throughout the SA. Wetlands and streams are particularly sensitive to degradation by ATVs. Heavy ATV traffic in off-road areas damages soil and vegetation and disrupts hydrology (Hunt 2002). Illegal ATV use along streams, particularly in the Mat-Su Basin, impacts spawning habitat, wetlands, and riparian habitat (ADF&G 2013). There are approximately 600 miles of ATV trails within Wrangell-Saint Elias National Park, many of which have impacted wetlands, permafrost soils, and stream banks (Weeks 2003). Increased ATV trails and illegal off-trail ATV use will increase impacts on wetlands and streams.

The Three-Rivers area at the head of Turnagain Arm (the Placer River and Spencer Lake, the Twentymile River system, and Portage Creek) receives high levels of recreational use in the summer. Fishing, recreational motor boating, packrafting, and hunting, in addition to commercial guide operations, are increasing (USFS 2010). Motorized boating, including use of jet boats that can travel through shallow waters, may impact salmon spawning habitat.

Agriculture

Farming, particularly for hay and vegetable production, represents a significant land use within the Mat-Su Valley. In 2012, the Anchorage Area Agricultural Census Area (which includes the Mat-Su Borough) contained 291 farms totaling 36,378 acres (USDA 2014). This represents a 5 percent decrease in acreage and a 5 percent increase in number of farms from 2007, when there were 38,391 acres of land in 278 farms. While the number of medium and large farms (between 10 and 1,000 acres in size) remained the same or decreased between 2007 and 2012, the number of small farms between 1 and 9 acres in size increased from 39 to 58 (USDA 2014). These data show a trend toward more small farms in the Anchorage Area Agricultural Census Area.

Transportation

Increased transportation links between and within Anchorage and the Mat-Su Borough are being constructed and planned to accommodate the increasing population. New road projects and projects that widen or realign existing roads will likely fill wetlands and may result in other impacts, including altered hydrology and increased runoff from impervious surfaces.

The Alaska Range Transition SA includes portions of all five of Alaska's major highways: the Sterling, Seward, Parks, Glenn, and Richardson highways. These routes provide surface connections between coastal communities in Southcentral Alaska and the Interior and are heavily traveled by Alaska residents and visitors alike. The 2020-2023 STIP includes improvements such as resurfacing, widening, bridge replacements, and safety improvements for all five of these highways (DOT&PF 2020).

The Knik Arm Crossing is a proposed bridge across Knik Arm connecting Anchorage to Point MacKenzie. Construction of the preferred alternative would require approximately 40 acres of fill in wetlands and 90 acres of marine fill, as well as 33 piers within Knik Arm (FHWA 2007). Construction of infrastructure associated with the crossing and changes in land use would result in cumulative impacts to approximately 40,000 acres of land (FHWA 2007).

The Port MacKenzie Rail Extension project is a 32-mile rail line to connect Port MacKenzie on Cook Inlet to the existing rail system near Houston. The new rail link will shorten the distance between the Interior and the tidewater port. Five of the six segments of the project are substantially complete. The project is anticipated to be complete pending funding. In 2012, the U.S. Army Corps of Engineers (USACE) issued a permit to the Alaska Railroad Corporation for the project, permitting fill of 95.8 acres of wetlands (USACE 2012).

The West Susitna Access project is being explored by the Alaska Industrial Development and Export Authority (AIDEA). This project would connect the road system near Big Lake to the Yentna Mining District with an all-season access road. The road would access potential mine sites for gold, copper, and strategic metals, 65,0000 acres of agriculture area, 700,000 acres of timber resources, and 6 million acres of recreational land (AIDEA 2021).

Potential airport improvements at Big Lake, Gulkana, Homer, Palmer, Soldotna, and Talkeetna including runway rehabilitation and widening, and apron and taxiway construction. Long-term improvements at the Ted Stevens Anchorage International Airport, which is the fifth-busiest airport in the world for cargo traffic, include runway realignments and extensions, terminal renovations and expansions, and construction of additional facilities, including parking areas, airport support buildings, and fuel storage (RS&H 2014).

The Alaska Range Transition SA has the highest density of roads of the seven terrestrial SAs. Roads are the primary vector for the spread of invasive species. Invasive species are prevalent along the highway corridors within the SA (AKNHP 2021b). Invasive species of particular concern are those that colonize river floodplains and riparian areas or are particularly insidious wetland invaders, including reed canary grass, purple loosestrife, yellow toadflax, white sweetclover, and narrowleaf hawksbeard. Floatplanes can also spread aquatic invasive species between waterbodies over large distances.

Resource Development

Hydroelectric

The Susitna-Watana Hydroelectric Project is a proposed hydroelectric dam on the upper Susitna River in the Talkeetna Mountains. The project would include a 705-foot dam and a 23,500-acre

reservoir that would stretch 42 miles upstream, as well as associated facilities, access roads, transmission lines, substations, worker housing, an airstrip, and a railroad spur. Construction of the dam and facilities would likely impact wetlands, and filling the reservoir would result in flooding and loss of riparian habitat, streams, and wetlands along the 42 miles upstream of the dam.

Oil and Gas

The Alaska Liquefied Natural Gas (LNG) Project is a proposed project to develop natural gas resources in the Arctic and transport the gas to Southcentral Alaska for export. The project would involve construction of an 800-mile, large-diameter pipeline from the North Slope to Cook Inlet. Within the SA the selected route follows the Parks Highway and the Susitna River, crossing Cook Inlet to a terminal at Nikiski (FERC 2020). A liquefaction plant, LNG storage facilities, and a tanker terminal would be constructed at Nikiski. Construction of the pipeline and liquefaction and export facilities would result in impacts to wetlands, including stream crossings and fill in estuarine areas (FERC 2020).

Mining

The only operating coal mine in Alaska is within the Alaska Range Transition SA. Usibelli Coal Mine in Healy holds five active permits within the Nenana Coal Field, which together produce an average of 2 million tons of coal per year. Several coal mines operated in the Matanuska area in the early 20th century, and most ceased operation in the 1980s. Usibelli Coal Mine purchased the lease for the Wishbone Hill Mine near Sutton in 1997 and began exploration work in 2010.

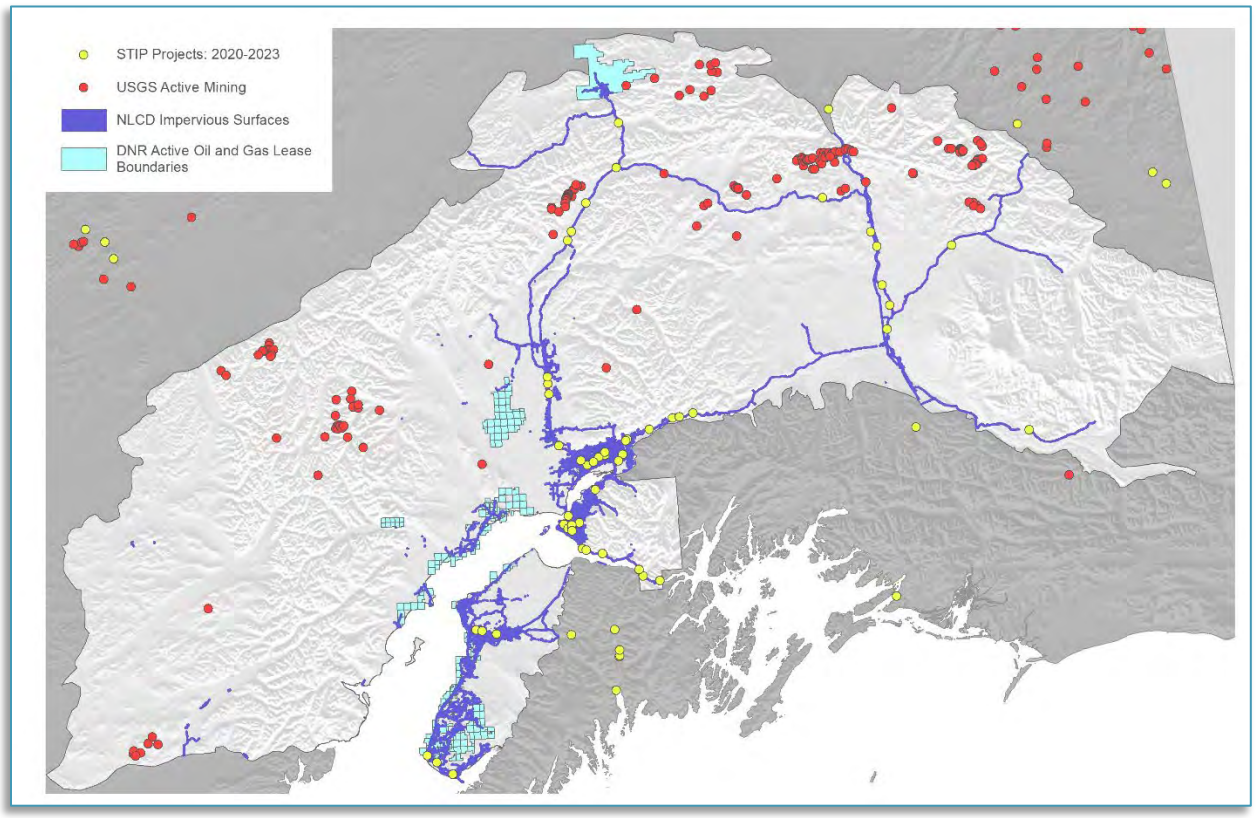
There are multiple hard rock mine prospects within the SA, located primarily in the Alaska Range. These prospects are copper, gold, silver, molybdenum, nickel, and platinum deposits, and are all in the exploration phase. Significant copper, gold, silver, and molybdenum deposits occur in the Southwest Alaska region of the SA as well.

Pebble Limited Partnership, a consortium of mining companies, is planning to develop a large-scale mine to extract up to 6.5 billion tons of ore, including copper, gold, molybdenum, and silver (DNR 2021f). The Pebble deposit is the largest undeveloped porphyry copper deposit in the world, and the majority lies within the Alaska Range Transition SA, north of Lake Iliamna. In November 2020, the U.S. Army Corps of Engineers denied the Section 404/Section 10 permit for impacts to wetlands and waterbodies. The permit denial has been appealed by the Pebble Limited Partnership and the appeal is currently under review.

Impacts from mining activities include short-term impacts during construction and long-term impacts resulting from conversion or degradation of aquatic resources. The footprint of a mine and associated facilities, buildings, and roads would impact wetlands, streams, and waterbodies by filling or excavating these resources. Without proper mitigation fish and wildlife populations would also be affected by direct loss of habitat. Transportation corridors associated with a mine would impact aquatic resources from vehicles and increasing sedimentation from air-dispersed dust or sloughing of gravel shoulders. Sloughing can also alter normal stream flow. Culverts installed at stream crossings in the corridor may fail by becoming perched or crushed, impeding fish movement and resulting in the loss of habitat upstream.

This ILFP will offset these threats to aquatic resources by protecting and restoring wetlands and waters that function similarly within the same ecoregion, in accordance with the goals and objectives stated below.

Some of the threats described are shown in Inset 4.



Inset 4. Threats to Aquatic Resources within the Alaska Range Transition SA

2.2.4 Aquatic Resource Goals and Objectives

Of the 23,700,000 acres of state lands within the SA, approximately 49 percent is covered by NWI mapping. **Table 10** displays the types and amounts of aquatic resources on State of Alaska land within the Alaska Range Transition SA that have been mapped by the NWI and could potentially be used for restoration, enhancement, and/or preservation mitigation activities.

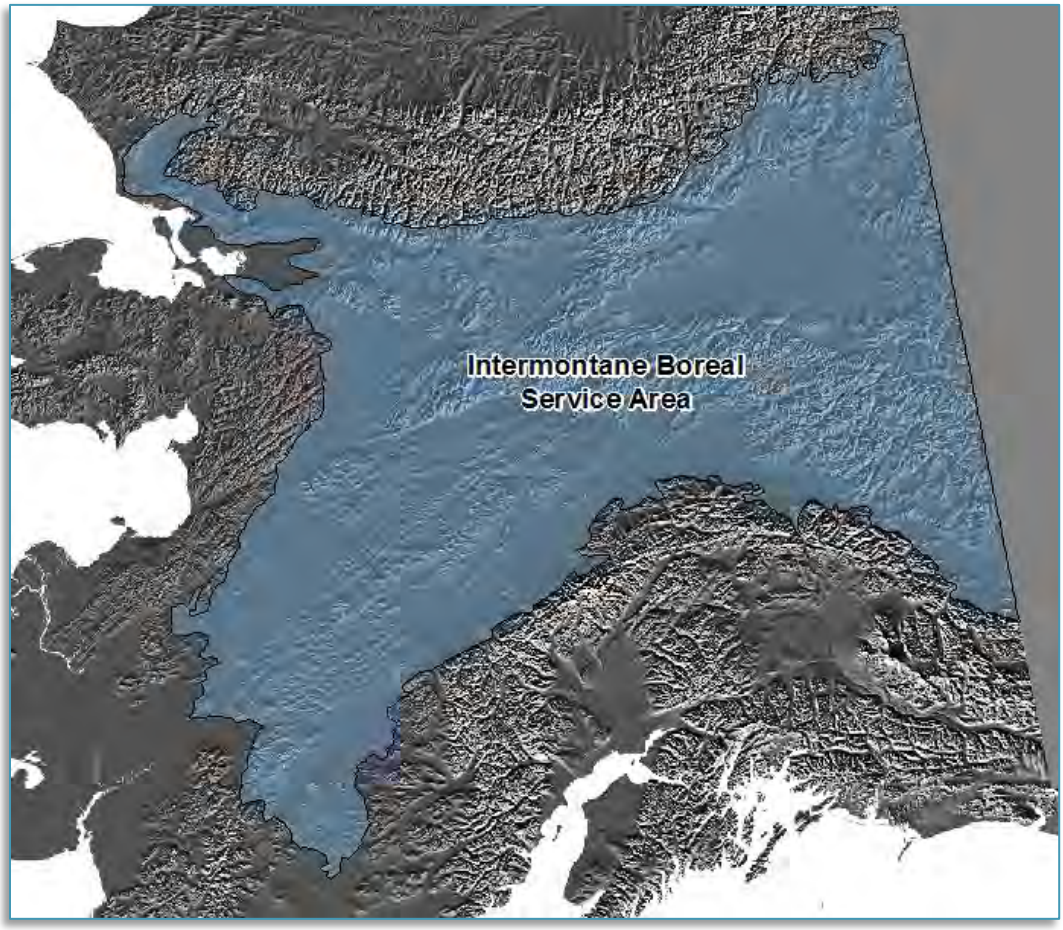
Table 10. State-Owned Aquatic Resources within the Alaska Range Transition SA[1]	
Aquatic Resource Type	**Acres**
Estuarine and Marine Deepwater	5,516
Estuarine and Marine Wetland	63,504
Freshwater Emergent Wetland	625,217
Freshwater Forested/Shrub Wetland	2,368,416
Freshwater Pond	81,412
Lake	188,736
Freshwater Moss/Lichen Wetland	24
Riverine	321,470
TOTAL	**3,654,297**

1. Based on NWI Mapping (USFWS 2021).

Within the Alaska Range Transition SA, the State of Alaska will work to achieve the following goals and objectives:

- Use the State's resources and partnerships to select, secure, and implement aquatic resource restoration, establishment, enhancement, and/or preservation activities to improve watershed health.
- Ensure a greater level of certainty in the outcome of restoration and enhancement mitigation projects through coordinated efforts by State conservation professionals who are deeply familiar with the SA.
- Remove threats to important aquatic resources through preservation.
- Reduce the extent of cumulative adverse impacts to aquatic resources throughout the Alaska Range Transition SA.
- Preserve, restore, and enhance aquatic resources that provide habitat for migratory birds, anadromous fish, and species of conservation concern.
- Increase the types of aquatic resources available for compensatory mitigation in the SA.

2.3 Intermontane Boreal SA



Inset 5. Intermontane Boreal Service Area

The Intermontane Boreal SA (Inset 5) is the largest SA covering 181,308 square miles and containing a portion of the largest coniferous forest in the world. This SA is the second most populated with approximately 110,000 people living within the boundaries. The largest population center is Fairbanks, with a population of 31,535 (U.S. Census Bureau 2012; see **Table 11**). This SA contains the Fairbanks North Star Borough (FNSB) and parts of the Northwest Arctic Borough and the Denali Borough. The State of Alaska is the largest landowner within this region (see **Table 12**).

Table 11. Population Centers within the Intermontane Boreal SA

Major Cities (Population >1,000)	Population
Fairbanks	31,535
North Pole	2,117

There are nine ecoregions within this SA, which consist of mountains and river valleys (Nowacki et al. 2001). The river valleys include the Yukon-Old Crow Basin, the Tanana-Kuskokwim Lowlands, and the Yukon River Lowlands. Ecoregions of old, largely unglaciated mountains are the Kobuk Ridges and Valleys, the Ray Mountains, the Davidson Mountains, the North Ogilvie Mountains, the Yukon-Tanana Uplands, and the Kuskokwim Mountains (Spencer et al. 2002).

Average annual precipitation ranges from 10 to 24 inches and the mean annual temperatures are between 20 and 30°F (ADF&G 2006).

Table 12. Major Landowners within the Intermontane Boreal SA

Landowner	Percent of SA
State of Alaska	37.8
Federal – U.S. Fish and Wildlife Service	23.8
Private	19.6
Federal – Bureau of Land Management	11.7
Federal – National Park Service	5.5
Federal – Department of Defense	1.5

The boreal region is characterized by long, cold winters and short, warm summers and is typically dry. Temperature ranges become greater and the precipitation decreases from west to east within the SA. Most of the area is underlain by ice-rich permafrost, which is present in continuous and discontinuous patches with varying patterns and thicknesses. The boreal lowlands are drained by several large river systems, including the Yukon, Porcupine, Tanana, Koyukuk, and Kuskokwim. The river valleys are covered with a thick layer of loess, blown off the Alaska Range or deposited by side streams from adjacent hills and mountains (Spencer et al. 2002).

Well-drained floodplains of the river systems contain white spruce and balsam polar forests. Wet sedge meadows and aquatic vegetation occur in sloughs and oxbow ponds. Permafrost-dominated lowlands contain black spruce forests, as well as dwarf birch, ericaceous shrubs, and sedge-tussock bogs (Spencer et al. 2002).

Black bears, brown bears, caribou, moose, Dall sheep, minks, weasels, lemmings, muskrats, river otters, foxes, snowshoe hares, martens, marmots, and lynx are all found within this SA. Aquatic habitats support large concentrations of nesting waterfowl and other migratory birds. All five species of Pacific salmon, sheefish, whitefish, Dolly Varden, northern pike, and Arctic grayling are also found in the SA (ADF&G 2006).

2.3.1 Current Aquatic Resource Conditions

Wetlands

NWI mapping is available for approximately 33 percent of the Intermontane Boreal SA (USFW 2021). Most of the area of NWI coverage is along the road system and within several of the larger federal conservation units within the SA. Within this coverage area, 15,699,969 acres are mapped as wetlands. NWI habitat types occurring within the SA are shown in **Table 13**.

The Intermontane Boreal SA is the sole terrestrial SA that lacks marine coastline. The SA includes approximately 9 miles of shore along Selawik Lake, which is slightly brackish, and approximately 0.5 mile of the shore of a lagoon on Hotham Inlet. The small acreage of estuarine waters and wetlands represents a portion of Krusenstern Lagoon that is within the SA.

Most of the SA is underlain by discontinuous permafrost, although the Tanana-Kuskokwim Lowlands are predominantly underlain by isolated masses of permafrost. The SA contains diverse topography, which influences the occurrence and prevalence of wetlands across the region. More mountainous regions have less wetland area, ranging from approximately 40 percent wetland coverage in the Yukon-Tanana Uplands to approximately 53 percent in the Kuskokwim Mountains

(McNab and Avers 1994). Flat bottomlands along major rivers and valleys have a higher percentage of wetlands; approximately 61 percent wetland coverage in the Yukon and Kuskokwim lowlands and up to approximately 76 percent wetlands in the valleys of the upper Kobuk River (McNab and Avers 1994). The valleys and lowlands of the Yukon River Basin contain expansive and highly productive wetlands that support large populations of wildlife, including abundant waterfowl. Forested wetlands are prevalent within the Tanana and Yukon Flats (Whitcomb et al. 2009).

Table 13. Acres of NWI Mapping within the Intermontane Boreal SA by Habitat Type

NWI Habitat Type	Acres	Percent of Wetland Area
Estuarine and Marine Deepwater Habitat	44	<1
Estuarine and Marine Wetland	1	<1
Freshwater Emergent Wetland	1,410,607	10
Freshwater Forested-Shrub Wetland	12,746,883	65
Freshwater Pond	168,794	1
Lake	455,665	3
Freshwater Moss/Lichen Wetland	54,426	<1
Riverine	863,546	5
TOTAL	**15,699,969**	**-**

Rivers and Streams

The Intermontane Boreal SA contains the headwaters, drainages, and floodplains of the largest river systems in Alaska. There are 234,571 miles of streams included in the NHD within the SA (USGS 2016). Of these, approximately 19,657 miles of streams, in addition to 25 lakes, are included in the AWC (ADF&G 2015a). Major river systems in the SA include the Upper Kuskokwim, Yukon, Koyukuk, Tanana, Porcupine, Kobuk, Noatak, and Innoko rivers. Rivers and streams within the Alaska Range Transition SA that support salmon are EFH.

At 1,980 miles, the Yukon River is the longest river in Alaska. It flows from its source at Llewellyn Glacier in British Columbia across Alaska to Norton Sound on the Bering Sea. Significant tributaries include the Pelly, Porcupine, Tanana, Koyukuk, and Innoko rivers. The river and its tributaries drain an area of about 328,000 square miles. The Yukon is home to one of the longest salmon runs in the world, as Chinook, coho, and chum salmon migrate from the Bering Sea to spawning streams in Alaska, Yukon, and British Columbia. The Yukon River forms the boundary between the Bering Taiga SA and the Intermontane Boreal SA.

The Porcupine River drainage is the largest tributary system of the Yukon River. The Porcupine begins in the Ogilvie Mountains in Yukon Territory and flows approximately 500 miles to its confluence with the Yukon River. The Porcupine River drainage basin is approximately 45,000 square miles.

The Tanana River begins at the confluence of the Chisana and Nabesna rivers, which drain from the Wrangell-St. Elias Mountains, and flows approximately 580 miles to the Yukon River. The

Tanana River drains an area of approximately 44,000 square miles, primarily from the north side of the Alaska Range. Although the Tanana River drainage is smaller than the Porcupine River drainage, the Tanana contributes the greatest percentage of flow to the Yukon River (approximately 19.6 percent; Brabets et al. 2000).

Protected and/or Conservation Areas

Approximately 24 percent of the land in the Intermontane Boreal SA is within the National Wildlife Refuge (NWR) System. Refuges range in size from the Yukon Flats NWR, at 8.6 million acres, to Tetlin NWR, which at 700,000 acres is the second smallest NWR in Alaska. These Refuges all contain large wetland areas.

Yukon Flats NWR protects the Yukon Flats, an area of extensive flat wetlands along the Yukon, Porcupine, and Chandalar rivers. Approximately 48 percent of the Refuge is covered by wetlands, including marshes, shallow lakes, oxbows, sloughs, and meandering streams (USFWS 1985). The Yukon Flats is one of the largest waterfowl breeding areas in North America and supports the highest density of breeding ducks in Alaska.

Creamer's Field Wildlife Refuge, in Fairbanks, was the site of a dairy until 1966. It is a State Wildlife Refuge managed by ADF&G that protects wetlands and fields that are used as a stopover by migrating birds.

Protected and/or Conservation Areas

USFWS
- Innoko NWR
- Kanuti NWR
- Koyukuk NWR
- Nowitna NWR
- Selawik NWR
- Tetlin NWR
- Yukon Flats NWR
- Arctic NWR
- Nowitna WSR
- Selawik WSR
- Sheenjek WSR
- Wind WSR
- North Fork Koyukuk WSR
- Salmon WSR

DNR
- Chena River State Recreation Area
- Tanana Valley State Forest
- Goldstream Public Use Area

BLM
- Beaver Creek WSR (co-managed with USFWS)
- Birch Creek WSR
- Delta WSR
- Fortymile WSR
- Steese National Conservation Area
- White Mountain National Recreation Area

NPS
- Cape Krusenstern National Monument
- Denali National Park and Preserve
- Gates of the Arctic National Park and Preserve
- Kobuk Valley National Preserve
- Wrangell-St. Elias National Park and Preserve
- Yukon-Charley Rivers National Preserve
- Charley WSR
- Kobuk WSR

ADF&G
- Creamer's Field Migratory Waterfowl Refuge
- Minto Flats State Game Refuge
- Delta Junction Bison Range

Threatened and Endangered Species

Wood bison, a federally listed threatened species, are native to Alaska, although overhunting and change in habitat distribution led to their extirpation in Alaska in the early 1900s. In 2015, a herd of 130 wood bison were reintroduced near Shageluk. The Lower Yukon-Innoko Rivers herd is anticipated to reestablish a sustainable wild population of wood bison in Alaska.

Important Bird Areas

IBAs within the SA are located along river lowlands that contain large wetland complexes with habitats including emergent and scrub-shrub riparian areas, muskegs, lowland conifer forests, and sedge meadows. These areas are crucial habitat for migrating birds including swans, geese, ducks, cranes, and raptors.

Important Bird Areas

Coastal IBAs
- Krusenstern Lagoon

Interior IBAs
- Alaska Range Foothills
- Creamer's Field
- Iditarod River Lowlands
- Minto Flats
- Selawik Basin*
- Upper Tanana River Valley
- Yukon-Charley Rivers
- Yukon Flats East*
- Yukon Flats West*

*Potential Global IBA

2.3.2 Historic Loss of Aquatic Resources

Mining has been a major driver in land development in the Intermontane Boreal SA. Based on USGS (2015) records, 496 active and inactive mines have been in production within the SA. The largest hardrock mines in production within the SA are Pogo Mine, Red Dog Mine, Fort Knox, and Nixon Fork. Exploration mining is performed on a smaller scale, thus impacts are relatively minor and short term in comparison. The most sought-after minerals have primarily been gold, copper, and zinc. Coal was also heavily mined up until the discovery of the Prudhoe Bay oilfield in the 1950s, which brought about the conversion of coal infrastructure to oil and gas sources. There are six abandoned coal mines within the SA and one currently in operation, the Usibelli Coal Mine, near Healy.

Abandoned coal and hardrock mines could potentially be a source of water pollution from AMD. Chemical reactions from AMD could potentially dissolve heavy metals such as copper, lead, and mercury into surface and groundwater. These metals have the potential to contaminate drinking water, disrupt the growth of aquatic plants, degrade or destroy fish and wildlife habitat, and corrode infrastructure over time. AMD can be mitigated on small scales through the creation of wetlands, where natural processes can effectively neutralize the impact of the heavy metals, if the wetlands are actively monitored and managed.

The ADEC Contaminated Sites Database contains 874 contaminated site cases within the Intermontane Boreal SA (ADEC 2015a). The dominant sources of impact are urban runoff of petroleum products and sediment, and toxic releases from mining operations. **Table 14** lists the nine impaired waterbodies within the Intermontane Boreal SA and the sources of impairment for each.

The NLCD shows 97,082 acres of development within the Intermontane Boreal SA for 2011 (Xian et al. 2011). This represents 0.08 percent of the entire SA.

Table 14. ADEC Category 4a, 4b, and 5 Impaired Waterbodies[1]		
Waterbody Name	**Source of Impairment**	**Community/Landmark**
Birch Creek Drainage	Placer Mining – Turbidity	Fairbanks
Garrison Slough	Military – Toxic and Deleterious Substances	Eielson Air Force Base
Noyes Slough	Urban Runoff, Oil and Grease	Fairbanks
Chena River	Urban Runoff – Sediment	Fairbanks
Chena Slough	Urban Runoff – Sediment	Fairbanks
Crooked Creek	Placer Mining – Toxic and Deleterious Substances	Fairbanks
Goldstream Creek	Placer Mining – Turbidity	Fairbanks
Kuskokwim River	Mining – Toxic and Deleterious Substances	Red Devil
Red Devil Creek	Mining – Toxic and Deleterious Substances	Red Devil

[1] (ADEC 2018).

2.3.3 Threats to Aquatic Resources

Urbanization and Development

Between the 2000 and 2010 censuses, the population of the Intermontane Boreal SA increased by approximately 14,400 people (U.S. Census Bureau 2012). This SA, which has the second largest population, correspondingly experienced the second largest population increase of the seven terrestrial SAs during this time frame. The FNSB is the second largest city in the state after Anchorage, and population growth trends are expected to continue.

Wetlands and aquatic resources within population hubs are at the most risk for conversion, degradation, and fragmentation. The FNSB does not maintain a wetlands management plan, and the only direction regarding wetlands in the FNSB *Regional Comprehensive Plan* is to "advocate for reasonable application of wetlands regulations" in order to maintain water quality within the FNSB (FNSB 2005). In 2015, the Tanana Valley Watershed Association prepared a *Watershed Resource Action Plan* to identify threats to resources in the Chena River watershed and develop strategies to mitigate those threats and enhance the health of the watershed (Tanana Valley Watershed Association 2015). Concerns within the Chena watershed, the lower reach of which flows through downtown Fairbanks, include incompatible development, filling of wetlands, and removal of native vegetation from riparian areas, which can destabilize the banks of the river, increase erosion, and reduce water quality.

Based on the NLCD, 1,407 acres of undeveloped land within the SA were converted to developed uses between 2001 and 2011. Approximately 51 percent of this development occurred in the Fairbanks area. Of the recently developed area, approximately 198 were characterized as wetland and water prior to conversion (Xian et al. 2011).

Recreation

Increases in human population lead to increased use of aquatic resources for recreational purposes. Recreational and utilitarian ATV use is prevalent throughout the SA. Wetlands and

streams are particularly sensitive to degradation by ATVs. Heavy ATV traffic in off-road areas damages soil and vegetation and disrupts hydrology (Hunt 2002). There are approximately 850 miles of trails within the FNSB, many of which permit ATV use. Increased ATV trails and illegal off-trail ATV use will increase impacts on wetlands and streams.

Increased human traffic within waterbodies can also contribute to the spread of invasive species, such as *Elodea* and reed canary grass, which are species of particular concern in the Fairbanks area (Fairbanks Cooperative Weed Management Area).

Agriculture

Farming, primarily for hay production, represents a significant land use within the SA. In 2017, the Fairbanks Area Agricultural Census Area contained 274 farms totaling 102,005 acres (USDA 2017). This represents a 2 percent increase in acreage and a 26 percent increase in number of farms from 2012.

Transportation

The Intermontane Boreal SA is crossed by eight of Alaska's major highways: the Parks, Richardson, Dalton, Elliott, Steese, Tok Cutoff, Taylor, and Top of the World highways. These routes provide surface connections between interior communities and Southcentral Alaska, as well as connections to Canada and the Lower 48 states. These routes are heavily traveled by Alaska residents and visitors alike. The 2020-2023 STIP includes improvements such as resurfacing, widening, bridge replacements, and safety improvements for the Dalton, Elliott, Richardson, Alaska, Parks, Taylor, and Steese highways, as well as road improvement projects in Fairbanks (DOT&PF 2020). New road projects and projects that widen or realign existing roads will likely fill wetlands, and may result in other impacts, including altered hydrology, and increased runoff from impervious surfaces.

In 2013, work began on a single-lane gravel road that extends 35 miles from Manley Hot Springs to the Yukon River near the village of Tanana. The road, part of the Roads to Resources Initiative, is intended to increase access to mineral developments in the region, and was studied as the first segment of a potential road corridor to Nome (for the Western Alaska Access Project). The road toward Tanana was completed in 2016, although there are currently no further plans for building additional segments of a road to Nome.

Ambler road is 200-mile-long road from the Dalton Highway to the Ambler Mining District. This road will allow access to the Ambler Mining District for mining exploration and development projects. The proposed road corridor is on the boundary between the Intermontane Boreal SA and the Arctic Tundra SA and could potentially impact aquatic resources within both SAs (BLM 2020).

The Northern Rail Extension project is a proposed rail link between North Pole and Delta Junction. The project extends passenger and freight service to North Pole and provides year-round access to military training areas on the south side of the Tanana River. The bridge spans 3,300 feet over the Tanana River, making it one of the longest bridges in Alaska. The bridge and its 2-mile-long levee required 12,650 tons of steel girders, 12,000 cubic yards of concrete, 9,000 truckloads of

riprap, and 600,000 cubic yards of embankment (Richardson 2014). This phase resulted in permanent filling of 6.2 acres of wetlands and 26.4 acres of the Tanana River (USACE 2011a).

The Alberta to Alaska Railway Development Corporation is proposing to build a rail connecting Northern Canada to the Northern Rail Extension project. The project would build 200 miles of new rail and rail embankment, would cross the US/Canada border near Tok and connect with the Alaska Railroad in Delta Junction.

Long-term improvements planned at the Fairbanks International Airport include runway reconfiguration and terminal expansion (PDC 2014). Additional airport improvement projects will be needed and potentially funded by FAA for airports serving Ambler, Bettles, Chuathbaluk, Fort Yukon, Manley Hot Springs, McGrath, Tanana, Tok, and potentially other communities.

The Intermontane Boreal SA receives the Alaska and Top of the World Highways, which are two of only three major surface connections to Canada and the Lower 48 states. Roads are the primary vector for the spread of invasive species. Invasive species are prevalent along the highway corridors within the SA (AKNHP 2021b). Invasive species of particular concern are those that colonize river floodplains and riparian areas or are particularly insidious wetland invaders, including reed canary grass, purple loosestrife, yellow toadflax, white sweetclover, and narrowleaf hawksbeard. Floatplanes can also spread aquatic invasive species between waterbodies over large distances.

Resource Development

Oil and Gas

The Alaska LNG Project would require construction of a pipeline across the Intermontane Boreal SA to transport natural gas from the North Slope to Cook Inlet. Construction of a pipeline would result in impacts to wetlands, including stream crossings. Wetlands within this area are predominantly scrub-shrub and forested, and are located on permafrost soils.

Mining

Expansion of existing mines presents the most likely source of impacts to aquatic resources from mining within the SA. Continued exploration of deposits occurs concurrently with active mining operations, as the mining infrastructure already in place reduces the high cost of exploring new deposits. There are two operating gold mines within the SA. Fort Knox is an open pit gold mine 25 miles northeast of Fairbanks. The mine area includes an open pit mine, mill, administrative facilities, tailings storage facility, water storage reservoir and the Walter Creek and Barnes Creek Heap Leach facilities (DNR 2021g). Pogo Mine is an underground cut-and-fill operation using gravity, flotation, and cyanide leaching processes to recover gold. The mine is located 38 miles northeast of Delta Junction, Alaska. Access to the mine is via a 49-mile all season road from the Richardson Highway. In addition to the underground mine workings, major facilities include surface mill, dry stack tailings facility, water management systems, administrative facilities, 250 person upper camp and 203 person lower camp (DNR 2021d).

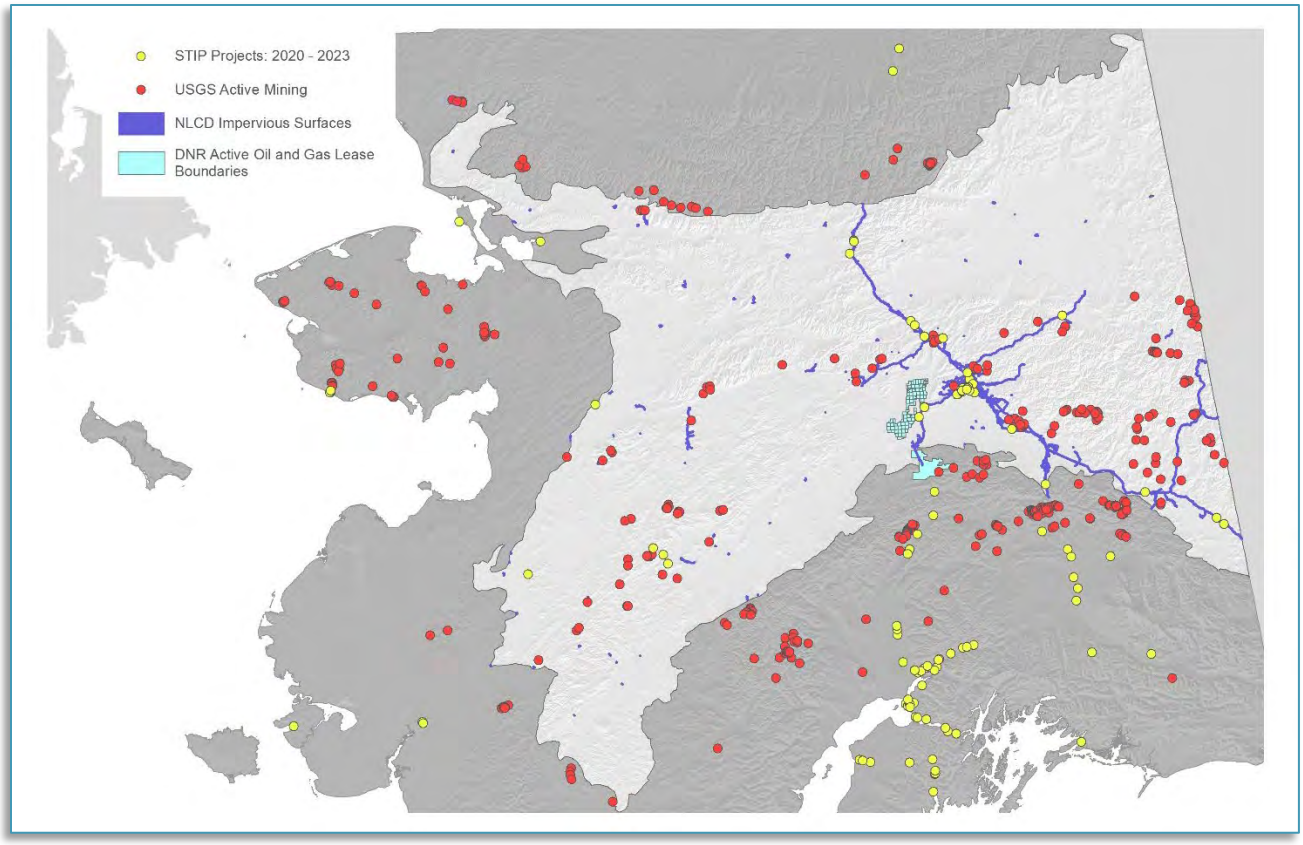
There are 16 active hard rock mine prospects within the SA, located primarily in the Yukon-Tanana Uplands. These prospects are mostly gold deposits, but also include copper, molybdenum, silver, antimony, tin, and rare earth elements prospects. There are also significant gold deposits in the Kuskokwim Mountains.

The Donlin project is a proposed gold mine 10 miles northwest of Crooked Creek, a village on the Kuskokwim River. The project consist of an open pit mine operating for 27-plus years. Project components would include a mine pit, processing facility, waste rock facility, tailings storage facility, 30-mile access road, port on the Kuskokwim River, over 300 mile pipeline, airstrip and more (DNR 2021e).

The Ambler Mining District in the Kobuk River Valley has significant zinc, copper, gold, silver, and lead deposits. A 2020 feasibility study estimated (using 12 year mine life) 1.8 billion pounds of copper, 2.3 billion pounds of zinc, 384 million pounds of lead, 384,000 ounces of gold, and 40 million ounces of silver (Ausenco 2020).

This ILFP will offset these threats to aquatic resources by protecting and restoring wetlands and waters that function similarly within the same ecoregion, in accordance with the goals and objectives stated below.

Some of the threats described are shown in Inset 6.



Inset 6. Threats to Aquatic Resources within the Intermontane Boreal SA

2.3.4 Aquatic Resource Goals and Objectives

Of the 35,440,000 acres of state lands within the SA, approximately 42 percent is covered by NWI mapping. **Table 15** displays the types and amounts of aquatic resources on State of Alaska land within the Intermontane Boreal SA that have been mapped by the NWI and could potentially be used for restoration, enhancement, and/or preservation mitigation activities.

Table 15. State-Owned Aquatic Resources within the Intermontane Boreal SA[1]	
Aquatic Resource Type	**Acres**
Estuarine and Marine Deepwater	0
Estuarine and Marine Wetland	0
Freshwater Emergent Wetland	396,815
Freshwater Forested/Shrub Wetland	5,156,020
Freshwater Pond	39,388
Lake	109,161
Freshwater Moss/Lichen Wetland	11,281
Riverine	276,800
TOTAL	**5,989,466**

[1.] Based on NWI Mapping (USFWS 2021).

Within the Intermontane Boreal SA, the State of Alaska will work to achieve the following goals and objectives:

- Use the State's resources and partnerships to select, secure, and implement aquatic resource restoration, establishment, enhancement, and/or preservation activities to improve watershed health.
- Ensure a greater level of certainty in the outcome of restoration and enhancement mitigation projects through coordinated efforts by State conservation professionals who are deeply familiar with the SA.
- Remove threats to important aquatic resources through preservation.
- Reduce the extent of cumulative adverse impacts to aquatic resources throughout the Intermontane Boreal SA.
- Preserve, restore, and enhance aquatic resources that provide habitat for migratory birds, anadromous fish, and species of conservation concern.
- Increase the types of aquatic resources available for compensatory mitigation in the SA.

2.4 Aleutian Meadows SA

Inset 7. Aleutian Meadows Service Area

The Aleutian Meadows SA (Inset 7) covers 29,282 square miles and stretches approximately 2,000 miles from Lake Iliamna to the Near Islands. Approximately 11,000 residents live within its borders, and approximately half of the population is located within the communities of Unalaska and Akutan (U.S. Census Bureau 2012; see **Table 16**). The USFWS is the largest landowner holding approximately one-third of all the land (see **Table 17**). The SA contains the Aleutians East Borough and a portion of the Lake and Peninsula Borough.

Table 16. Population Centers within the Aleutian Meadows SA

Major Cities (Population >1,000)	Population
Unalaska	4,376
Akutan	1,027

The region is defined by cool, moist, harsh weather and is heavily exposed in its location between the Bering Sea and the North Pacific Ocean. It is formed by the Pacific Plate subduction zone and is one of the most seismically and volcanically active areas in the world. The Aleutian Meadows SA includes the Alaska Peninsula and Aleutian Islands ecoregions (Nowacki et al. 2001). The average annual precipitation ranges from 20 to 82 inches with an average annual temperature between 34 to 39°F (ADF&G 2006).

The Alaska Peninsula has been affected by extensive glaciation that has rounded off the lower mountains of the Aleutian Range and left large basins filled with freshwater lakes along the western slopes. The Aleutian Islands are predominantly volcanic features rising from the ocean. Permafrost is absent in the region (Spencer et al. 2002).

Table 17. Major Land Owners within the Aleutian Meadows SA

Land Owner	Percent of SA
Federal – U.S. Fish and Wildlife Service	33.7
Private	24.9
Federal – National Park Service	22.8
State of Alaska	14.8
Federal – Bureau of Land Management	3.2
Federal – Department of Defense	0.6

Trees are limited within this SA and are generally limited to a few Sitka spruce perched on rocky promontories on the Shelikof Strait coast. Lush meadow and heath vegetation are typical of the region. Barren cinder plains cover areas of recent glaciation and volcanic activity (Spencer et al. 2002).

Wildlife within the SA includes brown bears, wolves, wolverines, lynx, moose, caribou, tundra hares, and marmots. All five species of Pacific salmon, steelhead trout, rainbow trout, Arctic grayling, and Dolly Varden are also present. Coastal wetlands, lagoons, and bays provide staging areas for large seasonal aggregations of waterfowl and shorebirds. Sea otters, harbor seals, and Steller sea lions are found along the rocky coastlines. Introduced species include foxes and rats, which have decimated ground-nesting waterfowl on some islands (ADF&G 2006).

2.4.1 Current Aquatic Resource Conditions

Wetlands

NWI mapping is only available for approximately 13 percent of the Aleutian Meadows SA (USFWS2021). This is the lowest coverage available for the seven terrestrial SAs. The area covered by NWI mapping is limited to the northernmost portion of the SA, including portions of Lake Iliamna. Within this coverage area, 496,919 acres are mapped as wetlands. NWI habitat types occurring within the SA are shown in **Table 18**.

Table 18. Acres of NWI Mapping within the Aleutian Meadows SA by Habitat Type

NWI Habitat Type	Acres	Percent of Wetland Area
Estuarine and Marine Deepwater Habitat	1,195	<1
Estuarine and Marine Wetland	3,604	1
Freshwater Emergent Wetland	37,222	7
Freshwater Forested-Shrub Wetland	58,909	12
Freshwater Pond	15,594	<1
Lake	372,750	75
Freshwater Moss/Lichen Wetland	71	<1
Riverine	7,574	2
TOTAL	**496,919**	

Approximately 55 percent of the Bristol Bay Lowlands, which includes the portion of the Alaska Peninsula north of the Aleutian Range that drains into Bristol Bay, is covered by wetlands (McNab and Avers 1994). The Aleutian Islands, with their volcanic topography and glaciated mountains, are approximately 11 percent covered by wetlands (McNab and Avers 1994).

Rivers and Streams

Rivers and streams in the Alaska Peninsula arise from glaciers in the Aleutian Range, thus streams that flow north into Bristol Bay are longer than those that flow south into the Gulf of

Alaska. Rivers and streams in the Aleutian Islands are short and swift, many terminating in waterfalls over steep cliffs. There are 39,079 miles of streams included in the NHD within the SA (USGS 2016). Of these, approximately 5,614 miles of streams, in addition to 202 lakes, are included in the AWC (ADF&G 2015a). Many short, small streams on islands within the Aleutian Islands support anadromous fish populations. Major rivers include the upper Kvichak and Alagnak rivers.

Rivers and streams within the Aleutian Meadows SA that support salmon are EFH. Estuarine areas within the SA also provide important support to marine species that directly utilize estuarine habitat for feeding or portions of their lifecycle, or that benefit indirectly from other functions performed by estuarine areas. Federally managed marine species that are supported directly or indirectly by estuarine areas in the SA include Alaska plaice, arrowtooth flounder, Atka mackerel, blue king crab, Chinook salmon, dover sole, dusty rockfish, flathead sole, golden king crab, Greenland turbot, northern rockfish, pacific cod, pacific ocean perch, pink salmon, red king crab, rex sole, rock sole, sablefish, sculpin, shortraker, rougheye rockfish, skate, snow crab, squid, tanner crab, thornyhead rockfish, walleye pollock, weathervane scallop, yelloweye rockfish, and yellowfin sole.

Lake Iliamna, which at approximately 1,020 square miles is the largest lake in Alaska and eighth largest lake in the United States, is within the Aleutian Meadows SA. The lake is bordered by the Aleutian Range to the east and drains into the Kvichak River to the west. Lake Iliamna and its tributaries support spawning Chinook, coho, and sockeye salmon, as well as resident fish species including rainbow trout, Arctic grayling, Arctic char, and northern pike. The lake is also home to a population of resident freshwater harbor seals. It is unknown whether this population is a genetically distinct subspecies.

The Kvichak River flows from Lake Iliamna to Bristol Bay, totaling approximately 50 miles in length. The Kvichak River supports all five species of Pacific salmon, and contains the largest sockeye salmon run in the world. The river also provides a navigable connection between Lake Iliamna and Bristol Bay.

The Alagnak River is a tributary to the Kvichak River. The Alagnak flows for 64 miles from Kukaklek Lake to the Kvichak, and supports all five species of Pacific salmon. The upper 56 miles of the river are designated as a National WSR, which preserves the river in a free-flowing condition and protects its outstanding scenic, fish and wildlife, and recreation attributes.

Protected and/or Conservation Areas

Approximately 34 percent of the SA is included within the NWR system. The Alaska Maritime NWR, which was established to conserve marine mammals, sea birds, and other migratory birds and the marine resources upon which they rely, includes most of the land area of the Aleutian Islands as well as nearly 1,600 islands, islets, and rocks on the south side of the Alaska Peninsula. The Alaska Peninsula NWR, which was established to conserve fish and wildlife populations and habitats and protect subsistence resources, stretches along the southern coast of the Alaska Peninsula, covering 3.7 million acres within three units. Becharof NWR, which covers 1.2 million acres, is managed as a complex with two of the units of the Alaska Peninsula NWR. Becharof NWR contains Becharof Lake, the second largest lake in Alaska. At 315,000 acres, Izembek NWR is the smallest NWR in Alaska. The NWR is centered on Izembek Lagoon, which contains one of the largest eelgrass beds in the world. This unique habitat provides valuable feeding habitat for waterfowl, including Steller's eiders (listed as threatened under the ESA), and supports fish populations upon which many species of marine mammals feed.

Protected and/or Conservation Areas

USFWS
- Alaska Maritime NWR
- Alaska Peninsula NWR
- Becharof NWR
- Izembek NWR

NPS
- Katmai National Park and Preserve
- Aniakchak National Monument and Preserve
- Alagnak WSR
- Aniakchak WSR

ADF&G
- Port Moller CHA
- Port Heiden CHA
- Izembek State Game Refuge
- McNeil River State Game Refuge
- McNeil River State Game Sanctuary

Threatened and Endangered Species

Steller's eiders, which are listed as threatened under the ESA, winter in Izembek and Nelson lagoons, where they feed in shallow water habitats. Kittlitz's murrelets, which have been considered for listing, nest along the rocky coastal cliffs of the Aleutian Islands and the Alaska Peninsula (AKNHP 2021a).

Important Bird Areas

Many of the IBAs within the SA are important seabird breeding colonies. More than 10.5 million individual seabirds of 26 species nest on the Aleutian Islands. Abundant species include storm-petrels, auklets, tufted puffins, red-faced cormorants, and northern fulmars. Although the rocky terrain of much of the Aleutian Islands does not provide quality waterfowl habitat, some species of waterfowl nest within the Aleutian Islands, such as the Aleutian cackling goose. The Aleutian cackling goose population was decimated by introduced Arctic fox and considered extinct by 1930. A colony was discovered on Buldir Island in 1962, and as the population has recovered the species was delisted under the ESA in 2001.

Evermann's rock ptarmigan, a bird species of conservation concern, is endemic to the SA. This species was also hunted to near extinction by foxes. A single population remained on Attu Island, and the species was reintroduced to Agattu Island in 2003.

Important Bird Areas

Coastal IBAs

- Cape Douglas to Amalik Bay *
- Chignik Bay
- Ivanof Bay
- Izembek Lagoon & Bechevin Bay
- Kamishak Bay
- Kuluk Bay
- Northern Alaska Peninsula Coastal
- Pavlof Bay*
- Port Moller
- Sanak Islands Marine*
- Urilia Bay
- Wide Bay

Interior IBAs

- Agattu Island, Interior

Colonies

- Agattu Island Colonies
- Akun Strait Colonies
- Amagat & Umga Island Colonies
- Amak Island Colony
- Amakdedulia Cove Colony
- Amalik Bay Colonies
- Amchitka Island Colony
- Attu Island Colony
- Baby Islands & Akutan Pass Colonies
- Bird Island Colony
- Buldir Island Colony
- Castle Rock Colonies
- Chagulak Island Colony
- Cherni Island Complex Colonies
- Contact Point Colony
- Entrance Point Colony
- Gareloi Island Colony
- Kanaga Island Colonies
- Kigul Islets Colonies
- Kiska Island Colonies
- Koniuji-Atka Island Colonies
- Koniuji-Shumagin Islands Colonies
- Near Island Colony
- Nelson Lagoon Colonies
- Ogangen Island Colonies
- Segula & Davidof Island Colonies
- Semichi Islands Colonies
- Semidi Islands Colonies
- Semisopochnoi Island Colonies
- Spitz Island Colony
- Ugaiushak Island Colonies
- Ugamak Strait Colonies
- Umnak Pass Colonies

*Potential Global IBA

2.4.2 Historic Loss of Aquatic Resources

Quantifying the extent of historic losses to aquatic resources within the Aleutian Meadows SA is difficult due to a lack of wetland mapping for the region. However, due to the low level of urbanization and resource development, losses are likely small as a percentage of the total aquatic resource abundance in the SA.

Mining activity has been limited within the SA. According to the USGS (2015), 7 producing mines for gold, copper, zinc, and pumice have operated within the SA.

The ADEC Contaminated Sites Database contains 259 contaminated sites cases within the Aleutian Meadows SA (ADEC 2015a). The dominant sources of impact are surface runoff, and spills or leaks of hazardous materials into nearby streams and soils. A majority of the contaminated sites are associated with World War II stations, bases, and minefields that contain hazardous waste, PCBs, asbestos, and diesel fuel leaks. The Department of Defense database lists 35 FUDS within the Aleutian Meadows SA that vary in size (USACE 2013a). Many of these sites require remediation associated with the presence of hazardous, radioactive, or toxic waste that may have impacted local water quality. The ADEC does not have any listed impaired waters in the SA (ADEC 2018).

The NLCD shows 6,602 acres of development within the Aleutian Meadows SA for 2011 (Xian et al. 2011). This represents 0.04 percent of the entire SA.

2.4.3 Threats to Aquatic Resources

Urbanization and Development

Between 2000 and 2010 the population of the SA increased by approximately 90 people (U.S. Census Bureau 2012). This SA experienced the smallest increase in population of the seven terrestrial SAs during this time frame.

Development within the SA is largely concentrated around existing communities. As communities grow, improvements such as housing, schools, water systems, roads, landfills, and sewage treatment facilities will be required. Future development is likely to occur within the boundaries of existing communities.

The Lake Iliamna and Kvichak River region is a popular sport fishing destination. Construction of fishing lodges, private cabins, boat launches, and recreational facilities on or in close proximity to salmon-bearing waters may lead to loss of riparian wetlands, increased sedimentation and pollution from construction and human activity, and alteration of hydrology in streams.

Based on the NLCD, 170 acres of undeveloped land within the SA were converted to developed uses between 2001 and 2011. This development occurred exclusively within communities, including Igiugig, Kokhanok, and False Pass. The largest single area developed was within Unalaska for improvements and construction along Captain’s Bay Road and Pyramid Creek Road. Of the recently developed area, the NLCD classified 4 acres as developed from wetland or open water habitat (Xian et al. 2011).

Transportation

Several communities within the SA are served by the AMHS, including Dutch Harbor, Akutan, Cold Bay, King Cove, and Sand Point. Ferry terminals in these communities require regular maintenance. The 2020-2023 STIP includes a project to replace the existing ferry terminal in Sand Point with a multi-use dock. The replacement dock will require terrestrial and marine fill. As ferry terminals in other communities age, future improvements and replacements will involve additional impacts to terrestrial and nearshore marine areas.

Surface transportation within the SA is limited by the terrain; there are only approximately 146 miles of existing roads within the SA. A proposed road between King Cove and Cold Bay is included in the 2020-2023 STIP. This road would provide residents of King Cove reliable access to the all-weather airport in Cold Bay. However, the proposed road corridor transects the Izembek NWR and would impact wetlands within the refuge.

As the communities within the SA are not connected to the statewide highway system, aviation is a primary mode of transportation to and from communities. Communities within the SA that that will require continuous airport improvements include Atka, Cold Bay, Iliamna, Nelson Lagoon, and Unalaska. Projects include rehabilitating runways, constructing storage buildings, constructing snow removal equipment buildings, and more. Additionally, Akutan received funds for the construction of a new airport.

Resource Development

The southwestern Alaska Peninsula contains significant mineral deposits, including gold, copper, molybdenum, silver, zinc, and lead. There are three active mine prospects within the Aleutian Meadows SA: the Alaska Peninsula project, a copper-gold-molybdenum prospect near Chignik; Pyramid, a copper-gold-molybdenum prospect on the Alaska Peninsula north of Unga Island; and Unga, a gold-copper prospect on Unga Island. These projects are in the exploration phase. Development of operating mines would involve impacts to aquatic resources from mining operations as well construction of support facilities.

Although the Pebble Deposit is located within the Alaska Range Transition SA, a large-scale mining operation would have impacts within the Aleutian Meadows SA. Components considered that would have direct impacts on aquatic resources within the Aleutian Meadows SA include a road or rail corridor on the north or south side of Lake Iliamna and construction of a deep-water port in Cook Inlet. Construction of these features would require filling freshwater and estuarine wetlands, which are abundant within the Lake Iliamna region, as well as filling marine areas.

This ILFP will offset these threats to aquatic resources by protecting and restoring wetlands and waters that function similarly within the same ecoregion, in accordance with the goals and objectives stated below.

Some of the threats described are shown in Inset 8.

Inset 8. Threats to Aquatic Resources within the Aleutian Meadows SA

2.4.4 Aquatic Resource Goals and Objectives

Of the 2,514,000 acres of state lands within the SA, approximately 26 percent is covered by NWI mapping. **Table 19** displays the types and amounts of aquatic resources on State of Alaska land within the Aleutian Meadows SA that have been mapped by the NWI and could potentially be used for restoration, enhancement, and/or preservation mitigation activities to generate credits for sale to prospective permittees.

Table 19. State-Owned Aquatic Resources within the Aleutian Meadows SA[1]

Aquatic Resource Type	Acres
Estuarine and Marine Deepwater	531
Estuarine and Marine Wetland	1,195
Freshwater Emergent Wetland	17,011
Freshwater Forested/Shrub Wetland	18,345
Freshwater Pond	9,913
Lake	40,709
Freshwater Moss/Lichen Wetland	64
Riverine	3,469
TOTAL	**91,237**

1. Based on NWI Mapping (USFWS 2021).

Within the Aleutian Meadows SA, the State of Alaska will work to achieve the following goals and objectives:

- Use the State's resources and partnerships to select, secure, and implement aquatic resource restoration, establishment, enhancement, and/or preservation activities to improve watershed health.

- Ensure a greater level of certainty in the outcome of restoration and enhancement mitigation projects through coordinated efforts by State conservation professionals who are deeply familiar with the SA.
- Remove threats to important aquatic resources through preservation.
- Reduce the extent of cumulative adverse impacts to aquatic resources throughout the Aleutian Meadows SA.
- Preserve, restore, and enhance aquatic resources that provide habitat for migratory birds, anadromous fish, and species of conservation concern.
- Increase the types of aquatic resources available for compensatory mitigation in the SA.

2.5 Bering Taiga SA

The Bering Taiga SA (Inset 9) comprises 80,050 square miles and extends along the western coast of Alaska adjacent to the Bering Sea from Norton Sound to Bristol Bay. The population of this SA is approximately 30,800, and Bethel is the largest city (U.S. Census Bureau 2012; see **Table 20**). The major landowner is the USFWS followed by private landowners, primarily Native corporations (see **Table 21**). This SA is mostly unorganized with only a small portion of the southern end within the Lake and Peninsula Borough.

Inset 9. Bering Taiga Service Area

The Bering Taiga SA is composed of four ecoregions: the Nulato Hills, Yukon-Kuskokwim Delta, Ahklun Mountains and the Bristol Bay Lowlands (Nowacki et al. 2001). The Ahklun Mountains and Nulato Hills are old weathered mountains, and the Bristol Bay Lowlands and Yukon-Kuskokwim Delta are low-lying depositional areas. The depositional areas have been formed by fluctuating sea levels during glacial periods and alluvial deposition from large river systems draining central Alaska. This results in glacial, alluvial, and marine sediments forming low-lying saturated soils in a mosaic of ponds, sloughs, streams, and wetlands.

Table 20. Population Centers within the Bering Taiga SA

Major Cities (Population >1,000)	Population
Bethel	6,080
Dillingham	2,329
Hooper Bay	1,093

Permafrost is nearly continuous in the Yukon-Kuskokwim Delta and patchy in the Bristol Bay Lowlands. The mountain ecoregions have rocky soils with sporadic permafrost in valleys. The average annual temperatures range from 23 to 39°F with an average annual precipitation of 12 to 32 inches, except in the Ahklun Mountains which receive 40 to 80 inches of precipitation annually (ADG&G 2006).

Vegetation in the Bering Taiga SA is largely dependent on the terrain. White spruce and balsam poplar forests border most river systems. Rolling hills support black spruce and paper birch forests as well as tall dwarf birch and alder shrub communities. Higher elevations are covered with shrub tundra and lichens or barrens. Lowlands contain emergent wetlands and sedge-tussock and sedge-moss bogs, with willows growing along stream channels (Spencer et al. 2002).

The river systems in this SA are among the most productive in the world. The Bristol Bay sockeye salmon run, which includes the Kvichak River, is the largest in the world, and huge pink salmon runs ascend the Unalakleet River every summer. All five species of Pacific salmon, steelhead, rainbow smelt, Dolly Varden, rainbow trout, Arctic grayling, whitefish, Bering cisco, Arctic lamprey, and northern pike are found in this SA. The ponds, lakes, and wetlands in this region support millions of staging and nesting waterfowl and shorebirds. Brown bears, black bears, wolves, wolverines, martens, lynx, foxes, moose, beavers, caribou, and Arctic hares are also found in this region. Walruses and sea lions haul out on rocky beaches (Spencer et al. 2002).

Table 21. Major Land Owners within the Bering Taiga SA

Land Owner	Percent of SA
Federal – U.S. Fish and Wildlife Service	37.8
Private	25.2
State of Alaska	19.7
Federal – Bureau of Land Management	17.0
Federal – National Park Service	0.2
Federal – Department of Defense	0.1

2.5.1 Current Aquatic Resource Conditions

Wetlands

NWI mapping is available for approximately 38 percent of the Bering Taiga SA (USFWS 2021). Coverage is higher in the Yukon-Kuskokwim Delta and sparser in the Nulato Hills, Ahklun Mountains, and Bristol Bay Lowlands ecoregions. Within this coverage area, 16,043,317 acres are mapped as wetlands. NWI habitat types occurring within the SA are shown in **Table 22**.

Table 22. Acres of NWI Mapping within the Bering Taiga SA by Habitat Type

NWI Habitat Type	Acres	Percent of Wetland Area
Estuarine and Marine Deepwater Habitat	109,009	1
Estuarine and Marine Wetland	216,867	1
Freshwater Emergent Wetland	10,538,609	65
Freshwater Forested-Shrub Wetland	2,686,710	17
Freshwater Pond	576,497	4
Lake	1,792,082	11
Freshwater Moss/Lichen Wetland	11,482	<1
Riverine	251,669	2
TOTAL	**16,182,925**	

The Yukon-Kuskokwim Delta is one of the largest coastal deltas in the world. The delta is approximately 79 percent covered by wetlands (Hall et al. 1994), and provides important habitat for migratory birds, fish, and marine mammals. Wetland types occurring within the delta include wet tundra, grassy sloughs, shrub swamps, ponds, brackish marsh, tidal meadows, and coastal mudflats.

The Bristol Bay Lowlands ecoregion includes the northern portion of the Alaska Peninsula that drains from the Aleutian Range. This flat lowland area contains abundant lakes and ponds, and is approximately 55 percent covered by wetlands (McNab and Avers 1994).

Rivers and Streams

The Bering Taiga SA contains the lower reaches and outlets of several significant river systems that flow from Interior Alaska and Canada into the Bering Sea. There are 148,999 miles of streams included in the NHD within the SA (USGS 2016). Of these, approximately 15,688 miles of streams, as well as 142 lakes, are included within the AWC (ADF&G 2015a). Major rivers include the lower reaches and outlets of the Yukon, Kuskokwim, Nushagak, and Kvichak rivers.

Rivers and streams within the Bering Taiga SA that support salmon are EFH. Estuarine areas within the SA also provide important support to marine species that directly utilize estuarine habitat for feeding or portions of their lifecycle, or that benefit indirectly from other functions performed by estuarine areas. Federally managed marine species that are supported directly or indirectly by estuarine areas in the SA include Alaska plaice, Chinook salmon, chum salmon, coho salmon, pink salmon, sockeye salmon, rock sole, sculpin, walleye pollock, and yellowfin sole.

At 1,980 miles, the Yukon River is the longest river in Alaska. The Yukon is home to one of the longest salmon runs in the world. The Yukon River forms the boundary between the Bering Taiga SA and the Intermontane Boreal SA.

The Kuskokwim River flows for 702 miles from the western slopes of the Alaska Range to Kuskokwim Bay on the Bering Sea. The river and its tributaries drain the Alaska Range and Kuskokwim Mountains. The Kuskokwim supports runs of Chinook, sockeye, chum, and coho salmon.

The Unalkaleet River flows from the Nulato Hills to Norton Sound. The river supports Chinook and chum salmon and has been used by native Inupiat and European settlers as an important navigational route to the Interior. The Iditarod National Historic Trail follows the Unalkaleet River to the Bering Sea. The upper 81 miles of the river are designated as a National Wild River and are managed to protect its primitive recreation opportunities, water quality, and historic and archeological values. The lower portion of the Alagnak Wild River, which begins in the Aleutian Meadows SA, is also within the Bering Taiga SA.

Protected and/or Conservation Areas

Approximately 37 percent of the SA is within the 19-million-acre Yukon Delta NWR. The Yukon Delta NWR protects the vast flat wetland complex within the Yukon-Kuskokwim Delta. The NWR includes scrub, peatland, heath meadow, marsh, wet tundra, and bog habitats and supports one

of the largest aggregations of waterfowl in the world. Millions of waterfowl breed within the NWR, and the Yukon Delta is the most important shorebird nesting area in the United States.

Walrus Islands State Game Sanctuary, comprising of seven small craggy islands and the surrounding waters in northern Bristol Bay, protects one of the largest terrestrial Pacific walrus haulout sites in North America. As many as 14,000 walrus have been counted at the major haulout on Round Island in a single day (ADF&G 2021a). Although not currently listed under the ESA, in 2011 USFWS determined that the walrus warrants listing as a threatened species because of the increasing loss of sea ice habitat due to climate change (50 CFR §17). In addition to walrus, there are several Steller sea lion haulouts on the islands, as well as more than a hundred species of birds.

Protected and/or Conservation Areas

USFWS
- Becharof NWR
- Koyukuk NWR
- Selawik NWR
- Togiak NWR
- Yukon Deltan NWR
- Alaska Peninsula NWR
- Alaska Maritime NWR
- Adreafsky WSR

BLM
- Unakaleet WSR

NPS
- Katmai National Park and Preserve
- Alagnak WSR

ADF&G
- Cinder River CHA
- Egegik CHA
- Pilot Point CHA
- Cape Newenham State Game Refuge
- Walrus Island State Game Sanctuary

Threatened and Endangered Species

Steller's eiders, which are listed as threatened under the ESA, historically nested in the Yukon-Kuskokwim Delta, although the breeding population in the region has significantly declined (AKNHP 2016). Steller's eiders feed on invertebrates in shallow water habitats. Kittlitz's murrelets, which have been considered for listing, occur in coastal areas of the SA.

Important Bird Areas

Several large IBAs cover large swaths of the SA. These IBAs provide extensive habitats for high densities of nesting and migrating waterfowl and shorebirds. The coastal plains of Yukon-Kuskokwim Delta (which includes three separate IBAs) is one of the most productive wildlife areas in Alaska.

Important Bird Areas

Coastal IBAs
- Cape Vancouver Marine*
- Jacksmith Bay to Cape Pierce
- Kuskokwim Bay
- Northern Alaska Peninsula Coastal
- Norton Bay
- Nushagak & Kvichak Bays
- Stebbins-St. Michael
- Yukon River Coastal

Interior IBAs
- Andreafsky Wilderness
- Central Yukon-Kuskokwim
- Kuskokwim River Delta
- Kwik River*
- Upper Naknek River
- Yukon River Delta

Colonies
- Cape Pierce & Cape Newenham Colonies
- Crooked Island Colony
- Goodnews Bay Colony
- Hegemeister Island Colonies
- Round Island Colony

*Potential Global IBA

2.5.2 Historic Loss of Aquatic Resources

Urbanization of larger regional hub communities such as Bethel, Unalkaleet, Marshall, and other second-class cities has led to the loss or degradation of aquatic assets

along the Yukon and Kuskokwim Rivers. Gravel roads in these communities can generate significant amounts of dust that is deposited on the surrounding tundra, impacting vegetation and soils. These remote communities rely on shipments of petroleum products, food, and consumer products that are delivered by boats and airplanes. Such transportation requires infrastructure that has impacted aquatic resources from the placement of fill or runoff from impervious surfaces like roads, airstrips, schools, and other public facilities.

Mining developments have primarily targeted gold and platinum-group metals in the SA. The USGS (2015) lists 54 producing mines within the Bering Taiga SA. Placer mining of waterways has been the dominant method for extracting these metals. Hardrock mining in the source rock of downstream placer deposits has also occurred in the foothills and mountains throughout the SA. AMD from abandoned mines is a potential source of water pollution. Chemical reactions from AMD dissolve heavy metals such as copper, lead, and mercury into surface and groundwater. These metals have the potential to contaminate drinking water, disrupt the growth of aquatic plants, impact fish and wildlife habitat, and corrode infrastructure over time. AMD can be mitigated on small scales through the creation of wetlands, where natural processes can effectively neutralize the impact of the heavy metals if the wetlands are actively monitored and managed.

Platinum was discovered in the area of Goodnews Bay, located south of Kuskokwim Bay, in 1926 by small-scale placer miners. Larger mines operated in the area until the mid-1970s producing more than a half-million ounces of platinum, as well as smaller amounts of gold. Recently, XS Platinum, Inc. operated in the area by mining the tailings ponds created by abandoned placer operations. These operations have resulted in impacts to salmon stream habitat, riparian habitat, and wetland habitat.

The ADEC Contaminated Sites Database contains 259 contaminated sites cases within the Bering Taiga SA (ADEC 2015a). The dominant sources of impact are surface runoff, and spills or leaks of petroleum products into nearby streams and soils. Runoff from impervious surfaces can cause short-term impacts to water quality that degrade fish habitat. There are long-term hazards associated with spills of diesel and oil. These products can contaminate groundwater where some compounds can persist (Irwin 1997). The Department of Defense database lists 35 FUDS within the Bering Taiga SA that vary in size (USACE 2013a). Many of these sites require remediation associated with the presence of hazardous, radioactive, or toxic waste that may have impacted local water quality.

The NLCD shows 9,300 acres of development within the Bering Taiga SA for 2011 (Xian et al. 2011). This represents 0.02 percent of the entire SA. The Bering Taiga SA is the least developed of all the terrestrial SAs.

2.5.3 Threats to Aquatic Resources

Urbanization and Development

Between 2000 and 2010 the population of the SA increased by approximately 1,400 people (U.S. Census Bureau 2012). Development within the SA is largely concentrated around existing communities. As communities grow improvements such as housing, schools, water systems,

roads, landfills, and sewage treatment facilities will be required. Future development is likely to occur within the boundaries of existing communities.

Based on the NLCD, 1,219 acres of undeveloped land within the SA were converted to developed uses between 2001 and 2011. This development occurred primarily within communities, including Naknek, Togiak, Unakaleet, and Mountain Village. The largest areas were developed for improvements on the road between Aleknagik and Dillingham, which was paved in 2004, and construction at the Platinum Creek Mine. Of the recently developed area, 48 acres were previously wetland and 9 acres were previously open water prior to development (Xian et al. 2011).

Transportation

There are few roads within communities in the SA, and even fewer between communities. There are only approximately 304 miles of existing roads within the SA. The 2020-2023 STIP includes few projects within the SA. These include reconstruction and rehabilitation of streets in Dillingham and Bethel, and improvements to airport access roads in Nulato and Shageluk (DOT&PF 2020).

Air access is the primary mode of transportation to and from most communities in the SA. Improvements and expansions to airports are regularly required, and are likely to impact wetlands. Communities within the SA that received funding from the FAA for airport improvements in 2014 and 2015 include Allakaket, Bethel, Dillingham, Hooper Bay, King Salmon, Koliganek, Levelock, and St. Mary's. Funding was granted for projects including rehabilitating runways, taxiways, and aprons, constructing storage buildings, and constructing snow removal equipment buildings. Additionally, Pilot Station received funds for the construction of a new airport.

Although not connected to the road system, which is a primary vector for invasive species, non-native aquatic species have been documented within the Bristol Bay and Yukon-Kuskokwim regions. These species may be transported via float planes, boats, ships, and barges. Non-native aquatic species of concern within the region include rock snot (*Didymosphenia geminate*) and *Elodea* (Kuskokwim River Watershed Council 2016).

Resource Development

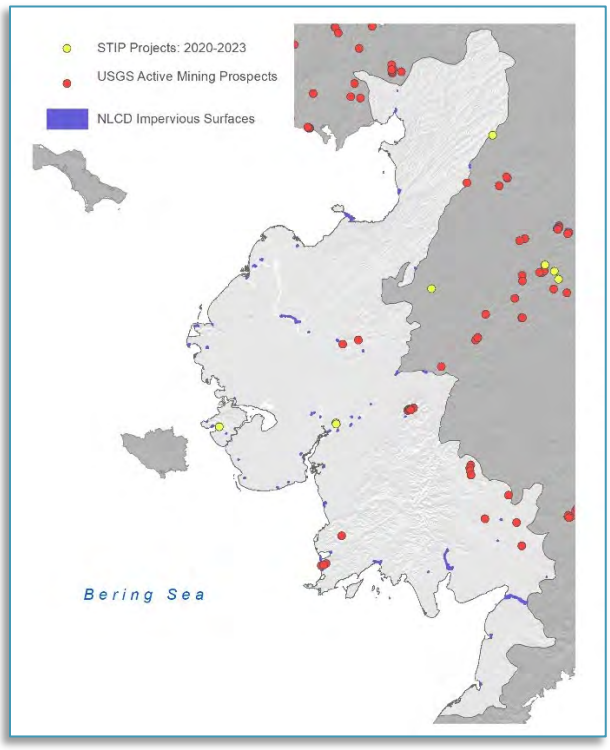
Impacts to aquatic resources from placer mining have historically occurred within the SA, and mine leases continue to be available.

There are fewer active hard-rock mine prospects in the Bering Taiga SA. Active prospects are limited to Humble, a copper-gold prospect, and Shotgun/Winchester, a gold prospect, in the Nushagak watershed; and Silver Chalice, a silver-gold prospect in the Nulato Hills. These projects are in the exploration phase. Development of operating mines would involve impacts to aquatic resources from mining operations as well construction of support facilities.

Platinum Creek Mine is a platinum mine south of Goodnews Bay. Placer mining for platinum has occurred in this area since 1927, and between 2008 and 2012 XS Platinum, Inc. operated a facility to reprocess tailings from previous mining activities.

This ILFP will offset these threats to aquatic resources by protecting and restoring wetlands and waters that function similarly within the same ecoregion, in accordance with the goals and objectives stated below.

Some of the threats described are shown in Inset 10.



Inset 10. Threats to Aquatic Resources within the Bering Taiga SA

2.5.4 Aquatic Resource Goals and Objectives

Of the 7,322,000 acres of state lands within the SA, approximately 12 percent is covered by NWI mapping. **Table 23** displays the types and amounts of aquatic resources on State of Alaska land within the Bering Taiga SA that have been mapped by the NWI and could potentially be used for restoration, enhancement, and/or preservation mitigation activities.

Table 23. State-Owned Aquatic Resources within the Bering Taiga SA[1]	
Aquatic Resource Type	**Acres**
Estuarine and Marine Deepwater	3,752
Estuarine and Marine Wetland	3,969
Freshwater Emergent Wetland	304,017
Freshwater Forested/Shrub Wetland	352,711
Freshwater Pond	16,684
Lake	29,854
Freshwater Moss/Lichen Wetland	227
Riverine	13,918
TOTAL	**725,133**

[1.] Based on NWI Mapping (USFWS 2021)

Within the Bering Taiga, SA the State of Alaska will work to achieve the following goals and objectives:

- Use the State's resources and partnerships to select, secure, and implement aquatic resource restoration, establishment, enhancement, and/or preservation activities to improve watershed health.
- Ensure a greater level of certainty in the outcome of restoration and enhancement mitigation projects through coordinated efforts by State conservation professionals who are deeply familiar with the SA.
- Remove threats to important aquatic resources through preservation.
- Reduce the extent of cumulative adverse impacts to aquatic resources throughout the Bering Taiga SA.
- Preserve, restore, and enhance aquatic resources that provide habitat for migratory birds, anadromous fish, and species of conservation concern.
- Increase the types of aquatic resources available for compensatory mitigation in the SA.

2.6 Bering Tundra SA

Inset 11. Bering Tundra Service Area

The Bering Tundra SA (Inset 11) contains approximately 27,283 square miles of land and contains St. Lawrence, Nunivak, St. Matthew, and the Pribilof islands. Approximately 12,200 people live in this SA, with most people residing in Nome and Kotzebue (U.S. Census Bureau 2012; see **Table 24**). The northern portion of the SA is within the Northwest Arctic Borough. Native corporations and the State of Alaska are the primary landowners (see **Table 25**).

Table 24. Population Centers within the Bering Tundra SA

Major Cities (Population >1,000)	Population
Nome	3,598
Kotzebue	3,201

The Bering Tundra SA is composed of three ecoregions: Kotzebue Sound Lowlands, Seward Peninsula, and Bering Sea Islands (Nowacki et al. 2001). Cold Siberian air sweeps across the frozen Bering Strait much of the year, keeping conditions cold and windy. The average annual precipitation is 4 to 20 inches except for the mountains within the Seward Peninsula, which can receive more than 40 inches. The average annual temperatures range from 20 to 26°F (ADF&G 2006). Permafrost of varying thickness is continuous in the region.

The terrain within the Seward Peninsula ecoregion varies from coastal plains to glaciated mountains reaching heights of up to 4,600 feet. The Kotzebue Sound Lowlands, in the coastal plains of Kotzebue Sound, are formed primarily by depositional material washed or blown off

nearby hills and outwash plains. Volcanic hills form the Bering Sea Islands and the mountains of the Seward Peninsula (Spencer et al. 2002).

Table 25. Major Land Owners within the Bering Tundra SA

Land Owner	Percent of SA
Private	34.0
State of Alaska	30.0
Federal – National Park Service	14.8
Federal – Bureau of Land Management	11.1
Federal – U.S. Fish and Wildlife Service	10.0
Federal – Department of Defense	0.1

The treeless landscape within this SA is dominated by moist and wet tundra communities of sedges, grasses, low shrubs, and lichens interspersed with rocky cliffs. Dryer ridgetops of the Seward Peninsula have alpine Dryas-lichen tundra and barrens, with low shrub tundra on hillsides and willow thickets along streams (Spencer et al. 2002).

Bears, caribou, arctic foxes, singing voles, and tundra hares inhabit this SA. Muskoxen and reindeer have been introduced to Nunivak Island and the Seward Peninsula. The vast amounts of water in this SA make it prime habitat for nesting waterfowl and shorebirds. Millions of seabirds (cormorants, kittiwakes, murres, puffins, and auklets) and marine mammals (northern fur seals, ribbon seals, and sea lions) inhabit the rocky shores of St. Lawrence, St. Matthew, and the Pribilof Islands during the summer (Spencer et al. 2002).

All five species of Pacific salmon occur within this SA, with pink salmon the most numerous. Other fish include sheefish, Arctic char, Bering cisco, Dolly Varden, northern pike, Arctic grayling, and Alaska blackfish (ADF&G 2006).

2.6.1 Current Aquatic Resource Conditions

Wetlands

NWI mapping is available for approximately 29 percent of the Bering Tundra SA (USFWS 2021). The area covered by NWI mapping is limited to the coast of the Seward Peninsula and northern Kotzebue Sound. Within this coverage area, 2,991,578 acres are mapped as wetlands. NWI habitat types occurring within the SA are shown in **Table 26**.

The Seward Peninsula is approximately 53 percent wetlands (McNab and Avers 1994); the Bering Sea Islands (St. Lawrence, St. Matthew, Nunivak, and the Pribilof islands) are approximately 76 percent wetlands, and the Kotzebue Sound Lowlands are approximately 76 percent wetlands (Hall et al. 1994).

Table 26. Acres of NWI Mapping within the Bering Tundra SA by Habitat Type		
NWI Habitat Type	**Acres**	**Percent of Wetland Area**
Estuarine and Marine Deepwater Habitat	53,743	2
Estuarine and Marine Wetland	65,944	2
Freshwater Emergent Wetland	1,857,015	62
Freshwater Forested-Shrub Wetland	585,493	20
Freshwater Pond	72,994	2
Lake	296,444	10
Freshwater Moss/Lichen Wetland	27	<1
Riverine	59,916	2
TOTAL	**2,991,578**	

Rivers and Streams

There are 34,034 miles of streams included within the NHD (USGS 2016). Of these, approximately 4,054 miles of streams, in addition to 17 lakes, are included in the AWC (limited sampling has been conducted on St. Lawrence Island; ADF&G 2015a). Streams and rivers originating within the Kigluaik and Bendeleben Mountains on the Seward Peninsula flow south into the Bering Sea and north into the Chukchi Sea. Major rivers include the Kobuk, Noatak, and Selawik rivers.

Rivers and streams within the Bering Tundra SA that support salmon are EFH. Estuarine areas within the SA also provide important support to marine species that directly utilize estuarine habitat for feeding or portions of their lifecycle, or that benefit indirectly from other functions performed by estuarine areas. Federally managed marine species that are supported directly or indirectly by estuarine areas in the SA include Alaska plaice, Arctic cod, Arctic saffron cod, Arctic snow crab, blue king crab, Chinook salmon, chum salmon, coho salmon, pink salmon, sockeye salmon, flathead sole, Greenland turbot, Pacific cod, rock sole, sculpin, skate, snow crab, and walleye pollock.

The Kobuk River, which drains an area of 12,300 square miles and flows approximately 360 miles from the western Brooks Range to Kotzebue Sound, is one of the largest rivers in Northwest Alaska. The Kobuk River supports Chinook, pink, and chum salmon, as well as Dolly Varden and one of the largest populations of sheefish.

The Noatak River flows for 425 miles from the western Brooks Range to Kotzebue Sound. The Noatak River and its many tributaries drain an area of 12,600 square miles, the entirety of which is protected within the Gates of the Arctic National Park and the Noatak National Preserve, making it the largest undisturbed

Protected and/or Conservation Areas

USFWS
- Selawik NWR
- Yukon Delta NWR
- Alaska Maritime NWR
- Selawik WSR

NPS
- Bering Land Bridge National Preserve
- Cape Krusenstern National Monument
- Noatak National Preserve

watershed in the United States. The Noatak supports all five species of Pacific salmon as well as Dolly Varden and sheefish.

Protected and/or Conservation Areas

Bering Land Bridge National Preserve covers 2.7 million acres of the northern Seward Peninsula. The preserve contains the four largest and most northern maar lakes in the world. These unique waterbodies are shallow crater lakes formed by explosions caused when hot lava or magma came into contact with permafrost.

Selawik NWR protects habitat used by the Western Arctic Caribou Herd. The refuge contains extensive wetlands along the Selawik River, which includes lakes, riparian habitat, and wet meadows. The Selawik and Kobuk river deltas, on the eastern shores of Selawik Lake and Hotham Inlet, are within the refuge. These river deltas, which were joined together with the Noatak delta in recent geologic times, provide valuable habitat for many species of migratory birds (NPS 1973).

There are no state-managed protected or conservation areas in the Bering Tundra SA.

Threatened and Endangered Species

The Seward Peninsula and Saint Lawrence Island are within the southern range of polar bears. Their range is closely tied to the extent of the Arctic ice pack (AKNHP 2021c). Polar bears were listed as threatened under the ESA in 2008.

Important Bird Areas

IBAs within the SA include colonies in the Bering Sea Islands and Kotzebue Sound, migratory stopover areas, and coastal breeding grounds. Lopp Lagoon, Cape Espenberg, and Sishmaref Inlet IBAs contain a series of barrier lagoons along the northern coast of the Seward Peninsula, which protect intertidal mudflats and estuarine meadows; these areas are used by high densities of shorebirds and migrants. Safety Sound and Golovin Lagoon IBAs along the northern shore of Norton Sound contain eelgrass beds within protected coastal lagoons that support breeding shorebirds.

Important Bird Areas

Coastal IBAs
- Cape Espenberg
- Golovin Lagoon*
- Krusenstern Lagoon
- Lopp Lagoon
- Nugnugalurtuk River Mouth**
- Nunivak Island Coastal**
- Safety Sound
- Shishmaref Inlet**

Interior IBAs
- Central Seward Peninsula
- Imuruk Basin**
- Kobuk River Mouth**
- Kwik River**
- Selawik Basin**
- Serpentine River**
- St. Matthew Islan**

Colonies
- Bluff Colonies
- Chamisso Island Colonies
- Diomede Island Colonies
- King Island Colony
- Noatak River Delta Colony
- Northwest Cape Colony
- Pinnacle Island Colony
- Savoonga Colonies
- Southwest Cape Colonies
- St. George Island Colony
- St. Matthew & Hall Island Colonies
- St. Paul Island Colony

*Potential Continental IBA
**Potential Global IBA

2.6.2 Historic Loss of Aquatic Resources

The Seward Peninsula has experienced limited urban development. The regional hub is Nome, a city that saw considerable growth during the latter part of the 1800s and early 1900s known as the Nome Gold Rush. Other large communities include Kotzebue, Savoonga, Shishmaref, and Selawik.

During the time of the Gold Rush, Nome was the largest city in Alaska. Due to the ease of finding gold in the area, many placer mining operations dredged large amounts of natural stream beds to remove gold. These operations impacted many aquatic resources and altered natural hydrology. Due to the presence of continuous permafrost, miners melted the ice in the soil for easier processing. This led to the destruction or degradation of wetlands and streams, and has altered the surface hydrology and thermal regime of soils in the vicinity of these historic operations. More modern forms of placer mining rely on stream diversions by heavy equipment so that streambeds can be processed for metals.

The USGS (2015) lists 359 mines that have produced in varying amounts in the SA. Hardrock mining in the source rock found in the foothills and mountains was also prevalent upstream of placer deposits throughout the SA. AMD is a potential source of water pollution from abandoned hardrock mines. Chemical reactions from AMD dissolve heavy metals such as copper, lead, and mercury into surface and groundwater. These metals have the potential to contaminate drinking water, disrupt the growth of aquatic plants, degrade or destroy fish and wildlife habitat, and corrode infrastructure over time. AMD can be mitigated on small scales through the creation of wetlands, where natural processes can effectively neutralize the impact of the heavy metals if the wetlands are actively monitored and managed.

The ADEC Contaminated Sites Database contains 177 contaminated site cases within the Bering Tundra SA (ADEC 2015a). The dominant sources of impact are spills or leaks of hazardous materials such as diesel, other petrochemicals, and PCBs that have entered nearby streams and soils.

The Department of Defense database lists 41 FUDS within the Bering Tundra SA that range in size (USACE 2013a). Many of these sites require remediation associated with the presence of hazardous, radioactive, or toxic waste that may have impacted local water quality or degraded estuarine habitat.

The NLCD shows 8,494 acres of development within the Bering Tundra SA for 2011 (Xian et al. 2011). This represents 0.05 percent of the entire SA.

2.6.3 Threats to Aquatic Resources

Urbanization and Development

Between the 2000 and 2010 censuses, the population of the SA increased by approximately 500 people (U.S. Census Bureau 2012).

Development within the SA is largely concentrated around existing communities. As communities grow, improvements such as housing, schools, water systems, roads, landfills, and sewage treatment facilities will be required. Future development is likely to occur within the boundaries of existing communities.

Based on the NLCD, 75 acres of undeveloped land were converted to developed uses between 2001 and 2011. This development occurred exclusively within the communities of Nome, White Mountain, Brevig Mission, and Elim. The largest single area developed was for airport improvements in Elim. Of the recently developed area, 7 acres was previously classified as wetland prior to development (Xian et al. 2011).

Transportation

Projects included in the 2020-2023 STIP within the SA are in the communities of Nome, Kotzebue, and Selawik. These projects are primarily for road and bridge rehabilitation. A new road from Kotzebue to a port site near Cape Blossom is also planned.

A road connecting Nome to the statewide highway system has been proposed in the past. The Western Alaska Access Planning Study recommended a 500-mile route from Manley Hot Springs to the Nome-Council Highway, paralleling the Yukon River, as the preferred corridor (DOT&PF 2010). Construction of a new road would impact wetlands and waterbodies within the project footprint and require stream crossings. In addition to direct impacts from the project footprint, a new road would improve accessibility to significant mineral deposits and potential energy developments, increasing impacts to aquatic resources. This project has not received funding and is not actively being planned at this time, although a road from Manley Hot Springs to the Yukon River near Tanana (the first phase of the studied corridor) was completed in 2016.

DOT&PF and USACE began evaluating potential deep-draft port locations in the Arctic in 2008. In 2011, Nome was tentatively identified as the most feasible location for a deep draft port, which would support offshore oil and gas developments, search and rescue, and oil spill response. Most impacts from construction of a deep draft port would occur in the marine environment, although onshore impacts would result from construction activities, construction of expanded port infrastructure, and regular operations. In 2020, USACE approved a $618 million plan to expand the Port of Nome. The plan is waiting on funding from Congress.

Air access is the primary mode of transportation to and from most communities in the SA. Improvements and expansions to airports are regularly required, and are likely to impact wetlands.

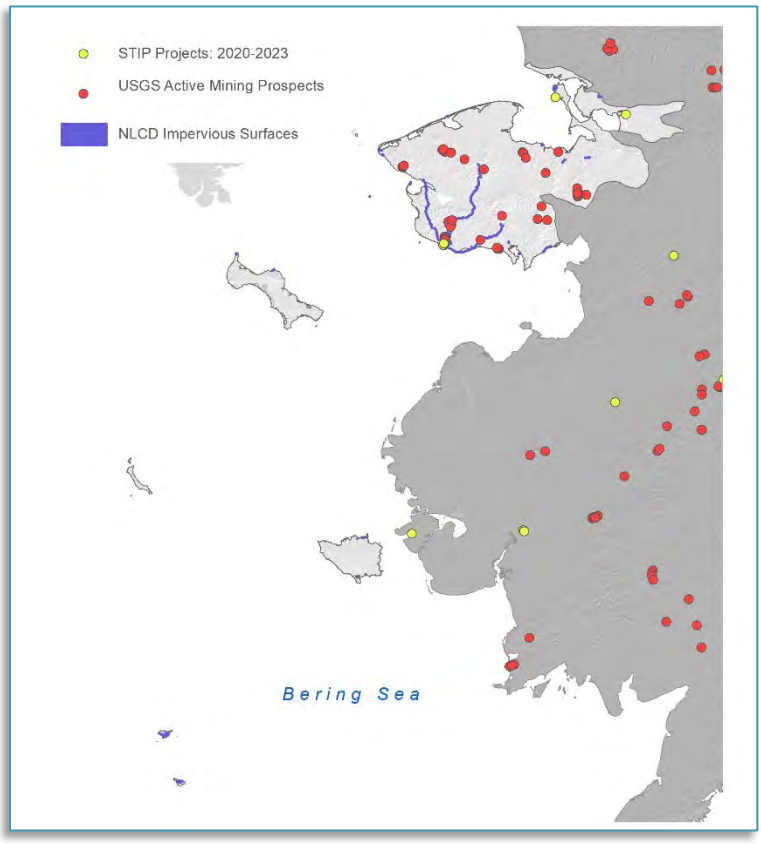
Resource Development

Impacts to aquatic resources from placer mining have historically occurred within the SA, and mine leases continue to be available.

While offshore dredging for gold is still ongoing in Nome, there are no operating gold mines or active prospects in the SA. There are two active hard rock prospects: Anugi, a zinc-lead-silver prospect on Kotzebue Sound; and Graphite Creek, a graphite prospect near Imuruk Basin.

This ILFP will offset these threats to aquatic resources by protecting and restoring wetlands and waters that function similarly within the same ecoregion, in accordance with the goals and objectives stated below.

Some of the threats described are shown in Inset 12.



Inset 12. Threats to Aquatic Resources within the Bering Tundra SA

2.6.4 Aquatic Resource Goals and Objectives

Of the 3,606,000 acres of state lands within the SA, approximately 18 percent is covered by NWI mapping. **Table 27** displays the types and amounts of aquatic resources on State of Alaska land within the Bering Tundra SA that have been mapped by the NWI and could potentially be used for restoration, enhancement, and/or preservation mitigation activities.

Table 27. State-Owned Aquatic Resources within the Bering Tundra SA[1]	
Aquatic Resource Type	**Acres**
Estuarine and Marine Deepwater	1,560
Estuarine and Marine Wetland	2,555
Freshwater Emergent Wetland	258,881
Freshwater Forested/Shrub Wetland	33,926
Freshwater Pond	2,897
Lake	3,870
Freshwater Moss/Lichen Wetland	0
Riverine	5,339
TOTAL	**309,031**

[1.] Based on NWI Mapping (USFWS 2021).

Within the Bering Tundra SA, the State of Alaska will work to achieve the following goals and objectives:

- Use the State's resources and partnerships to select, secure, and implement aquatic resource restoration, establishment, enhancement, and/or preservation activities to improve watershed health.
- Ensure a greater level of certainty in the outcome of restoration and enhancement mitigation projects through coordinated efforts by State conservation professionals who are deeply familiar with the SA.
- Remove threats to important aquatic resources through preservation.
- Reduce the extent of cumulative adverse impacts to aquatic resources throughout the Bering Tundra SA.
- Preserve, restore, and enhance aquatic resources that provide habitat for migratory birds, anadromous fish, and species of conservation concern.
- Increase the types of aquatic resources available for compensatory mitigation in the SA.

2.7 Arctic Tundra SA

Inset 13. Arctic Tundra Service Area

The Arctic Tundra SA (Inset 13) covers the Brooks Range, Brooks Foothills, and Beaufort Coastal Plain ecoregions (Nowacki et al. 2001). This SA has the lowest full-time population, with approximately 10,700 residents. The largest city is Utqiaġvik (formerly Barrow), with a population of 4,212 (U.S Census 2012; see **Table 28**). Major landowners are the Bureau of Land Management (BLM) and the State of Alaska (see **Table 29**). The North Slope Borough and the majority of the Northwest Arctic Borough are within this SA.

Table 28. Population Centers within the Arctic Tundra SA

Major Cities (Population >1,000)	Population
Utqiaġvik	4,212

Polar conditions define this SA with cold, low-moisture air coming from the permanent ice pack in the Beaufort Sea. Precipitation in the SA is less than 20 inches per year, and summer temperatures average less than 50°F, limiting tree growth to the southern fringe of the Brooks Range. Continuous permafrost dominates most of the region, allowing for saturated organic soils in the summer and a variety of freeze-thaw ground features. The Brooks Range is built up by accreted terranes and contains steep angular summits. The Arctic Coastal Plain is predominately wetlands covered with a mosaic of lakes, ponds, and braided rivers (Spencer et al. 2002).

Table 29. Major Landowners within the Arctic Tundra SA

Landowner	Percent of SA
Federal – Bureau of Land Management	31.9
State of Alaska	20.8
Federal – National Park Service	19.5
Federal – U.S. Fish and Wildlife Service	16.9
Private	10.9

High-energy, highly incised river stream channels originate in the Brooks Range and join in the foothills to form large braided rivers. Some of these large braided rivers freeze solid in the winter. During spring break-up and snowmelt in the northern Brooks Range, flood waters flow over the still frozen river channels out on to the Arctic Coastal Plain (Spencer et al. 2002).

For the most part, tundra and low shrub communities dominate the Arctic Tundra SA. A few spruce and birch forests are found on the southern portion of the Brooks Range, but the majority of the area is treeless. The Brooks Range ecoregion is dominated by alpine tundra and barrens. The Brooks Foothills are dominated by mixed shrub-sedge tussock tundra with willow thickets along drainages and Dryas tundra on ridges. The Arctic Coastal Plain is dominated by wet sedge tundra in drained lake basins, swales, and floodplains, and tussock tundra and alpine tundra on gentle ridges (Spencer et al. 2002).

Fauna found in the Arctic Tundra SA include caribou, wolves, arctic foxes, brown bears, polar bears, muskoxen, Dall's sheep, voles, lemmings, and arctic ground squirrels. The Arctic Coastal Plain is important to many breeding birds, including shorebirds, ducks, geese, swans, and songbirds. Fish species present include arctic char, arctic grayling, arctic cisco, broad whitefish, least cisco, and Dolly Varden (ADF&G 2006).

2.7.1 Current Aquatic Resource Conditions

Wetlands

The Arctic Tundra SA is characterized by flat topography and dominated by a network of wetland complexes, shallow tundra lakes and ponds, and meandering rivers. The SA is underlain by continuous permafrost, which dramatically affects the surface hydrology. Freshwater wetland types are scrub-shrub and herbaceous emergent dominated by willows and sedges. Coastal wetland types include shallow estuaries, salt marshes, and sparsely vegetated tidal flats.

NWI mapping is available for approximately 30 percent of the Arctic Tundra SA (USFWS 2021). Within this coverage area, 18,551,230 acres are mapped as wetlands. NWI habitat types occurring within the SA are shown in **Table 30**.

The southern portion of the SA is composed of rolling foothills of the Brooks Range, where scrub-shrub wetland tundra is dominant. Moving north, the topography becomes very flat and is dominated by vast complexes of polygonal tundra characterized by a mixture of scrub-shrub and herbaceous wetlands. Near the coast of the Arctic Ocean, broad river deltas are a prominent feature of the landscape. River deltas in the SA spread across wide areas creating large intertidal shorelines, marshes, and wet meadows that are important habitats for waterfowl and shorebirds.

Table 30. Acres of NWI Mapping within the Arctic Tundra SA by Habitat Type		
NWI Habitat Type	**Acres**	**Percent of Wetland Area**
Estuarine and Marine Deepwater Habitat	220,643	1
Estuarine and Marine Wetland	153,269	1
Freshwater Emergent Wetland	13,271,436	72
Freshwater Forested-Shrub Wetland	2,095,298	11
Freshwater Pond	310,868	2
Lake	2,039,642	11
Freshwater Moss/Lichen Wetland	97	<1
Riverine	459,974	2
TOTAL	**18,551,230**	

Rivers and Streams

Rivers and streams within the SA range from very large braided rivers to small tundra streams. The largest rivers originate in the Brooks Range and flow toward the Beaufort and Chukchi seas. The Colville River drains nearly 30 percent of the entire North Slope of Alaska (Walker 1983) due to the dozens of tributaries that flow into it. Other major rivers include the upper Noatak, Kuparuk, Sagavanirktok, Canning, Kokolik, and Kongakut rivers. Teshekpuk Lake is the largest lake in the SA and lies within the National Petroleum Reserve-Alaska (NPR-A).

There are 192,714 miles of streams within the NHD in the SA. Of these, approximately 6,316 miles of streams, as well as 174 lakes, are included in the AWC. Rivers and streams within the Alaska Range Transition SA that support salmon are EFH. Estuarine areas within the SA also provide important support to marine species that directly utilize estuarine habitat for feeding or portions of their lifecycle, or that benefit indirectly from other functions performed by estuarine areas. Federally managed marine species that are supported directly or indirectly by estuarine areas in the SA include Arctic cod, Arctic saffron cod, and Arctic snow crab.

Protected and/or Conservation Areas

USFWS

- Arctic NWR
- Alaska Maritime NWR
- Selawik WSR
- Ivishak WSR
- Sheenjek WSR
- Wind WSR

NPS

- Cape Krusenstern National Monument
- Gates of the Arctic National Park and Preserve
- Kobuk Valley National Park
- Noatak National Preserve
- Alatna WSR
- John WSR
- Kobuk WSR
- Noatak WSR
- North Fork Koyukuk WSR
- Salmon WSR
- Tinayguk WSR

Protected and/or Conservation Areas

Over two-thirds (67 percent) of the Arctic Tundra SA is covered by land within the federal conservation system. These areas are managed to varying degrees for protection and conservation of natural resources, including wildlife habitat and populations, recreational and subsistence uses, and wilderness values. Some of these areas allow a higher level of development and extraction of resources, for example, the NPR-A is administered by the BLM.

ConocoPhillips Alaska, Inc. (ConocoPhillips) recently received permits to drill within the NPR-A, the first such private development in the reserve.

The Arctic NWR covers more than 19 million acres and is the largest NWR in the country. The refuge extends from the Yukon River south of the Brooks Range to the Arctic Coast. The refuge provides primarily habitat for caribou, shorebirds, waterfowl, polar bears, and muskoxen. Two large caribou herds, the Central Arctic Herd and the Porcupine Herd, are known to use the refuge at various times of the year.

In addition to federally protected areas, there is one state restricted area, the James Dalton Highway Corridor. This area extends 5 miles on both sides of the highway, where hunting activities are restricted.

Important Bird Areas

There are five recognized IBAs within the SA. These areas represent high concentrations of birds, colonies of species of conservation concern, and critical breeding and migratory habitat at the state, continental, and global levels. The Teshekpuk Lake area is known to support the largest goose molting area in the Arctic and supports more than 20 percent of the Pacific black brant population. The area is also significant due to the high density of nesting habitat for Steller's eiders, spectacled eiders, yellow-billed loons, Arctic terns, Canada geese, king eiders, long-tailed ducks, northern pintails, Pacific loons, red-throated loons, Sabine's gulls, tundra swans, greater white-fronted geese, and a variety of shorebirds. The Colville River has cliffs along its banks that are inhabited by a large number of nesting raptors, 68 breeding bird species, and tens of thousands of shorebirds in summer and autumn.

Important Bird Areas

Coastal IBAs
- Kasegaluk Lagoon
- Krusenstern Lagoon

Interior IBAs
- Colville River Delta*
- Lower Colville River
- Northeast Arctic Coastal Plain*
- Teshekpuk Lake Area

*Potential Global IBA

2.7.2 Historic Loss of Aquatic Resources

Oil and gas developments within the Arctic Tundra SA have impacted aquatic resources. These impacts have occurred from the construction of gravel roads and pads, limited and regulated withdrawal of water from lakes and ponds for the construction of ice roads and pads, and mining of gravel within and near rivers. Including the portion of the Dalton Highway within the SA, more than 19,000 acres of land have been developed, many of which are wetlands. These surfaces are largely roads and gravel pads associated with the oil and gas industry. The communities of Utqiaġvik, Nuiqsut, Kaktovik, Point Lay, Point Hope, Wainwright, Kivalina, and Atqasuk also have gravel infrastructure that has impacted aquatic resources.

The USGS (2015) lists 80 mines that have produced in varying amounts in the SA. The majority of these are gold placer mines on the north side of the Brooks Range. Placer mining operations dredge natural stream beds and alluvial areas to remove gold. These operations have impacted fish habitat at the upper reaches of these stream systems and altered natural hydrology. Due to

the presence of continuous permafrost, miners were known to melt the ice in the soil for easier processing. This led to the degradation of wetlands and other aquatic resources, and an alteration in the surface hydrology and thermal regime of soils in the vicinity of these operations. More modern forms of placer mining rely on stream diversions by heavy equipment so that streambeds can be processed for metals.

Red Dog Mine is an open pit, truck-and-loader operation using grinding and flotation processes to recover zinc and lead. The mine is located in northwestern Alaska, in the De Long Mountains of the Western Brooks Range, approximately 82 miles north of Kotzebue and 46 miles inland from the coast of the Chukchi Sea, on land owned by NANA Regional Corporation, Inc. (NANA). The Access to the mine is by air. The major Red Dog Mine facilities include the Red Dog Main Pit, Aqqaluk Pit, mill, Tailings Storage Facility, main waste stockpile, freshwater storage reservoir, water management systems, an airstrip, and Personnel Accommodations Complex (PAC). Power is supplied by on-site diesel generators (DNR 2021c).

The ADEC Contained Sites Database contains 327 contaminated site cases within the Arctic Tundra SA (ADEC 2015a). The dominant source of impact is spills of petroleum related to oil and gas operations. Lease operators on the North Slope are required by state and federal regulators to remediate these spills and demonstrate that their efforts have met standards. However, some cleanup efforts require the removal of tundra soils for replacement with clean soils; this activity may alter the soil compaction and surface hydrology of palustrine wetlands.

No ADEC listed impaired waterbodies are located within the SA (ADEC 2018). The Department of Defense database lists 34 FUDS within the Arctic Tundra SA that vary in size (USACE 2013a). Many of these sites require remediation associated with the presence of hazardous, radioactive, or toxic waste that may have impacted local water quality or degraded estuarine habitat.

The NLCD shows 19,631 acres of development within the Arctic Tundra SA for 2011 (Xian et al. 2011). This represents 0.03 percent of the entire SA. The Arctic Tundra SA is the second least developed SA.

2.7.3 Threats to Aquatic Resources

Threat of development to aquatic resources within the Arctic Tundra SA primarily comes from continued trends in urbanization and resource development.

Urbanization and Development

The population within the SA increased by approximately 2,200 people to 10,700 between the 2000 and 2010 censuses (U.S. Census Bureau 2012). Development within the SA is largely concentrated around existing communities. As communities grow, improvements such as housing, schools, water systems, roads, landfills, and sewage treatment facilities will be required. Future development is likely to occur within the boundaries of existing communities.

Wetlands and aquatic resources within population hubs and state lease areas are at the most risk for conversion, degradation, and fragmentation. Based on the NLCD, 15 acres of undeveloped land were converted to developed uses between 2001 and 2011, none of which was previously

classified as wetland or open water (Xian et al. 2011). Utqiaġvik, the major population center within the SA has seen continued growth and expansion, which requires the construction of infrastructure.

Transportation

There are approximately 376 miles of roads within the SA, of which the Dalton Highway is approximately 250 miles and the Red Dog Road is approximately 50 miles. The 2020-2023 STIP includes several projects for rehabilitation and restoration of the Dalton Highway within the SA, and one project for a road upgrade in Utqiaġvik (DOT&PF 2020).

North Slope Borough is currently working with the Arctic Strategic Transportation and Resources (ASTAR) team with a purpose of connecting communities and identifying and advancing infrastructure needs on the North Slope. One project would construct an all-season access road between the communities of Utqiaġvik, Atqasuk, and Wainwright. The project would construct approximately 120 miles of road.

The road corridor to the Ambler Mining District is on the boundary between the Intermontane Boreal SA and the Arctic Tundra SA, and construction of this road would potentially impact aquatic resources within both SAs. The final EIS for the Ambler Road project was issued in March of 2020 (BLM 2020). Air access is the primary mode of transportation to and from most communities in the SA. Improvements and expansions to airports are regularly required and are likely to impact wetlands. Communities within the SA that receive funding from the FAA for airport improvements include Utqiaġvik, Coldfoot, Deadhorse, Wainwright, Atqasuk, Point Hope, Point Lay, Kaktovik and other communities. Potential projects include rehabilitation of runways and aprons, construction of snow removal equipment and chemical, runway expansion or relocation, storage buildings, and more.

Resource Development

Oil and Gas

The State of Alaska conducts annual Areawide lease sales in the North Slope, Beaufort Sea, and North Slope Foothills and has received bids for hundreds of thousands of acres of land for oil and gas exploration and development. Since the first North Slope lease sale in 1964, the state has offered tracts in 109 oil and gas lease sales from the Foothills north to the boundary of State-owned waters in the Beaufort Sea (DNR 2021a). The last North Slope sales in January 2021 resulted in 115 tracts sold, encompassing 190,173 acres (DNR 2021a). As of August 2021, nearly 2.7 million acres in the North Slope and Beaufort Sea were under lease (DNR 2021b)

Oil and gas exploration and development projects pose threats to wetlands in the SA, due to the nature of these activities and the abundance of wetlands within the region. The principal sources of wetland impacts from the oil and gas industry are related to construction of infrastructure, which includes drill pads, central processing facilities, roads, pipelines, powerlines, airstrips, causeways, docks, and other buildings and facilities. The need for gravel necessitates the construction of gravel mines, which cause direct impacts to wetlands and waterbodies, and disrupt hydrology and

permafrost. Additional impacts include indirect effects of roads and pipelines. Heavily used gravel roads spread dust, which increases sedimentation in waterbodies and near roadways.

In 2015, ConocoPhillips' CD5 drill site, within the Alpine field, produced the first commercial oil from the NPR-A. Construction of the pad for this drill site required filling 58.5 acres of wetlands (USACE 2011b). Since then, ConocoPhillips has received approval to develop the Greater Moose's Tooth-1 and Greater Moose's Tooth-2 projects near the Colville River Delta. ConocoPhillips is currently in the predevelopment stage of the Willow Project which would allow for construction of five drill sites within the NPR-A, including gravel roads and pipelines (USACE 2015a). Further exploration and development projects within NPR-A will result in additional impacts to wetlands and waters, as more than 95 percent of the NPR-A is wetlands (NSB 2014).

In 2019, Oil Search Alaska received approval to develop the Pikka Development Project from USACE located to the east of NPR-A. The project included three drill sites, gravel roads, a boat ramp, a seawater treatment facility, and a central processing facility. Gravel laying operations for portions of the project were started in January 2020.

Oil and gas infrastructure on the North Slope is expected to expand. The development of Point Thomson, the Willow Project in NPR-A, Coastal Plain Leases in ANWR and future offshore exploration in the Chukchi and Beaufort seas. Development is most likely to occur in proximity to existing infrastructure, particularly closer to the Trans-Alaska Pipeline. Additionally, any large diameter natural gas pipeline (i.e. AK Liquid Natural Gas or Alaska Stand Alone Pipeline) would be located in this SA and most likely originate on the North Slope.

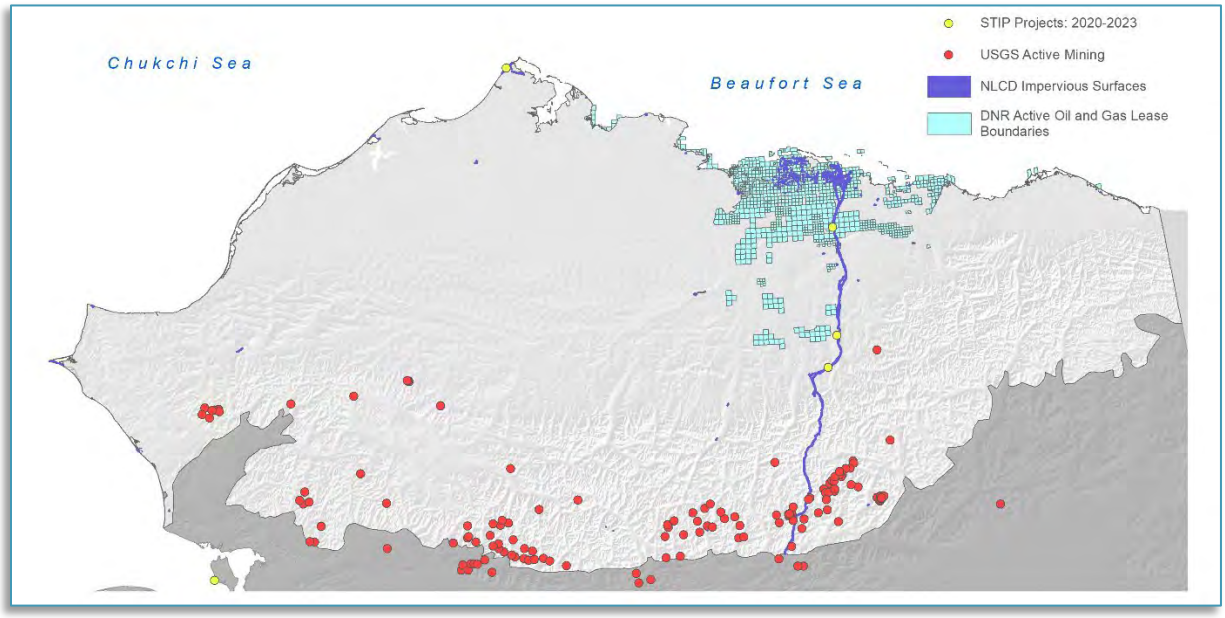
Mining

Expansion of existing mines presents the most likely source of impacts to aquatic resources from mining within the SA. Red Dog mine has been in operation since 1989, and operates 24-hours a day, 365 days a year. In 2019, Red Dog produced 552,400 metric tons (1.22 billion pounds) of zinc and 102,800 metric tons (226.6 million pounds) of lead. All concentrates are exported to world markets via the DeLong Mountain Transportation System that connects the mine to port facilities on the Chukchi Sea (DNR 2021c).

There are fewer active hard-rock mine prospects in the Arctic Tundra SA. Active prospects are limited to Lisburne and Lik, zinc-lead-silver prospects in the western Brooks Range; Baird Mountain, a zinc-lead-copper prospect in the Kobuk Valley; and Chandalar, a gold prospect approximately 50 miles east of Wiseman in the eastern Brooks Range. Development of operating mines would involve impacts to aquatic resources from mining operations as well construction of support facilities.

This ILFP will offset these threats to aquatic resources by protecting and restoring wetlands and waters that function similarly within the same ecoregion, in accordance with the goals and objectives stated below.

Some of the threats described are shown in Inset 14.



Inset 14. Threats to Aquatic Resources within the Arctic Tundra SA

2.7.4 Aquatic Resource Goals and Objectives

Of the 12,780,000 acres of state lands within the SA, approximately 47 percent is covered by NWI mapping. **Table 31** displays the types and amounts of aquatic resources on State of Alaska land within the Arctic Tundra SA that have been mapped by the NWI and could potentially be used for restoration, enhancement, and/or preservation mitigation activities.

Table 31. State-Owned Aquatic Resources within the Arctic Tundra SA[1]

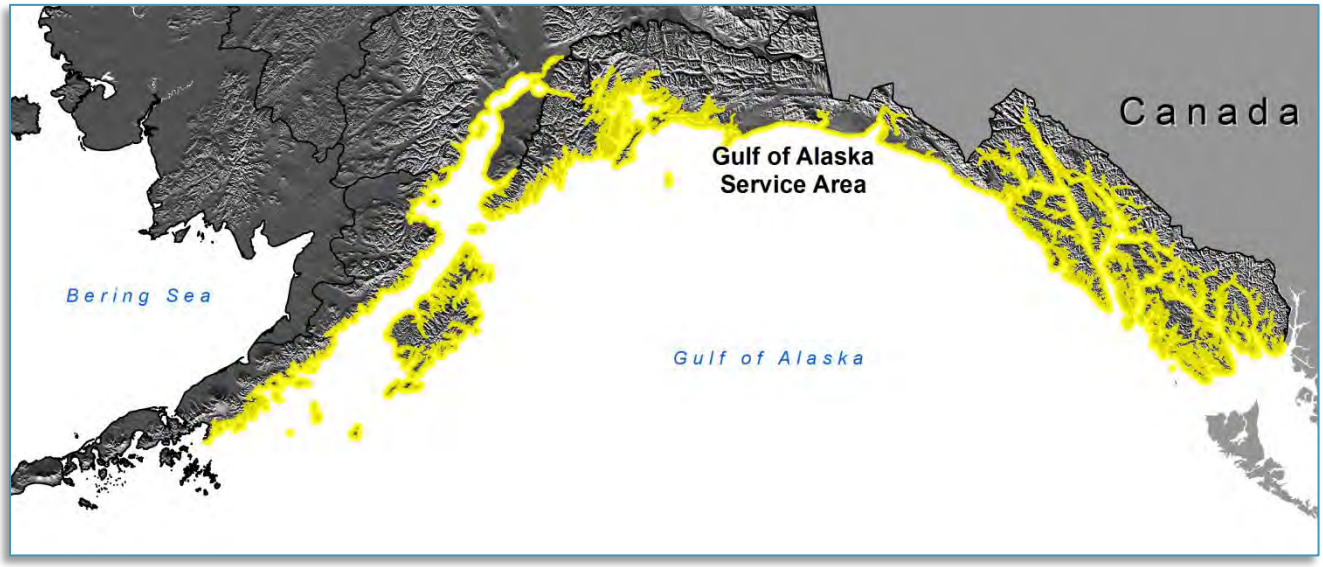
Aquatic Resource Type	**Acres**
Estuarine and Marine Deepwater	29,064
Estuarine and Marine Wetland	52,982
Freshwater Emergent Wetland	3,779,641
Freshwater Forested/Shrub Wetland	1,114,111
Freshwater Pond	95,411
Lake	248,716
Freshwater Moss/Lichen Wetland	39
Riverine	207,987
TOTAL	**5,527,955**

1. Based on NWI Mapping (USFWS 2021).

Within the Arctic Tundra SA, the State of Alaska will work to achieve the following goals and objectives:

- Use the State's resources and partnerships to select, secure, and implement aquatic resource restoration, establishment, enhancement, and/or preservation activities to improve watershed health.
- Ensure a greater level of certainty in the outcome of restoration and enhancement mitigation projects through coordinated efforts by State conservation professionals who are deeply familiar with the SA.
- Remove threats to important aquatic resources through preservation.
- Reduce the extent of cumulative adverse impacts to aquatic resources throughout the Arctic Tundra SA.
- Preserve, restore, and enhance aquatic resources that provide habitat for migratory birds, anadromous fish, and species of conservation concern.
- Increase the types of aquatic resources available for compensatory mitigation in the SA.

2.8 Gulf of Alaska SA



Inset 15. Gulf of Alaska Service Area

The Gulf of Alaska SA (Inset 15) covers 27,620 square miles and extends from the Canadian border in Southeast Alaska to the Alaska Peninsula. The SA includes Prince William Sound, Cook Inlet, and the waters off Kodiak Island. The Gulf of Alaska SA coastline, which at approximately 30,000 miles is the longest of the four marine SAs, is very convoluted, with many fjords, bays, coves, lagoons, and estuaries.

The intertidal and subtidal areas of the Gulf of Alaska SA are composed of nearshore estuarine, fjord, and exposed coastal settings. These areas are the most productive habitats within the SA. The annual growth of microalgae, seaweeds, and seagrasses supports many invertebrates that, in turn, support numerous fish, marine birds, and mammals (Mundy 2005).

The Alaska Coastal Current is the predominant current in this SA. It originates in British Columbia where it flows along the coast north and west to Unimak Pass on the Aleutian Islands. This current is fed by significant coastal sources of freshwater and has a low salinity. The Alaska Coastal Current distributes subarctic plankton communities around the region and to protected inside waters such as Prince William Sound and lower Cook Inlet. During the summer, the Alaska Coastal Current has local reversals and small eddies, which can concentrate plankton and small fishes in convergence zones for foraging fish, birds, and marine mammals (Mundy 2005).

The Gulf of Alaska has a subarctic climate and is subject to interannual and interdecadal climate variations (Brodeur et al. 1999). Its cold, nutrient-rich waters support rich, commercially important fisheries as well as many species of marine mammals.

2.8.1 Current Aquatic Resource Conditions

Fisheries and Fish Habitat

Commercially important fisheries within the Gulf of Alaska SA include crab, shrimp, scallops, walleye pollock, Pacific cod, rockfish, salmon, and halibut (UNEP 2009).

EFH within the Gulf of Alaska SA is designated for 28 species under the Gulf of Alaska Groundfish, Bering Sea and Aleutian Island Groundfish, Alaska Scallops, and Alaska Stocks of Pacific Salmon Fishery Management Plans.

Essential Fish Habitat

- Alaska Plaice
- Arrowtooth Flounder
- Atka Mackerel
- Chinook Salmon
- Chum Salmon
- Coho Salmon
- Dover Sole
- Dusty Rockfish
- Flathead Sole
- Greenland Turbot
- Northern Rockfish
- Pacific Cod
- Pacific Ocean Perch
- Pink Salmon
- Rex Sole
- Rock Sole
- Sablefish
- Sculpin
- Shortraker
- Rougheye Rockfish
- Skate
- Sockeye Salmon
- Squid
- Thornyhead Rockfish
- Walleye Pollock
- Weathervane Scallop
- Yelloweye Rockfish
- Yellowfin Sole

Threatened and Endangered Species

Threatened and Endangered Species

Endangered
- Cook Inlet Beluga Whale
- Fin Whale
- Humpback Whale
- North Pacific Right Whale
- Sperm Whale
- Leatherback Sea Turtle
- Short-Tailed Albatross
- Steller Sea Lion

Threatened
- Green Sea Turtle
- Loggerhead Turtle
- Northern Sea Otter
- Olive Ridley Sea Turtle
- Steller's Eider

Candidate for Listing
- Kittlitz's Murrelet

Federally designated critical habitat for four species listed as threatened or endangered under the ESA is included within the Gulf of Alaska SA. Critical habitat for northern sea otters is designated in southern Cook Inlet, the southern Alaska Peninsula, and on Kodiak Island. This designation protects habitats, including shallow, rocky areas and kelp forests, as well as areas with prey resources upon which sea otters depend. Critical habitat for Steller sea lions extends 20 nautical miles around major haulouts and rookeries, which within the SA are scattered along seaward islands from Prince William Sound to the Alaska Peninsula. It also includes a large foraging area in Shelikof Strait. The Gulf of Alaska SA includes a small portion of designated critical habitat for North Pacific right whale to the south of Kodiak Island. These areas are important feeding habitat with a high concentration of zooplankton, the primary prey species for North Pacific right whale. Upper Cook Inlet, Kachemak Bay, and the nearshore waters of lower Cook Inlet are designated critical habitat for Cook Inlet beluga whales. These areas provide important feeding habitat in areas with high concentrations of primary prey species, including Pacific salmon and eulachon.

Sensitive Aquatic Areas

There are 15,393 acres of salt marsh within the Gulf of Alaska SA, according to NOAA's Environmental Sensitivity Index (ESI) shoreline mapping (NOAA 1997; 2000; 2001a; 2002a). Salt marshes are classified as one of the shoreline types most sensitive to damage from oil spills. ESI mapping also identifies benthic habitats, including eelgrass and kelp. The Gulf of Alaska SA includes approximately 18,347 acres of eelgrass and kelp habitats. Eelgrass beds are an aquatic habitat of special concern. They provide habitat for many species of fish and invertebrates, particularly spawning habitat and rearing habitat for juveniles, as they are productive communities and provide refuge from predators. Eelgrass beds are found along approximately 8 percent of the shoreline of Southeast Alaska (ADEC and USCG 2013). Kelp beds are also important spawning and rearing habitat for fish and invertebrates and feeding habitat for many species of marine mammals. Kelp beds occur throughout the Gulf of Alaska, although the abundance and density of kelp beds has diminished in Southwest Alaska in recent decades due to declines in sea otter populations. Declines in the sea otter population reduce predation on sea urchins, which in turn overgraze kelp beds (Steneck et al. 2002).

The Gulf of Alaska SA also contains cold-water coral ecosystems. These corals typically grow in deeper waters, but the cold, nutrient-rich waters in Southeast Alaska support coral growth in shallower waters (Waller et al. 2011). A diversity of cold-water coral species occurs throughout

the Gulf of Alaska (Stone and Shotwell 2007). Corals are slow growing and slow to recover from damage, making them highly susceptible to impacts from fishing activities (Witherell and Coon 2001). Cold-water corals support fish and invertebrates, including commercially important species such as rockfish, by providing shelter, prey, and habitat.

Marine IBAs

- Barren Islands Marine
- Chirikof Island Marine
- Eastern Kodiak Island Marine
- Glacier Bay & Icy Strait
- Glacier Bay Outer Coast Marine
- Icy Bay
- Kachemak Bay
- Kenai Fjords
- Marmot Bay
- Outside Islands Marine
- Prince William Sound
- Seal Cape Marine
- Semidi Islands Marine
- Sitka Sound*
- Stephens Passage
- Sumner Strait*
- Tebenkof Bay*
- Yakutat Bay

*Potential Global IBA

Important Bird Areas

Marine IBAs identify areas of pelagic open water habitat that are used by a diversity of bird species, or a high number of individuals, or that provide a critical resource. Marine IBAs within the SA provide breeding habitat for many species, including horned puffins, marbled murrelets, pelagic cormorants, white-winged scoters, and Kittlitz's murrelets, which have been considered for listing on the ESA.

State Marine Parks

The 33 State Marine Parks managed by DNR are within the Gulf of Alaska SA. These parks protect coastal and nearshore aquatic resources for recreation, including boating, kayaking, hunting, sport fishing, clamming, and wildlife viewing. Most of these areas are accessible only by boat or float plane.

In addition to State Marine Parks, the Gulf of Alaska SA includes Kachemak Bay, in which the State of Alaska has prohibited oil and gas development. In 1976, an oil drilling rig became stuck in Kachemak Bay. A small amount of oil was spilled into the bay during the recovery operation, causing concern about the potential for large impacts to marine wildlife and habitat from oil and gas activity in Kachemak Bay. In response, the Alaska Legislature authorized a buy-back of

State Marine Parks

- Beecher Pass
- Bettles Bay
- Big Bear/Baby Bear Bays
- Boswell Bay Beaches
- Canoe Passage
- Chilkat Islands
- Dall Bay
- Decision Point
- Driftwood Bay
- Entry Cove
- Funter Bay
- Granite Bay
- Horseshoe Bay
- Jack Bay
- Joe Mac Island
- Kayak Island
- Magoun Islands
- Oliver Inlet
- Safety Cove
- Saint James Bay
- Sandspit Point
- Sawmill Bay
- Security Bay
- Shelter Island
- Shoup Bay
- South Esther Island
- Sullivan Island
- Sunny Cove
- Surprise Cove
- Taku Harbor
- Thoms Place
- Thumb Cove
- Ziegler Cove

existing oil and gas leases and prohibited future oil and gas lease sales in Kachemak Bay to protect its "extraordinary abundance and diversity of marine life" (Alaska Statute §38.05.184). This closure protects fish and wildlife, sensitive habitat, and communities within Kachemak Bay from the potential negative impacts of future development.

2.8.2 Historic Loss of Aquatic Resources

The loss of aquatic resources within the Gulf of Alaska SA has largely been caused by development in the fishing, mining, and logging industries. According to the NLCD (Xian et al. 2011), 2,839 acres of impervious surface has been developed within the SA. These industries all generally required facilities to be located at tidewater to deliver their product to market.

Commercial timber operations required the construction of log transfer and storage facilities that were built within the marine and estuarine environment. The majority of these facilities are found in the Southeast Alaska portion of the Gulf of Alaska SA. The number and locations of these formerly used sites are not well documented, although State of Alaska tideland leases, available through the Division of Mining, Land and Water, contain some of this information. The types of losses and aquatic resource impacts from log transfer and storage facilities include:

- Bark and wood deposited into the marine environment;
- Compression of soil substrate;
- Shading of the water column around the facilities;
- Shoreline and intertidal area modifications; and
- Secondary impacts from associated facilities, such as fuel transfer sites, camps, and docks.

The greatest impact from these facilities has been from the deposition of bark and wood as a consequence of normal operations. As the waste bark and wood accumulate on the seafloor, they can smother the habitat and the organisms utilizing the area. The USFS estimated that in 1982, 176 acres of estuarine habitat in Southeast Alaska was covered by bark associated with log transfer and storage sites (Faris and Vaughan 1985). The greatest impact has occurred within bays and coves that experience less tidal and weather-driven flushing to remove the bark and wood deposits. These facilities were cited in these locations precisely to avoid damage to their product, vessels, and structures. Sheltered marine and estuarine areas are also where important aquatic resources like eelgrass beds and salt marshes are found that provide habitat for fish and migratory birds throughout the Gulf of Alaska SA.

Limited mining of coastal areas has occurred in the SA. The USGS database (2015) has records of 20 mines producing gold, copper, and other metals within the SA. AMD is a potential source of water pollution from abandoned coal mines. Chemical reactions from AMD dissolve heavy metals such as copper, lead, and mercury into surface and groundwater. These metals have the potential to contaminate drinking water, disrupt the growth of aquatic plants, degrade or destroy fish and wildlife habitat, and corrode infrastructure over time. Recent studies have found that AMD causes toxic substances to accumulate in estuarine and marine food webs and kill larval stage insects that support salmon populations (Levings et al. 2004).

The ADEC database contains 84 contaminated site cases within the Gulf of Alaska SA (ADEC 2015a). The dominant sources of impact are long-term facility usage, leaks from hazardous waste storage, and spills of petrochemicals that contaminate soils and local groundwater. Runoff from impervious surfaces can cause short-term impacts to water quality that degrade fish habitat. The long-term hazards are associated with spills of diesel and oil. These products can contaminate groundwater, where some compounds can persist (Irwin 1997). Other sources of degradation include PCBs, waste from pulp mills, and mine tailings. **Table 32** lists the nine impaired waterbodies within the Gulf of Alaska SA and the sources of impairment for each.

Table 32. ADEC Category 4a, 4b, and 5 Impaired Waterbodies[1]

Waterbody Name	Source of Impairment	Community/Landmark
Herring Cove	Pulp Mill – Toxic and Deleterious Substances	Sitka
Klag Bay	Mining - Turbidity	West Chichagof Island
Silver Bay	Pulp Mill – Toxic and Deleterious Substances	Sitka
Thorne Bay	Log Transfer Facility – Woody Debris	Prince of Wales Island
Exxon Valdez Beaches	Oil Spill	Prince William Sound
East Port Frederick	Log Transfer Facility – Woody Debris	Chichagof Island
Salt Chuck Bay	Industrial – Toxic and Deleterious Substances	Prince of Wales Island
Skagway Harbor	Industrial – Toxic and Deleterious Substances	Skagway
Ward Cove	Pulp Mill – Toxic and Deleterious Substances	Ketchikan

1. (ADEC 2018).

On March 24, 1989, the oil tanker *Exxon Valdez* struck a reef in Prince William Sound and spilled millions of gallons of crude oil across approximately 1,300 miles of coastline and 11,000 square miles of open ocean. NOAA conducted a survey in 2001 of the beaches affected by the spill and estimated that about 20 acres of shoreline were still contaminated by oil (Short et al. 2001). Buried deposits of oil in these beaches are likely periodically dispersed into the marine environment by storm events and may be toxic to marine life.

Marine-based transportation has also led to the destruction or adverse modification of tidal and intertidal environments in the Gulf of Alaska SA. Harbors, ports, and navigation channels have been constructed through the excavation and dredging of these habitats that support a variety of fish and wildlife species.

ADF&G lists 18 streams as “Red” (known to impede fish passage) or “Gray” (may impede fish passage) in their Fish Passage Inventory Database (ADF&G 2015b) of culverts within the Gulf of Alaska SA. These culverts are all located along the Seward Highway in Turnagain Arm, where incoming tides travel through culverts to ponds and lakes located between the highway and the Chugach Mountains. Many of these culverts are deficient because they are perched on the downstream side, are too small in diameter, do not match natural slopes, or lack adequate substrate for effective fish movement. Upstream portions of these streams represent a large loss or degradation of spawning and rearing habitat since these culverts cut off access to freshwater habitats.

The Department of Defense database lists 29 FUDS within the Gulf of Alaska SA, which vary in size (USACE 2013a). Many of these sites require remediation associated with the presence of hazardous, radioactive, or toxic waste that may have impacted local water quality or degraded estuarine habitat.

2.8.3 Threats to Aquatic Resources

The Gulf of Alaska is at the center of many industries that are critical to Alaska's economy. Fishing, oil and gas development, recreation and tourism, marine transportation (passenger and commercial), timber, and subsistence harvest all occur within the Gulf of Alaska SA. These activities all have the potential to impact the resources of the Gulf of Alaska SA.

Threats to the resources of Gulf of Alaska SA include predation of native species by invasive species, discharges of oil products, and industrial and agricultural contaminants (UNEP 2009).

Development

The population of coastal communities adjacent to the Gulf of Alaska SA increased by 9 percent between 2000 and 2010, from approximately 380,000 to 415,000 people (U.S. Census Bureau 2012). Increased growth of coastal communities will result in additional impacts to marine resources. Anchorage is one of the few metropolitan communities in the country that completes only primary treatment of sewage effluent, which is discharged into Cook Inlet. Continued population growth in Anchorage will result in increased discharge of sewage effluent. Additional potential impacts include increased discharge of runoff and stormwater into marine waters, loss of wetlands and the filtration and stormwater protection functions they provide, and impacts to fish and wildlife.

ADEC permits wastewater discharges from sewage treatment and industrial facilities into marine waters. These outfalls require a permit, which may allow for a mixing zone. Mixing zones within the SA include the Mendenhall Wastewater Treatment Plant in Juneau, the Soldotna Wastewater Treatment Facility, and shore-based seafood processing facilities.

There are approximately 4,131 acres of municipal tidelands, 3,981 acres of tidal leases, and 9,413 acres of tidal easements within the Gulf of Alaska SA. Tidelands have been conveyed to 25 cities and boroughs for uses that include harbors, docks, and waterfront developments. Tidal leases have been granted to Native corporations, private companies, and individuals, for purposes including aquaculture, construction of docks, and log transfer facilities. Public and private easements to tidal lands have been granted to entities including seafood processors, oil and gas companies, electric utilities, private individuals, and state and federal agencies for purposes including buried utility lines, pipelines, and fiber optic cables, underwater outfalls, and construction of roads. Future conveyance of tidelands and grants of easements or leases may result in construction of new structures or placement of additional fill in tidelands, along with associated impacts.

Expansion of port and harbor facilities is a primary source of impacts to marine areas within communities. There are over 130 ports, docks, floats, and small boat harbors in 57 coastal communities within the Gulf of Alaska SA. These facilities are maintained by DOT&PF or local

governments. Additionally, there are two breakwaters and 11 navigational channels maintained by USACE within the SA. Harbors require regular maintenance dredging, which has direct and indirect impacts on marine and estuarine resources. Impacts include reduced marine habitat, reduced water quality via increased sedimentation and turbidity and potential spills of hazardous materials, and increased ambient noise, which can disturb wildlife.

Recreation

Increased population and tourism within the SA lead to increased pressure on aquatic resources from recreational users. Increasing motorboat and seaplane traffic pose a threat to intertidal and shallow subtidal areas and can disturb wildlife. Increased marine fishing concentrated around popular ports can selectively target certain fish species.

Transportation

Coastal communities within the Gulf of Alaska SA contain more than half of Alaska's population. As these communities grow, the need for expanding existing transportation infrastructure will continue to increase. Several projects are in development or planning that would have impacts on marine resources within the Gulf of Alaska SA.

The proposed Knik Arm Crossing project would span Cook Inlet, crossing federally designated critical habitat for Cook Inlet beluga whales and EFH for three groundfish, one forage fish, and five Pacific salmon species. Construction of the preferred alternative would require approximately 90 acres of marine fill, as well as 33 piers within Knik Arm (FHWA 2007).

Juneau Access Improvements proposed to improve surface transportation to and from Juneau within Lynn Canal. The purpose and need for the project is to provide improved transportation to and from Juneau within the Lynn Canal corridor by reducing travel times between communities, reducing State and user costs, providing capacity to meet demand, and providing flexibility and improved opportunity for travel (DOT&PF 2018).

The preferred alternative for the Gravina Access project, which seeks to provide increased surface transportation between Ketchikan and the airport on Gravina Island, would upgrade the existing ferry terminal on Revillagigedo Island, construct new ferry docks on either side of the Tongass Narrows, and construct a new heavy freight dock on Gravina Island. Construction of the new ferry docks would not require dredging and would occur in areas that are already riprapped, and thus would have minimal impacts to intertidal or subtidal areas(HDR 2013).

The Seward Highway Milepost 75-90 Road and Bridge Rehabilitation project, which is in the first phase of construction, will replace eight bridges and improve 15 miles of the Seward Highway between Girdwood and Ingram Creek and will require placement of fill in Turnagain Arm (USFS 2021).

Marine Traffic

Most marine transport destined to and departing from Alaska crosses the Gulf of Alaska. Of all Alaskan ports, the Port of Valdez handles the most tonnage (USDOT 2015), which is largely

petroleum. The Trans-Alaska Pipeline carries crude oil from the North Slope to Valdez, where it is loaded into tankers and shipped to the Lower 48 states or the oil refinery in Nikiski. The Port of Valdez received 266 oil tanker calls in 2015 (USDOT 2015). The Port of Anchorage, which handles the most non-petroleum freight, handled 4.7 million tons of commodities (including petroleum) in 2020 (POA 2020). This represents 90 percent of all merchandise goods destined for mainland communities (POA 2021).

High levels of marine traffic, both passenger and commercial, introduce the potential for oil spills. Oil tankers represent the largest risk due to the large volumes of crude and refined petroleum transported. The *Exxon Valdez* spill increased awareness about the potentially devastating impacts of another large oil spill. Citizens' advisory councils and spill preparedness response programs were instituted after the *Exxon Valdez* spill to prepare spill prevention plans and organize spill response in an attempt to mitigate risks. Smaller spills can cumulatively impact aquatic resources as well; between January 1992 and August 2006, there were 295 minor oil spills (less than 10,000 gallons per spill) reported from vessels in Cook Inlet (Eley 2006).

Construction of the proposed Alaska LNG Project would involve development of a gas terminal at Nikiski, which would include a liquefaction plant, LNG storage facilities, and a tanker terminal (FERC 2020). This would result in a significant increase in tanker traffic.

The 2020-2023 STIP includes ferry terminal improvements for the AMHS, which would involve construction in nearshore waters of the Gulf of Alaska SA (DOT&PF 2020). Improvements and modifications are planned for ferry terminals in Gustavus, Ketchikan, Auke Bay, and Skagway.

Cruise Ships

Tourism is a significant sector in Alaska's economy. The cruise industry makes up a large portion of the tourism market in Alaska. Cruise ships slowed down in the recent years because of the pandemic but is expected to rebound in the near future. Between May and September 2019, cruise ship passengers accounted for 60 percent of out-of-state visitors to Alaska (McDowell Group 2020), and in 2019, 24 cruise vessels made 573 voyages transporting more than 1.2 million passengers in Alaskan waters (ADEC 2019). Cruise ship traffic is almost entirely within the Gulf of Alaska SA and centered in Southeast Alaska, as the Inside Passage is the most popular cruising route (Colt et al. 2007). Major cruise ship ports include Juneau, Ketchikan, Skagway, and Sitka. Potential impacts to aquatic resources within the Gulf of Alaska SA from cruise ships are related primarily to the waste streams generated on cruise ships. The primary cruise ship waste streams are sewage, graywater, oily bilge water, solid waste, and hazardous waste. A 2004 USEPA survey of cruise ships operating in Alaska reported ranges of 1,000 to 74,000 gallons of sewage and 36,000 to 249,000 gallons of graywater generated per day per vessel (USEPA 2008).

Alaska law allows large cruise ships to discharge treated sewage, graywater, and other wastewaters into state waters, and authorizes cruise ships to use mixing zones for these discharges to meet water quality standards under the Large Commercial Passenger Vessel Wastewater Discharge General Permit. The current law was passed after a scientific advisory panel determined that the cruise ship General Permit provides adequate protection to the marine environment, including marine mammals and fish. In 2019, 18 of the 24 large cruise ships that

operate under the General Permit discharged wastewater into Alaskan waters (ADEC 2019). As cruise traffic increases, permitted discharges of treated wastewater may increase.

Industrial Impacts

Commercial Fishing

Commercial fishing for salmon, shellfish, groundfish, and halibut occurs within the Gulf of Alaska SA. Environmental concerns from fishing include sustainability of fish stocks, bycatch of non-targeted fish populations, removal of marine nutrients, and degradation of habitats. Commercial fishing activities can also affect other species, including marine mammals, through entanglement in nets, disturbance to animals at haulouts and rookeries, and reduction in prey species.

Seafood Processing

Most seafood processing facilities in the SA operate under one of several ADEC Alaska Pollutant Discharge Elimination System (APDES) general permits that authorize discharges of seafood processing wastes into marine waters from onshore and offshore facilities. These permits allow for the discharge of seafood process waste, disinfectants, graywater, and other wastewaters. Discharges are prohibited into protected, special, at-risk, or degraded waters. As seafood processing increases, permitted discharges of seafood processing waste may increase.

Marine Debris

Due to prevailing currents and wind patterns, high volumes of floating pollutants and refuse adrift within the North Pacific, particularly plastic debris from the fishing industry, make landfall within the Gulf of Alaska SA. Several months after the tsunami that struck Japan in March 2011, an increase in marine debris was noted along the coast of Alaska from Southeast to Prince William Sound and Kodiak (ADEC 2016b). In addition to the primary impacts of marine debris on coastlines, such as damage to habitat and the aesthetic value of coastal areas, debris can entangle wildlife and injure or kill wildlife that ingest debris. Additional concerns from marine debris include potential leaching of hazardous materials, transport of invasive species, and interference with navigation.

Resource Development

Oil and Gas

As of June 2021, there were 399,422 acres of active offshore oil and gas leases in Cook Inlet. Based on recent evaluations of proved and probable reserves and existing technologies, there are 600 million barrels of recoverable oil and 12 billion cubic feet of recoverable natural gas in the Cook Inlet region (Munisteri et al. 2015). Future exploration and extraction of these reserves will involve continued operation and expansion of infrastructure.

The Alaska LNG Project would involve construction of an 800-mile, large-diameter pipeline from the North Slope to Cook Inlet. Although the pipeline route is not finalized, the preferred alternative crosses Cook Inlet (FERC 2020). The offshore portion of the pipeline would be laid on the seafloor across Cook Inlet on state submerged and submersible lands, and would be concrete-coated.

The pipeline may be buried in nearshore areas. Impacts from an underwater natural gas pipeline in Cook Inlet may include loss of benthic habitat, increased sedimentation during construction, and increased vessel traffic and noise during construction.

Timber

Although the logging industry in Alaska has shrunk significantly in recent decades, the USFS, Native corporations, and the State of Alaska continue to manage timber harvests on their lands. Logging activities in Alaska are concentrated within the Southeast and Prince William Sound areas. Increased logging activity increases the potential impacts to the aquatic resources within the marine environment.

This ILFP will offset these threats to marine aquatic resources by protecting and restoring areas that provide similar functions and services within the same marine ecosystem, in accordance with the goals and objectives stated below.

2.8.4 Aquatic Resource Goals and Objectives

The 17,676,970 acres within the SA are composed of intertidal and subtidal land. Approximately 17,659,445 acres are state-owned and available for restoration, enhancement, and/or preservation mitigation activities. The remaining land is composed of municipal tidelands or is state land currently leased or containing an easement.

Aquatic resource types likely to be impacted within this SA and the types that will be preserved, restored, or enhanced through mitigation activities directed by the ILFP are presented below:

- **Estuarine Waters** include deepwater habitats and estuarine shorelines landward of the HTL. Representative NWI codes include E1UBL and E2USN.
- **Estuarine Wetlands** include vegetated wetlands influenced by the presence of salt water. These include salt marshes and salt-tolerant sedge meadows. Representative NWI codes are E2EM1P and E2EM1N.
- **Marine Waters** include permanently submerged lands below HTL with no freshwater influence. A typical NWI code for marine waters is M1UBL.

Within the Gulf of Alaska SA, the State of Alaska will work to achieve the following goals and objectives:

- Use the State's resources and partnerships to select, secure, and implement aquatic resource restoration, establishment, enhancement, and/or preservation activities to improve the health of the marine environment.
- Ensure a greater level of certainty in the outcome of restoration and enhancement mitigation projects through coordinated efforts by State conservation professionals who are deeply familiar with the SA.
- Remove threats to important aquatic resources through preservation.
- Reduce the extent of cumulative adverse impacts to aquatic resources throughout the Gulf of Alaska SA.

- Preserve, restore, and enhance aquatic resources that provide habitat for migratory birds, marine mammals, anadromous fish, and species of conservation concern.
- Increase the types of aquatic resources available for compensatory mitigation in the SA.

2.9 Bering Sea SA

Inset 16. Bering Sea Service Area

The Bering Sea SA (Inset 16) covers 23,742 square miles and extends from the Kupreanof Peninsula to Cape Prince Wales on the Seward Peninsula. The SA includes the waters surrounding all of the Aleutian Islands, Bristol Bay, Norton Sound, and the waters off St. Lawrence Island, St. Matthews Island, Nunivak Island, and the Pribilof Islands. At approximately 11,700 miles, the Bering Sea SA coastline is the second longest of the four marine SAs, and includes many inlets, lagoons, estuaries, and small islands.

The Bering Sea is a highly productive shelf ecosystem that supports extensive fisheries and many species of birds and marine mammals, including threatened and endangered species. The intertidal and subtidal areas of the Bering Sea SA include many important and sensitive habitats, such as estuarine lagoons, large river deltas, eelgrass beds, kelp forests, and cold water corals.

The Bering Sea receives freshwater input from major river systems in Western Alaska, including the Yukon and the Kuskokwim. The Yukon River contributes approximately 8 percent of the total freshwater discharge to the Arctic Ocean, making it a major contributor of water and solutes to the Bering Sea SA (Brabets et al. 2000). The annual average discharge of the Yukon River near its mouth is more than 200,000 cubic feet per second.

Much of the Bering Sea, including portions of the SA, is covered annually by sea ice, which begins forming in the northern Bering Sea as late as September and usually reaches its maximum extent by March. Sea ice provides important habitat for marine mammals, including seals, walrus, and polar bears. A large phytoplankton bloom follows the spring retreat of the sea ice, which contributes greatly to the primary productivity of the Bering Sea.

The climate of the Bering Sea is shifting from a cold, dry Arctic climate to more sub-Arctic conditions (Overland and Stabeno 2004). Increased variability in winter temperatures has contributed to variable sea ice cover; in 2012, the sea ice extent in the Bering Sea reached the second-highest levels on record for the month of January, and was well below average in December 2015 (NSIDC 2012; 2016). Variability in sea ice cover in turn affects the timing of the spring phytoplankton bloom (Rodionov et al. 2003). These changes have caused shifts in the ecosystem at every level, from fishery composition to marine mammal populations (Overland and Stabeno 2004).

2.9.1 Current Aquatic Resource Conditions

Fisheries and Fish Habitat

Commercially important fisheries within the Bering Sea SA include salmon, herring, rockfish, skate, sole, plaice, pollock, mackerel, cod, shrimp, and crab. Bristol Bay supports the largest sockeye salmon fishery in the world.

Essential Fish Habitat

- Alaska Plaice
- Arrowtooth Flounder
- Atka Mackerel
- Blue King Crab
- Chinook Salmon
- Chum Salmon
- Coho Salmon
- Dover Sole
- Dusty Rockfish
- Flathead Sole
- Golden King Crab
- Greenland Turbot
- Northern Rockfish
- Pacific Cod
- Pacific Ocean Perch
- Pink Salmon
- Red King Crab
- Rex Sole
- Rock Sole
- Sablefish
- Sculpin
- Shortraker
- Rougheye Rockfish
- Skate
- Snow Crab
- Sockeye Salmon
- Squid
- Tanner Crab
- Thornyhead Rockfish
- Walleye Pollock
- Weathervane Scallop
- Yelloweye Rockfish
- Yellowfin Sole

EFH within the Bering Sea SA is designated for 33 species under the Bering Sea and Aleutian Island Crab, Bering Sea and Aleutian Island Groundfish, Gulf of Alaska Groundfish, Alaska Scallops, and Alaska Stocks of Pacific Salmon Fishery Management Plans.

Threatened and Endangered Species

Endangered
- Blue Whale
- Bowhead Whale
- Eskimo Curlew (Historic Range)
- Fin Whale
- Humpback Whale
- Leatherback Sea Turtle
- North Pacific Right Whale
- Sei Whale
- Short-Tailed Albatross
- Sperm Whale
- Steller Sea Lion

Threatened
- Bearded Seal
- Northern Sea Otter
- Polar Bear
- Ringed Seal
- Spectacled Eider
- Steller's Eider

Candidate for Listing
- Pacific Walrus
- Kittlitz's Murrelet

Threatened and Endangered Species

Federally designated critical habitat for four species listed as threatened or endangered under the ESA is included within the Bering Sea SA. Critical habitat for northern sea otters is designated along the southern coast of the Alaska Peninsula, the Pavlof, Shumagin, and Aleutian islands, as well as within Izembek Lagoon and Port Moller, and Herendeen Bay. This critical habitat includes shallow, rocky areas and kelp forests as well as areas with prey resources upon which sea otters depend. Critical habitat for Steller sea lions extends 20 miles around major haulouts and rookeries, which, within the SA, includes the Pavlof, Shumagin, Aleutian, and Pribilof islands, Round Island, Cape Newenham, and areas of St. Matthew and St. Lawrence Island. It also includes two large foraging areas near Seguam Pass and Bogoslof. Critical habitat for Steller's eiders has been designated to protect breeding habitat on the Yukon-Kuskokwim Delta, a staging area in the Kuskokwim Shoals, and molting areas at the Seal Islands, Nelson Lagoon, and Izembek Lagoon. Critical habitat for spectacled eiders has been designated to protect breeding areas on the Yukon-Kuskokwim Delta, a molting area in Norton Sound, and a wintering area south of St. Lawrence Island.

The Pacific walrus is designated as a candidate species for listing under the ESA. In 2011, USFWS determined that the Pacific walrus warrants listing as a threatened species due to the increasing loss of sea ice habitat caused by climate change, although it was not listed at that time (50 CFR §17). Pacific walruses occupy shallow waters throughout the Bering Sea in the summer. Major haulouts within the SA are found on St. Lawrence Island, Cape Newenham, Cape Pierce, Round Island (within the Walrus Islands State Game Sanctuary), and Cape Seniavin (USFWS 2015b). They winter on the Bering Sea ice pack.

Commercial whaling in the North Pacific in the 19th and early 20th centuries depleted the Bering-Chukchi-Beaufort bowhead whale stock significantly. Commercial harvest of bowhead whales ended in 1921, at which time the worldwide population of the species was approximately 3,000 (NOAA 2013). Bowhead whales have been protected at various times under the 1931 League of Nations Convention, the Endangered Species Preservation Act of 1966, and the Endangered Species Conservation Act of 1969. Bowhead whales were listed as endangered under the ESA

when it was enacted in 1973. Since 1981, the Alaska Eskimo Whaling Commission and NOAA have jointly managed the traditional subsistence harvest of bowhead whales in Alaska. The International Whaling Commission sets an annual harvest quota for the Bering-Chukchi-Beaufort bowhead stock, which is shared between Alaska Native communities and Native communities in the Russian Far East. The Alaska Eskimo Whaling Commission divides the Alaska share of the quota between 11 Native communities (International Whaling Commission 2021). Two of these communities, Savoonga and Gambell, are within the Bering Sea SA.

Sensitive Aquatic Areas

There are approximately 2,609,351 acres of eelgrass and 95,823 acres of kelp habitats within the Bering Sea SA, according to NOAA's ESI shoreline mapping (NOAA 2001b; 2002b; 2003; 2004). There are extensive areas of eelgrass and kelp in coastal lagoons along the western Alaska Peninsula and in the waters off the Shumagin, Pavlof, and Krenitzin islands and the Sandman Reefs. Smaller areas of these habitats are also found in coastal lagoons along the western coast of Alaska, including Goodnews Bay, Duchikthluk Bay on Nunivak Island, and Norton Sound. Eelgrass beds within the SA provide important feeding habitat for waterfowl. Izembek Lagoon contains one of the largest eelgrass beds in the world, which is visited by almost the entire eastern Pacific population of brant geese and half of the world's population of emperor geese, as well as Steller's eiders, shorebirds, and waterfowl. Kelp beds are also important spawning and rearing habitat for fish and invertebrates and feeding habitat for many species of marine mammals. Kelp beds occur throughout the Aleutian Islands and southern Bering Sea, although the abundance and density of kelp beds have diminished in Southwest Alaska in recent decades due to declines in sea otter populations. Declines in the sea otter population reduce predation on sea urchins, which in turn overgraze kelp beds. There are also approximately 313 acres of salt marsh within the SA (Steneck et al. 2002).

The Aleutian Archipelago supports the highest species diversity of cold-water corals in the world, including at least 25 endemic species (Heifetz et al. 2005). Coral gardens in the Aleutian Islands are incredibly productive and diverse ecosystems, providing shelter for shrimp and rockfish and breeding habitat for species such as golden king crab, and support for many other species including sponges, anemones, snails, and sea stars. Cold-water corals also occur on the broad, shallow continental shelf of the Bering Sea, although they are less prevalent and diverse than in the Aleutian Islands (Stone and Shotwell 2007).

Important Bird Areas

Marine IBAs within the SA primarily identify areas of pelagic open water habitat that are used by a diversity of bird species or a high number of individuals, or that provide a critical resource. Marine IBAs within the SA provide breeding habitat for many species, including whiskered auklets, tufted puffins, fork-tailed storm-petrels, red-faced cormorants, and spectacled eiders, a threatened species. The East Norton Sound IBA contains mudflats and shallow waters that provide staging and molting habitat for the Yukon-Kuskokwim Delta breeding population of spectacled eiders.

Marine IBAs

- Amchitka Pass
- Bering Sea Shelf Edge
- Buldir & Near Islands Marine
- Cape Tanak Marine
- Chagulak Island Marine
- Cold & Morzhovoi Bays
- East Norton Sound
- Fenimore Pass & Atka Island Marine
- Gareloi Island Marine
- Kagamil Island Marine
- Kiska Island Marine
- Prince William Sound
- Seguam Island Marine
- Shumagin Islands Marine
- St. George Island Marine
- St. Matthew Island Marine
- Unimak & Akutan Passes
- Western St. Lawrence Island Marine

2.9.2 Historic Loss of Aquatic Resources

Much of the SA contains pristine marine and estuarine habitat. There are several communities within the SA, including Emmonak, Eek, and Quinhagak. Sources of degradation and loss of aquatic resources have come largely from the mining and commercial fishing industries. Large mining operations and seafood processing plants require facilities built at tidewater, which have led to localized losses of aquatic resources.

Mining developments have targeted primarily gold and platinum-group metals in the SA. The USGS (2015) lists one mine in the SA that produced in varying amounts. As discussed in the Bering Taiga SA, placer mining of gold and platinum has occurred in Southwest Alaska since the 1920s, primarily in the Goodnews Bay and Nome areas. Hardrock mining also occurs in the foothills and mountains upstream of the SA. AMD is a potential source of water pollution from abandoned hardrock mines. Chemical reactions from AMD dissolve heavy metals such as copper, lead, and mercury into surface and ground water. These metals have the potential to contaminate drinking water, disrupt the growth of aquatic plants, degrade or destroy fish and wildlife habitat, and corrode infrastructure over time.

The ADEC database contains 95 contaminated site cases within the Bering Sea SA (ADEC 2015a). The dominant sources of impact are spills or leaks of hazardous materials such as diesel, other petrochemicals, and PCBs that have entered nearby streams and soils.

The Department of Defense database lists six FUDS within the Bering Sea SA that vary in size (USACE 2013a). Many of these sites require remediation associated with the presence of hazardous, radioactive, or toxic waste that may have impacted local water quality or degraded estuarine habitats.

2.9.3 Threats to Aquatic Resources

The Bering Sea contains some of the most productive commercial fisheries in the world and is the center of Alaska's commercial fishing industry. Stressors to the marine resources within the Bering Sea SA include fishing, mining, oil and gas development, marine traffic (passenger and commercial), and industrial and urban development.

Development

The population of coastal communities adjacent to the Bering Sea SA increased by 4 percent between 2000 and 2010, from approximately 31,900 to 33,100 people (U.S. Census Bureau 2012). Increased growth of coastal communities will result in additional impacts to marine resources.

There are approximately 681 acres of municipal tidelands, 790 acres of tidal leases, and 72 acres of tidal easements within the Bering Sea SA. Tidelands have been conveyed to eight cities and boroughs for uses that include docks, harbors, and roads. Tidal leases have been granted to entities including Native corporations, federal agencies, and seafood processors for purposes including mooring areas, breakwaters, and seafood processing facilities. Public and private easements to tidal lands have been granted to cities, seafood processors, Native corporations, and state agencies for purposes including airport right-of-way, boat ramps, and underwater sewage, wastewater, and seafood effluent outfalls. Future conveyance of tidelands and grants of easements or leases may result in construction of new structures or placement of additional fill in tidelands, along with associated impacts.

Expansion of port and harbor facilities is a primary source of impacts to marine areas within communities. There are 18 ports, docks, and harbors in 10 coastal communities within the Bering Sea SA. Additionally, there is one breakwater maintained by USACE within the SA. Harbors require regular maintenance dredging, which has direct and indirect impacts on marine and estuarine resources.

The St. George Harbor project is planned to provide a safer, more functional harbor in support of the local fishing economy on St. George Island. While preliminary alternatives are still being designed, the project will likely include construction of a new breakwater, dredging an entrance channel to improve navigability, and dredging an inner harbor to provide space for docking and mooring for up to eight fishing vessels. Construction of the project will require placement of marine fill and dredging, in addition to impacts that may result from increased sedimentation, increased noise, and increased vessel traffic (USACE 2020).

DOT&PF and USACE began evaluating potential deep draft port locations in the Arctic in 2008. In 2011, Nome was tentatively identified as the most feasible location for a deep draft port, which would support offshore oil and gas developments, search and rescue, and oil spill response. Expansion of the existing port facilities would include extending the causeway, building a new dock, and dredging the harbor to minus 28 feet Mean Lower Low Water. Construction of these features would require dredging 441,000 cubic yards for the navigation channel and harbor basin, and placement of 359,900 cubic yards of fill material in marine areas for the causeway extension.

Impacts would include direct loss of habitat, temporary impacts to water quality during construction, and disruption of wildlife due to increased noise, as well as impacts to water quality and wildlife due to increased marine vessel traffic (USACE 2015b).

Transportation

Marine Traffic

High levels of marine traffic within the SA, which includes freight, fishing, military, and fuel vessels, increase the risk of oil spills. The probability that increased marine traffic will increase spills is high in the vicinity of the Port of Dutch Harbor, which serves as the major distribution hub for petroleum products to villages in the Aleutian Islands and the southern Bering Sea, and to the region's fishing fleet (ADEC and USCG 2015). Between 1996 and 2005, 412,204 gallons were spilled by vessels in 320 separate incidents in the Aleutian Islands. Fuel transfer operations at villages are also a source of frequent spills (ADEC and USCG 2012). International vessels may also introduce contaminants into the SA, including invasive species. Hundreds of ships pass through the Aleutian Islands each year, travelling along an international shipping route between the West Coast and Asia.

In total port calls, the Port of Dutch Harbor was the busiest port in Alaska in 2018, receiving 272 total calls (USDOT 2015). It is also the largest fishing port in the United States by tonnage, serving as the primary harbor and onshore processing center for the crab and groundfish fisheries of the Bering Sea and Aleutian Islands (Northern Economics 2009). In 2018, 763 million pounds of commercial fishery landings were received at Dutch Harbor (NOAA 2020).

Many coastal communities adjacent to the Bering Sea SA are served by the AMHS, including Unalaska, Akutan, Cold Bay, King Cove, and Sand Point. Ferry terminals in these communities require regular maintenance. The 2020-2023 STIP includes a project to replace the existing ferry terminal in Sand Point with a multi-use dock (DOT&PF 2020). The dock replacement will require marine fill. As ferry terminals in other communities age, future improvements and replacements will involve additional impacts to marine areas.

Cruise Ships

Presently, Unalaska and the Port of Dutch Harbor receive low levels of cruise ship calls (Northern Economics 2009). However, Arctic tourism is becoming increasingly popular and will likely grow as the Arctic becomes more accessible. One study has projected that marine tourism in the Arctic region will increase at a rate of 24.9 percent per year through 2050 (Williams et al. 2011). Increased cruise ship traffic in the Arctic will introduce new threats to marine resources within the Bering Sea SA, including oil spills, impacts to marine mammals, and discharges of treated sewage, graywater, and other wastewaters. Additional ports and harbors capable of receiving cruise ships will likely be constructed. There will also be increased risk for major incidents, including sinkings, groundings, serious environmental violations, and disablings.

Industrial Impacts

Commercial Fishing

Commercial fishing for salmon, shellfish, herring, crab, groundfish, and halibut occurs within the Bering Sea. Environmental concerns from fishing include sustainability of fish stocks, bycatch of non-targeted fish populations, removal of marine nutrients, and degradation of habitats. Commercial fishing activities can also affect other species, including marine mammals, through entanglement in nets, disturbance to animals at haulouts and rookeries, and reduction in prey species.

The unique and diverse coral and sponge communities that are abundant in the Aleutian Islands are particularly susceptible to impacts from commercial fishing. Gear used in groundfish and crab fishing can disturb and damage these habitats, which are extremely slow-growing and thus extremely slow to recover from damage. One study in the Aleutian Islands found that 14 percent of corals and 21 percent of sponges surveyed exhibited damage from fishing gear or natural events, and that in areas of high-intensity trawl fishing, 49 percent of corals exhibited damage (Heifetz et al. 2009). Corals are also damaged as a result of bycatch. Each year between 1997 and 1999, approximately 81.5 metric tons of coral were removed from the seafloor as bycatch from commercial fishing in Alaska, and approximately 91 percent of this bycatch occurred in the Aleutian Islands and Bering Sea (Stone and Shotwell 2007).

Seafood Processing

The majority of ADEC-permitted mixing zones within the SA are for shore-based seafood processing facilities. Most seafood processing facilities in the SA operate under one of several ADEC APDES general permits that authorize discharges of seafood processing wastes into marine waters from onshore and offshore facilities. These permits allow for the discharge of seafood process waste, disinfectants, graywater, and other wastewaters. Within the SA there are 26 onshore seafood processing plants permitted to discharge processing waste into coastal waters, and several additional seafood processing plants that discharge into freshwater within 5 miles upstream of the SA (ADEC 2016a). There are also 23 permitted offshore seafood processing facilities operating within the SA (ADEC 2016a). As seafood processing increases, permitted discharges of seafood processing waste may increase.

Resource Development

Oil and Gas

The Alaska Peninsula Sale Area is located on the north side of the Alaska Peninsula, stretching from Cold Bay to the Nushagak Peninsula, and includes approximately 1.75 million acres of offshore state waters. This area has high potential to produce gas and low to moderate potential to produce oil. Oil and gas prospects were explored on the Alaska Peninsula between the 1950s and 1980s. In 2005 and 2007, 38 tracts were leased, but no exploration or development was conducted and all leases were relinquished by 2010. Three offshore tracts comprising 9,561 acres were leased in 2014, but are no long active as of June 2021 (DNR 2021a).

To date, no development or production of oil and gas has taken place in the Alaska Peninsula Sale Area, and little to no infrastructure to support the oil and gas industry has been constructed. Exploration, production, and transport of oil and gas within the Alaska Peninsula Sale Area would impact resources within the Bering Sea SA. Exploration activities can include seismic surveys, while development and production involve construction of drill sites; excavation of gravel; construction of facilities such as gravel pads, roads, airstrips, pipelines, and housing; construction and expansion of port facilities; transportation and operation of machinery; and transport and transfer of hydrocarbon products. An increase in these activities will increase impacts to the aquatic resources within the SA.

In addition to the offshore oil and gas reserves within the Alaska Peninsula Sale Area managed by DNR, there are extensive oil and gas reserves on the outer continental shelf (OCS) within the Bering Sea. Recent estimates of the recoverable oil and gas reserves in the Bering Sea OCS are 1.16 billion barrels of oil and 15.7 trillion cubic feet of natural gas (USDOI 2006). The reserves areas, which are managed by the Bureau of Ocean Energy Management (BOEM), are outside the Bering Sea SA and thus exploration and development on the OCS would not have direct impacts on aquatic resources within the SA. However, were production to occur on the OCS, transportation and support infrastructure would be required in coastal areas within the Bering Sea SA, which would impact aquatic resources within the SA.

Mining

Offshore gold placer mining in Nome, including large-scale commercial operations and recreational suction dredging, have increased significantly since 2011 due to high gold prices, offshore lease sales, and popular reality TV shows about gold mining in Alaska. Commercial gold placer mining is allowed only on offshore mining leases. In 2011, DNR sold offshore leases to 84 tracts totaling 23,793 acres (DNR 2016). Recreational mining is limited to the two Nome recreational mining areas, which total 570 acres of nearshore waters. In 2012, DNR issued 148 permits for suction dredging within the Nome recreational mining areas. Exploration and development of existing leases is ongoing. The increased popularity of recreational gold mining and continued exploration and development of offshore leases will increase the prevalence of these and additional impacts.

This ILFP will offset these threats to marine aquatic resources by protecting and restoring areas that provide similar functions and services within the same marine ecosystem, in accordance with the goals and objectives stated below.

2.9.4 Aquatic Resource Goals and Objectives

The 15,194,720 acres within the SA is composed of intertidal and subtidal land. Approximately 15,193,177 acres is state-owned and available for restoration, enhancement, and/or preservation mitigation activities. The remaining land is composed of municipal tidelands or is state land currently leased or containing an easement.

Estuarine wetlands, estuarine waters, and marine waters are likely to be impacted within this SA, and these aquatic resource types will be preserved, restored, or enhanced through mitigation activities directed by the ILFP.

Within the Bering Sea SA, the State of Alaska will work to achieve the following goals and objectives:

- Use the State's resources and partnerships to select, secure, and implement aquatic resource restoration, establishment, enhancement, and/or preservation activities to improve the health of the marine environment.
- Ensure a greater level of certainty in the outcome of restoration and enhancement mitigation projects through coordinated efforts by State conservation professionals who are deeply familiar with the SA.
- Remove threats to important aquatic resources through preservation.
- Reduce the extent of cumulative adverse impacts to aquatic resources throughout the Bering Sea SA.
- Preserve, restore, and enhance aquatic resources that provide habitat for migratory birds, marine mammals, anadromous fish, and species of conservation concern.
- Increase the types of aquatic resources available for compensatory mitigation in the SA.

2.10 Chukchi Sea SA

Inset 17. Chukchi Sea Service Area

The Chukchi Sea SA (Inset 17) covers 4,414 square miles and extends from Cape Prince Wales on the Seward Peninsula to Point Barrow, the northernmost point of Alaska (and of the United States). The SA includes Kotzebue Sound, Hotham Inlet, Selawik Lake, Shishmaref Inlet, Lopp Lagoon, and the waters surrounding the Diomede Islands. The Chukchi Sea SA coastline is 2,795 miles long, and includes estuaries, coastal lagoons, barrier beaches, and exposed points and capes.

The Chukchi Sea is a relatively shallow sea with an extensive continental shelf. Mean flow within the Chukchi Sea is northward, driven by the Pacific-Arctic pressure gradient. During the open water months, the Chukchi Sea receives warm, nutrient-rich waters from the Bering Sea. Primary productivity ranges from low to very high and is influenced heavily by sea ice. The shallow and productive sea floor supports rich shellfish fisheries, which in turn support many species of marine mammals and sea birds. Sea ice covers the Chukchi Sea for 6 to 8 months out of the year. Many marine mammals depend on the sea ice pack for resting, hunting, denning, and calving. Massive phytoplankton blooms have been found beneath the sea ice in recent years, which may be the result of increased light transmission through a thinner ice pack (Arrigo et al. 2012).

Long-term warming has been documented in the Chukchi Sea over the past 50 years (Heileman and Belkin 2009). Although modulated by interannual variability, long-term warming has accelerated since 1983. Early assessments of the Arctic sea ice pack in 2015 indicate that the

extent of sea ice cover was likely similar to that of 2011, the third lowest extent on record (NPFMC 2015).

2.10.1 Current Aquatic Resource Conditions

Fisheries and Fish Habitat

Commercial fisheries within the Chukchi Sea SA include chum salmon, yellowfin sole, Pacific herring, king crab, and a small sheefish harvest in Hotham Inlet. Dolly Varden, whitefish, and burbot are also occasionally sold commercially.

EFH within the Chukchi Sea SA is designated for eight species under the Alaska Stocks of Pacific Salmon and Fish Resources of the Arctic Management Area Fishery Management Plans.

Essential Fish Habitat

- Arctic Cod
- Arctic Saffron Cod
- Arctic Snow Crab
- Chinook Salmon
- Chum Salmon
- Coho Salmon
- Pink Salmon
- Sockeye Salmon

Threatened and Endangered Species

Federally designated critical habitat for spectacled eiders is included within the Chukchi Sea SA. Critical habitat has been designated to protect a molting area within the shallow waters of Ledyard Bay.

In 2008, the USFWS listed the polar bear as a threatened species under the ESA. This determination was made based on the threat that the continuing loss of sea ice poses to polar bears. Polar bears depend on sea ice for many purposes, including hunting, denning, and long-distance travel throughout their range. The continued decline of sea ice extent within the Chukchi Sea will continue to threaten polar bear habitat (50 CFR §17). The range of the polar bear includes the entire Chukchi Sea SA (ADF&G 2021b). Critical habitat for polar bears was designated in November 2010 that covered a large swath of the Beaufort and Chukchi Seas. The designation was based largely on the continued retreat of sea ice in the Arctic Ocean. The critical habitat designation was remanded by the U.S. District Court of Alaska because the area was deemed too extensive and the designation would inhibit economic growth tied to the exploration and development of oil and gas.

Threatened and Endangered Species

Endangered
- Bowhead Whale
- Fin Whale
- Humpback Whale
- North Pacific Right Whale

Threatened
- Bearded Seal
- Polar Bear
- Ringed Seal
- Spectacled Eider
- Steller's Eider

Candidate for Listing
- Pacific Walrus
- Kittlitz's Murrelet

Seven communities that subsistence hunt bowhead whales are within the Chukchi Sea SA: Wales, Little Diomede, Kivalina, Point Hope, Point Lay, Wainwright, and Utqiaġvik.

Sensitive Aquatic Areas

There are approximately 120,539 acres of eelgrass and 19,665 acres of kelp habitats within the Chukchi Sea SA, according to NOAA's ESI shoreline mapping (NOAA 2002b; 2005). There are large eelgrass beds in Kotzebue Sound, Hotham Inlet, and Shishmaref Inlet. Shishmaref Inlet is part of a large series of lagoons along the northern Seward Peninsula that provide important foraging habitat for seals, migrating habitat for many species of waterfowl, and spawning habitat for Pacific herring. There are also kelp beds along southern Kotzebue Sound. These areas are important habitat for Pacific herring.

The SA also contains extensive salt marsh habitat. Approximately 450 miles of shoreline between Cape Prince Wales and Point Hope is salt and brackish marsh (Coastal & Ocean Resources and Archipelago Marine Research Ltd. 2013). The barrier beach and tidal lagoon systems that occur throughout the SA provide protection from high-energy waves and protect these marsh habitats.

Soft corals are patchily distributed within the Chukchi Sea (Stone and Shotwell 2007). There is little information available on the extent and ecology of corals in the Arctic.

Important Bird Areas

Marine IBAs within the Chukchi Sea SA identify areas of pelagic open water habitat that are used by a diversity of bird species or a high number of individuals, or that provide a critical resource. The five marine IBAs within the SA provide breeding habitat for many species, including parakeet auklets, black-legged kittiwakes, common murres, glaucous gulls, king eiders, Arctic terns, and red phalaropes. Ledyard Bay is also federally designated critical habitat for spectacled eider.

Marine IBAs

- Barrow Canyon & Smith Bay
- Bering Strait
- Chukchi Sea Nearshore
- Ledyard Bay to Icy Cape
- Lisburne Peninsula Marine

2.10.2 Historic Loss of Aquatic Resources

The area around the Chukchi Sea SA is largely uninhabited and the marine environment has experienced little direct degradation or loss of aquatic resources. The North Slope regional hub of Utqiaġvik lies in the adjacent Arctic Tundra SA, but its residents commonly make use of the marine ecosystem. Other villages adjacent to the Chukchi Sea SA include Point Hope, Wainwright, Point Lay, and Kivalina.

There are three contaminated site cases listed in the ADEC database (ADEC 2015a) within the SA. The dominant sources of impact are spills or leaks of hazardous materials such as diesel, other petrochemicals, and PCBs that have entered nearby streams and soils. The Cape Sabine Distant Early Warning Line site, near the village of Point Lay, was found to contain high levels of PCBs and petroleum products from the associated camp. These toxins were also found to have entered nearby streams and surface waters. The site was considered closed as of 2005, following cleanup efforts by the ADEC.

The Middle Salt Lagoon in Utqiaġvik is listed as an open contaminated site with the ADEC. The surface water is contaminated with benzene. Benzene is a known carcinogen linked to several forms of leukemia. The lagoons in Utqiaġvik are known to support the highest densities of nesting Steller's eiders on the North Slope. Migratory habitat is a major function of these aquatic resources, and contamination by benzene and other hazardous chemicals may be degrading these habitats for Steller's eiders and other sensitive species migrating to the area.

2.10.3 Threats to Aquatic Resources

Development

The population of coastal communities adjacent to the Chukchi Sea SA decreased by 1.6 percent between 2000 and 2010, from approximately 12,700 to 12,500 people (U.S. Census Bureau 2012).

There are approximately 61 acres of tidal leases and 7 acres of tidal easements within the Chukchi Sea SA. One tidal lease has been granted to the Alaska Industrial Development and Export Authority for the port facilities of the DeLong Mountain Transportation System, which supports the Red Dog mine. One public easement to tidal lands has been granted to the North Slope Borough for an effluent outfall line from the Point Lay wastewater treatment plant. Future conveyance of tidelands and grants of easements or leases may result in construction of new structures or placement of additional fill in tidelands, along with associated impacts.

Expansion of port and harbor facilities is a primary source of impact to marine areas within communities. There are three port facilities within the Chukchi Sea SA: a port and small boat harbor in Kotzebue, and the DeLong Mountain Transportation System terminal. Harbors require regular maintenance dredging, which has direct and indirect impacts on marine and estuarine resources. Impacts include reduced marine habitat and increased ambient noise.

The North Slope Borough is developing and establishing a Port Authority. The mission of the Port Authority is to create port facilities in coastal communities throughout the Borough. Expanded port facilities will reduce living costs in communities and support projected future increases of marine traffic and resource extraction in the Arctic. Construction of new ports will require dredging and placement of fill in nearshore waters, which will impact marine aquatic resources and habitat.

Transportation

Marine Traffic

From 2013 to 2019 vessel traffic through the Northwest Passage has increased 44% (Arctic Council 2021). As navigability of the Arctic increases with lower summer ice extents, levels of marine traffic will continue to increase. Increased marine traffic for shipping, resource extraction, tourism, and research will introduce new threats to marine resources within the Chukchi Sea SA.

Cruise Ships

Although not common cruise ships have traveled through the Northwest Passage. While the Northwest Passage does not remain ice-free for a predictable amount of time each summer, the

trend appears to be pointing to a reliable open water route in the near future. Cruise companies are beginning to offer cruises in anticipation of an ice-free Arctic. Increased cruise ship traffic in the Arctic will introduce new threats to marine resources within the Chukchi Sea SA. Additional ports and harbors capable of receiving cruise ships will likely be constructed.

Industrial Impacts

Commercial Fishing

Commercial fishing for salmon, shellfish, groundfish, and sheefish occurs within the Chukchi Sea SA. Environmental concerns from fishing include sustainability of fish stocks, bycatch of non-targeted fish populations, removal of marine nutrients, and degradation of habitats. Commercial fishing activities can also affect other species, including marine mammals, through entanglement in nets, disturbance to animals at haulouts and rookeries, and reduction in prey species.

Resource Development

Oil and Gas

In 2008, the federal government offered offshore acreage leases on the Chukchi Sea OCS for the first time since 1991. Most of the leases were purchased by Royal Dutch Shell (Shell), which began oil and gas exploration activities in 2010. Shell shut down its Chukchi Sea exploration program in 2015.

Recent estimates of the recoverable oil and gas reserves in the Chukchi Sea OCS are 15.5 billion barrels of oil and 80.5 trillion cubic feet of natural gas (USDOI 2006). The reserves areas, which are managed by BOEM, are outside the Chukchi Sea SA, and thus any future exploration and development within the OCS would not have direct impacts on aquatic resources within the SA. However, were production to occur in the OCS, transportation and support infrastructure would be required in coastal areas within the Chukchi Sea SA, which would impact aquatic resources within the SA.

This ILFP will offset these threats to marine aquatic resources by protecting and restoring areas that provide similar functions and services within the same marine ecosystem, in accordance with the goals and objectives stated below.

2.10.4 Aquatic Resource Goals and Objectives

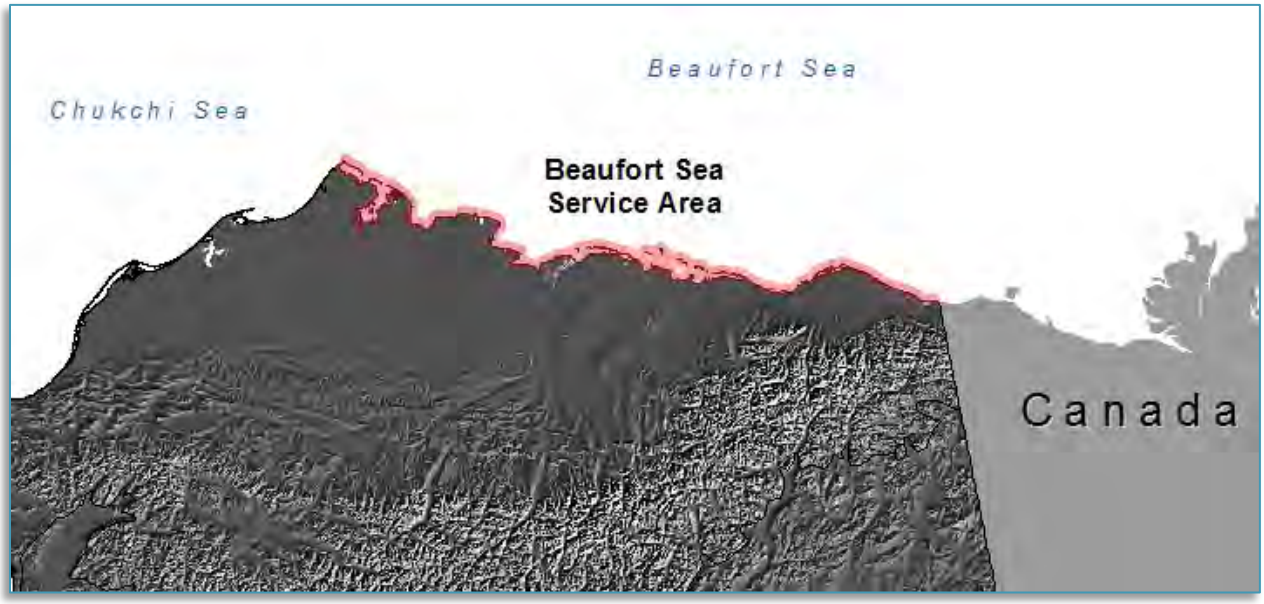
The 2,824,953 acres within the SA is composed of intertidal and subtidal land. Approximately 2,824,885 acres are state-owned and currently available for restoration, enhancement, and/or preservation mitigation activities. The remaining land is composed of municipal tidelands or is state land currently leased or containing an easement.

Estuarine wetlands, estuarine waters, and marine waters are likely to be impacted within this SA, and these aquatic resource types will be preserved, restored, or enhanced through mitigation activities directed by the ILFP.

Within the Chukchi Sea SA, the State of Alaska will work to achieve the following goals and objectives:

- Use the State's resources and partnerships to select, secure, and implement aquatic resource restoration, establishment, enhancement, and/or preservation activities to improve the health of the marine environment.
- Ensure a greater level of certainty in the outcome of restoration and enhancement mitigation projects through coordinated efforts by State conservation professionals who are deeply familiar with the SA.
- Remove threats to important aquatic resources through preservation.
- Reduce the extent of cumulative adverse impacts to aquatic resources throughout the Chukchi Sea SA.
- Preserve, restore, and enhance aquatic resources that provide habitat for migratory birds, marine mammals, anadromous fish, and species of conservation concern.
- Increase the types of aquatic resources available for compensatory mitigation in the SA.

2.11 Beaufort Sea SA



Inset 18. Beaufort Sea Service Area

The Beaufort Sea SA (Inset 18), which covers 2,575 square miles, is the smallest of the four marine SAs and extends from Point Barrow to the U.S.-Canada border. The SA includes Admiralty Bay, Prudhoe Bay, the Colville River Delta, and the waters surrounding the many barrier islands along the North Slope. At 1,714 miles long, the Beaufort Sea SA coastline is the shortest of the four marine SAs, and includes bays, estuaries, coastal lagoons, and barrier islands.

The Beaufort Sea is a marginal sea of the Arctic Ocean with a relatively narrow continental shelf. The Alaska Coastal Current delivers warm, nutrient-laden water from the Bering Sea to the Beaufort Sea. Primary productivity in the Beaufort Sea, while comparatively low, is generally higher in coastal areas and is enhanced following the spring retreat of sea ice along the shelf. The shoals, estuaries, spits, lagoons, and islands provide feeding, breeding, and resting habitat for many species of birds, fish, and marine mammals. Many of the marine mammals that occur within the Beaufort Sea also depend on the sea ice pack for resting, hunting, denning, and calving.

Most of the Beaufort Sea is covered by sea ice year-round. Landfast ice, which is anchored to the coast, covers the nearshore environment and shelf seasonally. Landfast ice is important habitat for ringed seals and polar bears. By the early 21st century, the coast of the Beaufort Sea was observed to be ice-free in late June, more than a month earlier than in the 1970s, when landfast ice persisted until early August (Mahoney et al. 2007).

2.11.1 Current Aquatic Resource Conditions

Fisheries and Fish Habitat

Essential Fish Habitat

- Arctic Cod
- Arctic Saffron Cod

Species that have been harvested commercially within the Beaufort Sea SA include yellowfin sole, Arctic cisco, and whitefish. There is a locally important subsistence fishery for Arctic cisco in the Colville River Delta that generally harvests between 20,000 and 25,000 fish annually (Wilson 2006). The Arctic cisco fishery is managed by the ADF&G Subsistence Division.

EFH within the Beaufort Sea SA is designated for two species under the Fishery Management Plan for Fish Resources of the Arctic Management Area (NPFMC 2009).

Threatened and Endangered Species

Threatened and Endangered Species

Endangered
- Bowhead Whale
- Humpback Whale

Threatened
- Bearded Seal
- Polar Bear
- Ringed Seal
- Spectacled Eider
- Steller's Eider

Candidate for Listing
- Kittlitz's Murrelet

There is no current critical habitat designation for any listed or candidate species under the ESA within the SA. The range of the polar bear includes the entire Beaufort Sea SA (ADF&G 2021b).

The bowhead whale is known to use the Beaufort Sea SA heavily during migration in the fall back toward the Bering Sea (Quakenbush et al. 2012). During this time period, Alaska Natives from the communities of Utqiaġvik, Nuiqsut, and Kaktovik hunt them as part of traditional subsistence practices. Bowhead whales have been known to avoid or alter their migration patterns in relation to oil and gas activities that generate loud noise underwater (Richardson et al. 1999).

The nearshore waters between the northern Alaska coastline and the many barrier islands that lie just offshore are important habitat for spectacled and Steller's eiders. In spring, these birds use open leads in the sea ice to rest between flights to their breeding grounds within the Arctic Tundra SA. Following breeding, male eiders depart and spend the remainder of summer in the nearshore pelagic environment, feeding on aquatic insects and crustaceans prior to fall migration. Female eiders and their young use this habitat once their broods are able to fly. The Beaufort Sea represents an important habitat for these listed species due to its abundant food sources and relatively pristine open water.

Sensitive Aquatic Areas

There are approximately 14,081 acres of kelp habitat within the Beaufort Sea SA, according to NOAA's ESI shoreline mapping (NOAA 2005). The greatest concentration of kelp is found in Prudhoe Bay in an area commonly referred to as the Boulder Patch. Since its discovery and description in the late 1970s, the Boulder Patch has been found to provide habitat for a diversity of benthic flora species, including cyanobacteria, plankton, and many types of algae (Wilce and

Dunton 2014). Research has shown that the Boulder Patch has been impacted by oil and gas activities, as well as natural processes such as ice scour. Due to the Arctic environment, colonization and recovery within the Boulder Patch happens very slowly (Konar 2006). Smaller patches of kelp communities are found to the east, offshore of Bullen Point and the Canning River delta. Kelp beds are also important spawning and rearing habitat for fish and invertebrates and feeding habitat for many species of marine mammals.

Important Bird Areas

Marine IBAs

- Barrow Canyon & Smith Bay
- Beaufort Nearshore
- Chukchi Sea Nearshore
- East Dease Inlet

Marine IBAs within the SA identify primarily areas of pelagic open water habitat that are used by a diversity of bird species or a high number of individuals, or that provide a critical resource. The four marine IBAs within the SA provide breeding and molting habitat for many species, including the glaucous gulls, long-tailed ducks, king eiders, black-legged kittiwakes, Sabine's gulls, Arctic terns, and red phalaropes. Many of these species are experiencing declines in their populations in other parts of the world but continue to breed in these areas due to the vast amount of pristine habitat.

2.11.2 Historic Loss of Aquatic Resources

The area around the majority of the Beaufort Sea SA is uninhabited and undeveloped. The North Slope regional hub of Utqiaġvik lies just west of the Beaufort Sea SA in the adjacent Arctic Tundra SA, but its residents commonly make use of the marine ecosystem. Other villages adjacent to the SA include Nuiqsut, Deadhorse, and Kaktovik.

The largest oil and gas industrial center within Alaska is located at Prudhoe Bay. Prudhoe Bay lies primarily within the adjacent Arctic Tundra SA, but there are several offshore developments and dock structures within the Beaufort Sea SA. The Endicott and Northstar Projects consist of man-made islands within the barrier islands that lie offshore. Acoustic monitoring of the marine environment has found that seismic surveying, vessel traffic, and drilling operations can affect the movements of marine mammals, particularly bowhead whales (Richardson et al. 1999).

Within the SA, there are 16 contaminated site cases listed in the ADEC database (ADEC 2015a). The dominant sources of impact are spills or leaks of hazardous materials such as diesel, other petrochemicals, and PCBs that have entered nearby streams and soils. These sites are associated with former oil and gas wells, spills associated with other oil and gas developments, and the Distant Early Warning Line program.

The Nuvagapak Point site is a FUDS located in Kaktovik, which is within the boundary of the Arctic NWR (USACE 2013a). Leaking storage tanks and pipelines have caused petroleum products to contaminate soils. Other issues include the presence of lead and PCBs, despite remediation actions taken in 2000.

2.11.3 Threats to Aquatic Resources

The Beaufort Sea SA contains some of the largest oil and gas fields currently developed or known in the world. Pressures on the system include oil and gas exploration, climate warming, sea ice loss, and potential for establishment of shipping routes through the Arctic.

Development

The population of the coastal communities adjacent to the Beaufort Sea SA increased by 250 percent between 2000 and 2010, from approximately 1,000 to 3,500 people (U.S. Census Bureau 2012). Increased growth of coastal communities is likely to result in additional impacts to marine resources.

There are approximately 1,248 acres of tidal leases within the Beaufort Sea SA. These leases have been granted to oil and gas companies for uses that include water treatment outfalls, causeways, and boat docks. Future conveyance of tidelands and grants of easements or leases may result in construction of new structures or placement of additional fill in tidelands, along with associated impacts.

In October 2020 the North Slope Borough Assembly approved an ordinance allowing the Borough to establish a Port Authority. The mission of the Port Authority is to create port facilities in coastal communities throughout the Borough. Expanded port facilities will reduce living costs in communities and support projected future increases in marine traffic and resource extraction in the Arctic. Construction of new ports will require dredging and placement of fill in nearshore waters, which will impact aquatic resources and habitat (NSB 2021).

Transportation

Marine Traffic

From 2013 to 2019 vessel traffic through the Northwest Passage has increased 44% which crosses through the Beaufort Sea (Arctic Council 2021). As navigability of the Arctic increases with lower summer ice extents, levels of marine traffic will continue to increase. Increased marine traffic for shipping, resource extraction, tourism, and research will introduce new threats to marine resources within the Beaufort Sea SA.

Cruise Ships

In 2009, the cruise ship *Bremen* traveled through the Northwest Passage and called at the Port of Nome. The ship stopped briefly offshore of Utqiaġvik, where passengers were taken to shore by smaller boats. While the Northwest Passage does not remain ice-free for a predictable amount of time each summer, the trend appears to be pointing to a reliable open water route in the near future. Cruise companies are beginning to offer cruises in anticipation of an ice-free Arctic. Increased cruise ship traffic in the Arctic will introduce new threats to marine resources within the Beaufort Sea SA. Additional ports and harbors capable of receiving cruise ships will likely be constructed.

Resource Development

Oil and Gas

There are approximately 1,248 acres of tidal leases within the Beaufort Sea SA leased to Hilcorp Alaska, LLC and ConocoPhillips, primarily at West Dock in Prudhoe Bay and Milne Point. Both of these leases contain dock facilities that offload large oil and gas modules and could expand in the future to accommodate the shipment of materials for a gas treatment facility. In 2020, DNR conducted a lease sale in the Beaufort Sea Area, which resulted in more than 38,386 acres of 13 tracts receiving accepted bids (DNR 2021a). The Beaufort Sea currently has 272 leased tracts totaling approximately 650,000 acres of offshore leases (DNR 2021b). Continued development of oil and gas resources within the SA is likely to require additional transportation and support infrastructure within state-owned marine areas, which would impact aquatic resources.

Hilcorp Alaska, LLC, has submitted a plan to BOEM to develop the Liberty reservoir within the Beaufort Sea (Hilcorp Alaska, LLC 2015). BOEM issued a Record of Decision in 2018. While the production wells and facility would be located on the OCS and not within the SA, the project would include an underwater pipeline within the SA to transport crude oil to facilities on the shore. Construction and operation of the project would also result in increased vessel traffic within the Beaufort Sea SA. As additional offshore leases within the Beaufort Sea OCS are sold and developed, these types of impacts to resources within the Beaufort Sea SA would be expected to increase.

Large-scale development of Alaska's oil and gas reserves is likely to continue. Recent estimates place the Alaska Arctic as the second-ranked area likely to contain major deposits of undiscovered oil, gas and, natural gas liquids (Bird et al. 2008).

This ILFP will offset these threats to marine aquatic resources by protecting and restoring areas that provide similar functions and services within the same marine ecosystem, in accordance with the goals and objectives stated below.

2.11.4 Aquatic Resource Goals and Objectives

The 1,647,842 acres within the SA is composed of intertidal and subtidal land that would be available for restoration, enhancement, and/or preservation mitigation activities.

Estuarine wetlands, estuarine waters, and marine waters are likely to be impacted within this SA, and these aquatic resource types will be preserved, restored, or enhanced through mitigation activities directed by the ILFP.

Within the Beaufort Sea SA, the State of Alaska will work to achieve the following goals and objectives:

- Use the State's resources and partnerships to select, secure, and implement aquatic resource restoration, establishment, enhancement, and/or preservation activities to improve the health of the marine environment.

- Ensure a greater level of certainty in the outcome of restoration and enhancement mitigation projects through coordinated efforts by State conservation professionals who are deeply familiar with the SA.
- Remove threats to important aquatic resources through preservation.
- Reduce the extent of cumulative adverse impacts to aquatic resources throughout the Beaufort Sea SA.
- Preserve, restore, and enhance aquatic resources that provide habitat for migratory birds, marine mammals, anadromous fish, and species of conservation concern.
- Increase the types of aquatic resources available for compensatory mitigation in the SA.

3.0 Prioritization Strategy for Selecting and Implementing Compensatory Mitigation Activities

The prioritization strategy is essential to targeting compensatory mitigation activities toward aquatic resources that function similarly to aquatic resources impacted within the same landscape or watershed. The prioritization strategy uses information presented in the SA descriptions to assess the effectiveness of potential activities and direct these activities to high-value aquatic resources that are threatened with development. The following section outlines the proposed mitigation activities and a conceptual approach of how sites will be prioritized. Additional detail can be found in the Alaska ILFP *Prioritization Strategy for Compensatory Mitigation Site Selection* included in **Appendix A**.

3.1 Compensatory Mitigation Activities

The State of Alaska proposes to offer compensatory mitigation credits to permittees through the restoration, establishment, enhancement, and preservation of aquatic resources throughout the 11 SAs. **Section 3.2** describes the site selection process used as part of the State of Alaska's watershed approach to prioritize and select projects that support the sustainability or improvement of aquatic resources.

3.2 Site Selection under a Watershed Approach

A watershed approach, as described in 33 CFR §332.3(c), will be used to ensure that site selection of compensatory mitigation activities will offset lost or degraded aquatic resource functions resulting from permitted impacts. A matrix of potential data sources by SA used in the Alaska ILFP site selection is presented in **Appendix B**. The Alaska ILFP will incorporate publicly available data to the greatest extent practicable to inform mitigation site selection. The State of Alaska intends to work with the Interagency Review Team (IRT) to incorporate other sources of information that would improve the approach where needed and as new sources become available.

A geographic information system (GIS)-based process will be used to generate scores across parcels owned by the State of Alaska within each SA. Parcels would be evaluated using three criteria: (1) current health of the watershed, (2) important natural resources, and (3) threat of development. Parcels with the highest scores in each of these categories will be considered to have high ecological value and the greatest potential to meet the stated aquatic resource goals and objectives within each SA.

Many of the data sources or parameters in the matrix clearly suggest impairments to watershed health, threat of development, or important wetland functions. However, when information is sparse or lacking, several of the parameters will be used to deduce impairment of watershed health. For example, aquatic resources within administrative boundaries such as municipalities and villages are assumed to have some level of historic or current impact due to the presence of

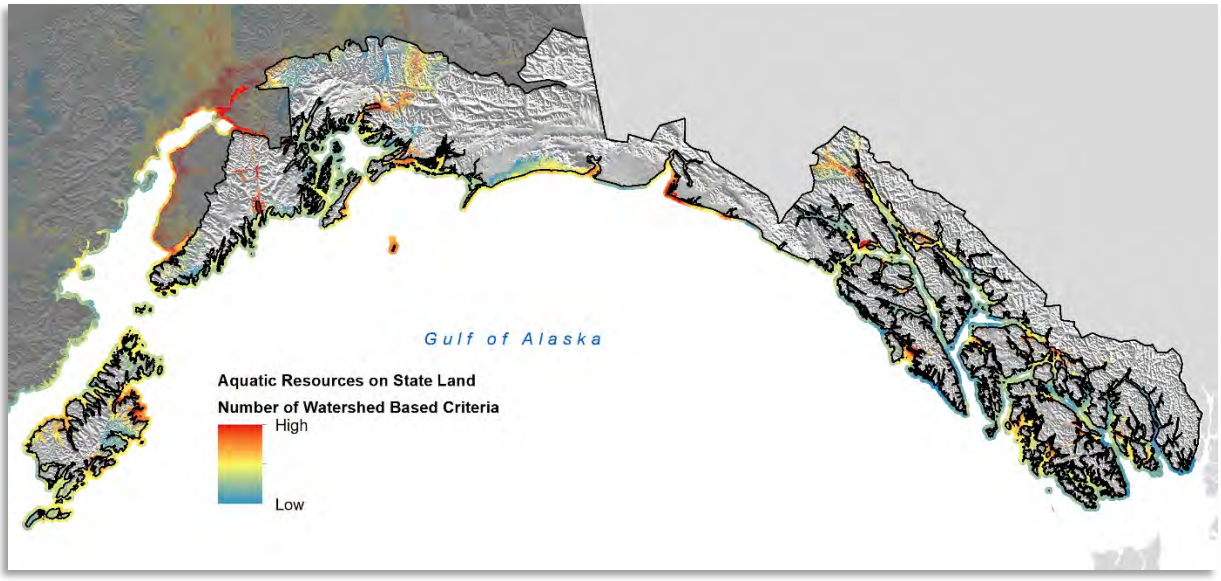
impervious surfaces in the developed area. Deducing these kinds of impacts is supported by situations such as:

- Legally unmanaged stormwater runoff in many Alaska communities (to include several cities) enters bodies of water within municipal or village boundaries;
- Sewage/wastewater discharged into waters within these same areas has a lower level of treatment than generally understood by the public, and such conditions also signify degraded watershed health; and
- High social use of wetland and water resources occurs and leads to adverse impacts to watershed health.

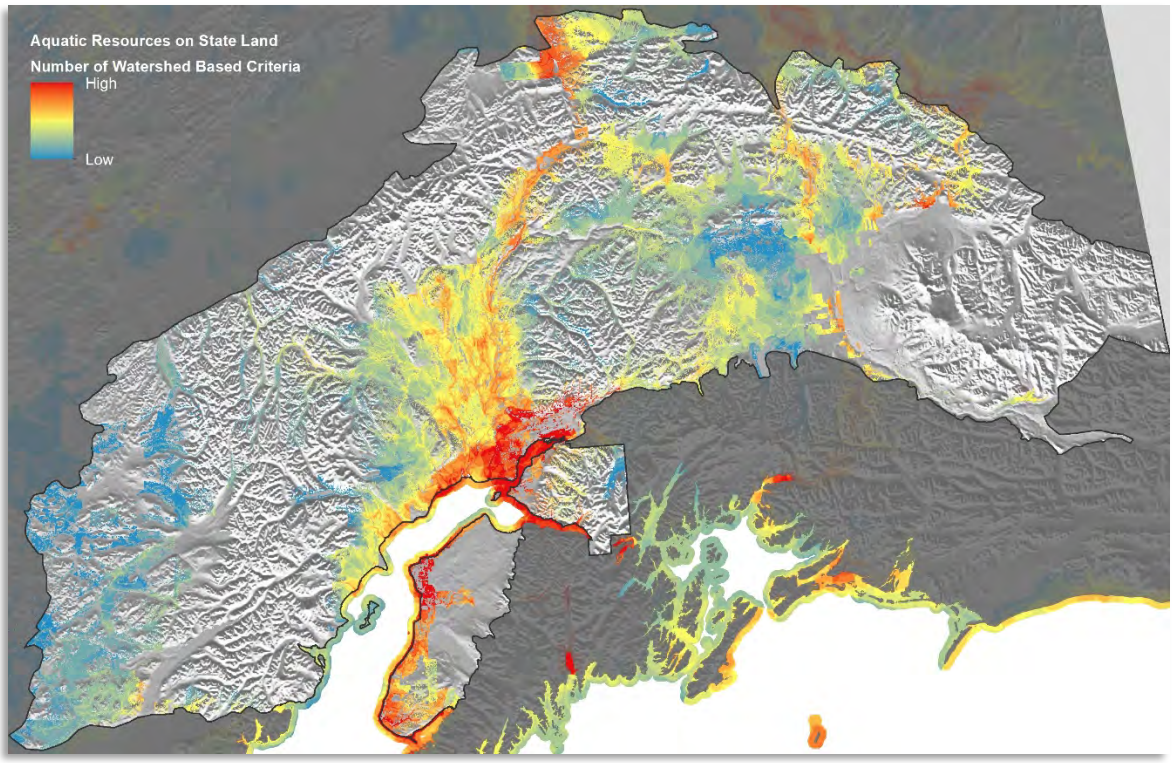
State and local government land ownership will be used to demonstrate threat of development through the potential for land sales or leases by a variety of administrative methods. These could include auctions, mineral development leases, and over-the-counter sales. These government entities are generally interested in selling or leasing lands for development to boost tax revenues and foster economic growth. Alaska Native regional and village corporations have similar economic incentives to develop their lands for commercial real estate or natural resource development.

The Alaska ILFP prioritization strategy also uses distances to various types of infrastructure and valuable natural resources to demonstrate threats of development. These distances are intended to be regionally dependent and applied in the context of the SA in question. For example, the distance-to-roads parameter in the Coastal Rainforests SA would likely be much smaller than the same parameter applied in the Intermontane Boreal SA. In Southeast Alaska, the marine ecosystem and mountainous areas constrict development to relatively small areas, while in Interior Alaska there are greater opportunities for expanding road systems. The distance to known mineral deposits also presents a threat through the exploration and development of associated mines, roads, and ancillary features that could destroy or degrade aquatic resources.

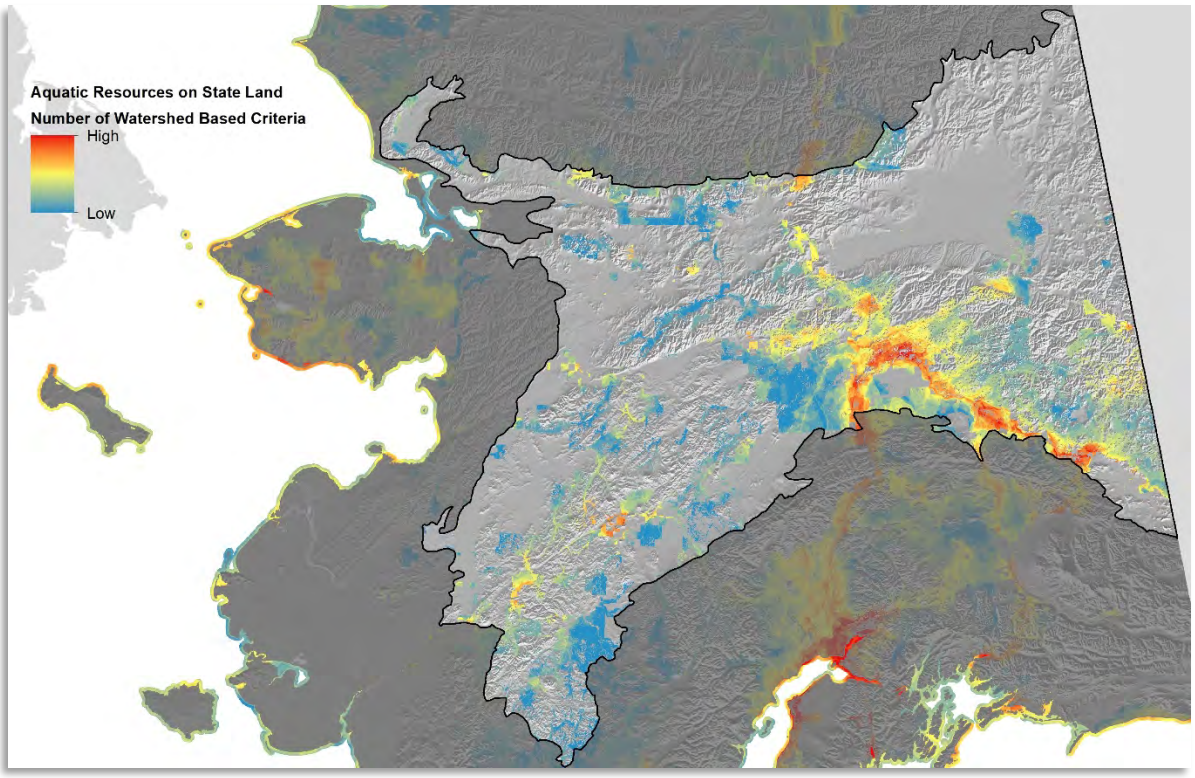
Examples of the output of the watershed-based prioritization strategy included in **Appendix A** by SA are shown in **Insets 19-25**.



Inset 19. Prioritization Strategy Results for Coastal Rainforests SA

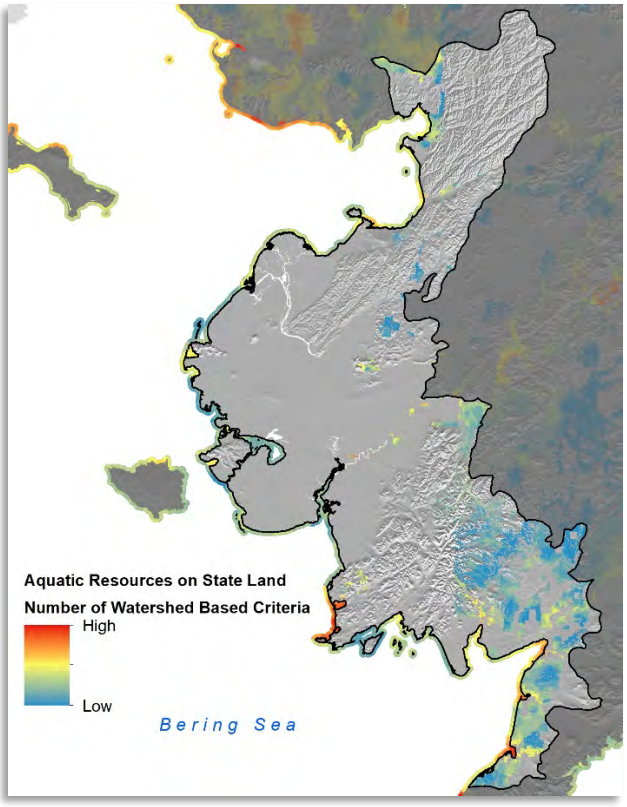


Inset 20. Prioritization Strategy Results for Alaska Range Transition SA

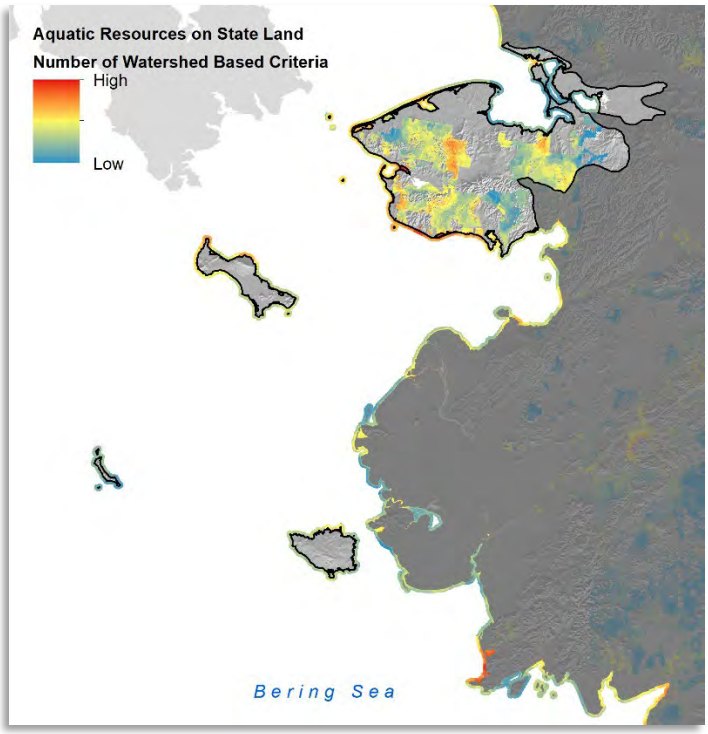


Inset 21. Prioritization Strategy Results for Intermontane Boreal SA

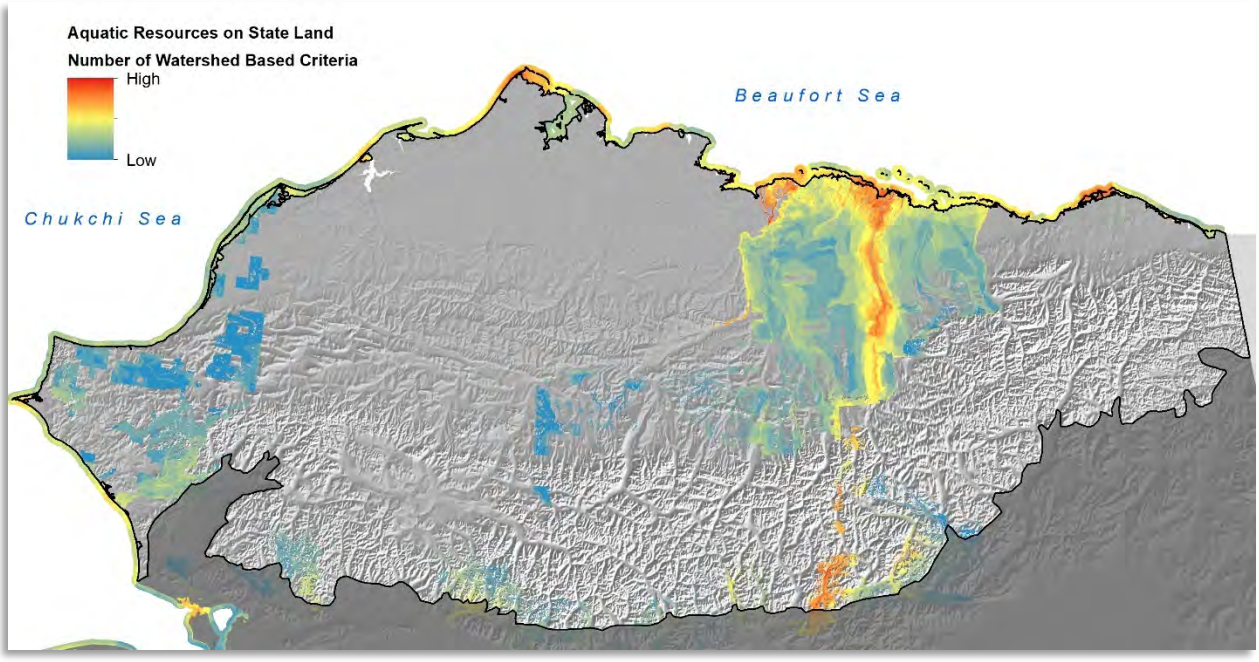
Inset 22. Prioritization Strategy Results for Aleutian Meadows SA



Inset 23. Prioritization Strategy Results for the Bering Taiga SA



Inset 24. Prioritization Strategy Results for Bering Tundra SA



Inset 25. Prioritization Strategy Results for Arctic Tundra SA

4.0 Preservation Objectives

Due to the amount of undeveloped land owned and managed by the State of Alaska, preservation will be a necessary form of mitigation credits provided under the Alaska ILFP. The USACE and USEPA have acknowledged substantial practicability issues regarding the technical feasibility and costs associated with avoidance, restoration, and enhancement activities in Alaska. The 2018 Memorandum of Agreement between USACE and USEPA concerning mitigation in Alaska states that "[r]estoring, enhancing, or establishing wetlands for compensatory mitigation may not be practicable due to limited availability of sites and/or technical or logistical limitation" (USACE and EPA 2018).

The 2018 Memorandum of Agreement acknowledges that a large proportion of land in Alaska is under public ownership and that compensatory mitigation project may be available on public land. It states that "compensatory credit could be generated by implementing aquatic resource restoration or enhancement projects on public lands that are not currently being planned for or by providing additional levels of protection to publicly held sites" (USACE and EPA 2018).

The 2008 Mitigation Rule states that preservation "is particularly valuable for protecting unique, rare, or difficult-to-replace aquatic resources, such as bogs, fens, and streams, and may be the most appropriate form of compensatory mitigation for those resources" (Preamble 33 CFR §325 and 332). These and other important aquatic resources are present in many of the SAs. Consistent with the 2008 Mitigation Rule and associated regulatory guidance, the Alaska ILFP seeks to provide preservation credits for aquatic resources that provide important chemical, physical, and biological functions within each SA.

DNR's compensatory mitigation site selection strategy described in **Section 3.2** and included in **Appendix A** will be used to identify important aquatic resources and describe the threat of development that would be removed through preservation. This process will ensure a transparent and effective means of achieving the Alaska ILFP's objectives. The State of Alaska is in a unique position to ensure that lands preserved under the ILFP would be protected and managed over the long term.

DNR recognizes that preservation of aquatic resources, either in conjunction with a creation, restoration, or enhancement project or alone, must meet the criteria at 33 CFR §332.3(h). The prioritization strategy described in **Section 3.2** and included in **Appendix A** will be employed to identify areas in which preservation of State-owned lands will meet these criteria. The prioritization strategy will evaluate State-owned parcels and resources using three prioritization criteria: (1) current health of the watershed; (2) important natural resources; and (3) threat of development. Utilizing a multilayered GIS analysis, these criteria will encompass and prioritize the requirements described below to ensure that any preservation site meets the following criteria:

- The resources to be preserved provide important physical, chemical, and biological functions for the watershed (33 CFR §332.3(h)(1)(i)).
- The resources to be preserved contribute significantly to the ecological sustainability of the watershed (33 CFR §332.3(h)(1)(ii).
- The resources are under threat of destruction or adverse modifications (33 CFR §332.3(h)(1)(iv)).

The prioritization criteria were developed in order to combine the requirements of the preservation criteria with the considerations of a watershed approach and produce comprehensive, concise criteria for evaluating all State-owned land for suitability as compensatory mitigation parcels. The GIS-based prioritization model will analyze the available geospatial data (Appendix A) to identify and rank State-owned parcels within a SA that meet all three prioritization criteria.

The GIS-based model contains approximately 50 variables, and each variable is connected to one or more of the preservation criteria. Examples of how a variable used in the GIS-based approach meets the preservation criteria include:

- Areas within critical habitat of Threatened and Endangered species are ranked higher because they provide important physical, chemical, and biological functions for the watershed.
- Areas adjacent to ADEC Impaired Waterbodies are ranked higher because they contribute to the ecological sustainability of the watershed.
- Areas adjacent to roads are ranked higher because they have a higher threat of development.

As stated in **Section 3.2**, many data sources are available that clearly indicate fulfillment of one or more of the prioritization criteria. Due to the scarcity of data coverage in some areas, however, other data sources were identified that can be used to deduce current watershed health or threat of development. Following prioritization, the highest ranked aquatic resources within a service area will be evaluated individually to ensure that their preservation will satisfy the preservation criteria. The result of this prioritization strategy will be the identification of high-ranking aquatic resources from State-owned lands that are suitable for preservation per the requirements of the

2008 Mitigation Rule, and the preservation of which will maintain and improve the quantity and quality of aquatic resources within their watersheds per the considerations of a watershed approach. Examples of the output of the prioritization strategy are shown in **Insets 19-25**.

DNR's ILFP will satisfy the remaining two preservation criteria as follows.

- Preservation is determined by the district engineer (DE) to be appropriate and practicable (33 CFR §332.3(h)(1)(iii)).

Fulfilment of ILFP credit obligations via preservation of aquatic resources will require submission of a mitigation plan to and approval of USACE. The DE will assess preservation activities and determine that they are appropriate and practicable before they are approved for use as compensatory mitigation under the ILFP.

- 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) (33 CFR §332.3(h)(1)(v)).

Section 6.0 discusses how resources that will be preserved under the ILFP will be protected. The site-specific mitigation plan, which will include a detailed long-term management plan, will identify the specific real estate or other legal instrument(s) that will be used. It is important to note that the SOA DNR is a "state resource agency" and already holds title for the majority of the aquatic resources that would be used for this ILFP (33 CFR §332.3(h)(1)(v)).

5.0 Stakeholder Involvement

DNR has met with a variety of stakeholders in the development of this CPF. Communications include both formal and informal discussions and coordination. Below is a summary of the stakeholder involvement DNR has had to date with federal, State, and other stakeholders. DNR has used the information from this stakeholder engagement to develop our ILFP. A summary of these communications is included below:

Federal

- Held preapplication meetings with the USACE
- Over the last 5 years DNR has consulted with many federal agencies several of which are represented on the IRT. Agencies were consulted on a variety of topics including ILFP development, SA's, resource management planning, and other related topics
    - Agencies include BLM, USFWS, EPA, NOAA, USFS

State

- Governor's Office – the development of this ILFP is supported and considered a priority project by the Governor's Office.
- Legislature initiative – Funding for the development of this ILFP was proposed and funded by the Alaska Legislature. Several Alaska Officials (in both the House and the Senate)

have heard consistent feedback from their constituents about the need for a Statewide mitigation program. This program is considered a priority by several State officials.

- Internal DNR review
- Meetings with DOT&PF to discuss past, current, and future needs for compensatory mitigation and to make sure DNR considers their long-range goals and projects.
- Past and ongoing coordination on efforts and proposals with ADEC.
- Past and ongoing coordination on efforts and proposals with ADF&G.
- The CPF and GIS tool was developed in coordination with the Alaska Geospatial Council (AGC) program. Discussions related to GIS mapping and how to develop a program and tools to best utilize current data and mapping efforts.
- Additional efforts include communication of DNR's efforts with the University of Alaska Anchorage, Mental Health Trust Land Office, and the Alaska Railroad Corporation.

Additional outreach

- Several meetings with in-state mitigation bankers to discuss DNR efforts and intentions and to make sure DNR understands any opportunities that exist to partner and/or complement existing mitigation banks.
- Meetings with out-of-state mitigation providers to discuss DNR efforts and the similarities and differences between running a program in Alaska versus the lower 48.
- Meetings with the Alaska Resource Development Council, the Alaska Mining Association, and the Alaska Oil and Gas Association to discuss the need for a statewide program, and the current conditions and concerns of the existing mitigation program.
- DNR has attended National Wetlands Mitigation Conference.
- Meetings with potential users of the ILFP

6.0 Long-Term Protection and Management Strategies

Considering each compensatory mitigation site will need its own project specific protections and also that the majority of land included in the ILFP is owned by the State of Alaska, DNR will identify and propose the appropriate mechanism that will provide long-term protection when developing project specific mitigation plans (33 CFR §332.4(c)). Long-term protections will be proposed and approved by the DE through project specific long-term management plans (33 CFR §332.4(c)(11)). Mitigation sites developed through this ILFP could be protected through a variety of tools, including conservation easements, deed restrictions, site-specific management plans (i.e., inclusion into adjacent State Parks or Refuges), DNR Area Plans (these plans would restrict incompatible activities through land use designations [using primary or co-designations] and/or land classification) or federal facility management plan (33 CFR §332.7(a)). Each mitigation project will require an approved mitigation plan, which will include a long-term management plan (33 CFR §332.4(c)).

For mitigation site management, DNR will typically serve as the long-term steward and responsible party for overseeing compensatory mitigation activities or, on occasion, may designate the responsibility to a third party. Long-term management and protection strategies for each mitigation project will be proposed in project-specific mitigation plans and long-term protection plans, and must be approved by USACE in consultation with the IRT on a project-by-project basis. In general, DNR will retain ownership of the project site throughout the life of the project, but in some cases may request to transfer management if a specific project warrants such a request (i.e., is adjacent to a refuge or similar conservation/restoration sites that are not managed by the SOA). DNR must propose each transfer of responsibility and potential ownership to USACE for approval.

6.1 Terrestrial Service Areas

DNR anticipates using formal, documented commitments to implement the long-term protection (see Prospectus, Section VI - Ownership and Long-Term Management of the ILFP Project Sites, for more information on site protection tools) and management of compensatory mitigation lands required under the 2008 Mitigation Rule[4]. However DNR may not need to utilize real estate mechanisms in order to ensure long-term protection of compensatory mitigation lands within any of the terrestrial SAs under the Alaska ILFP (33 CFR §332.7(a)). As a government entity, DNR has the resources and authority to manage these lands over the long term in order to meet its stated goals and objectives. Site specific protection and long-term management of individual

[4] The Preamble to the 2008 Mitigation Rule (Preamble 33 CFR §332.7(d)) states "[i]n cases where compensatory mitigation project sites are owned by public entities, it may not be necessary to include provisions for the financing of any required long-term management if, for example, a formal, documented commitment from a government agency is provided (i.e., stewardship commitment)."

compensatory mitigation projects will be included in the individual compensatory mitigation plans submitted to USACE and the IRT.

6.2 Streams

DNR is also proposing to conduct rehabilitation, enhancement, and preservation of stream habitats under the Alaska ILFP in both terrestrial and marine SAs. Long-term protection of compensatory mitigation sites through the use of real estate instruments such as conservation easements and deed restrictions is anticipated but will not always be required. The Preamble to the 2008 Mitigation Rule (33 CFR §332.7(a)) states that "[f]or stream compensatory mitigation projects, appropriate means of site protection will be determined by district engineers after considering the characteristics of the compensation activities and the real estate interests of the project proponent." The preamble continues by acknowledging that challenges exist with respect to long-term site protection of dynamic riverine systems. As a result of these dynamic resources appropriate long-term protection will need to be reviewed and approved by the DE for each compensatory mitigation project through project specific long-term management plan (33 CFR §332.4(c)(11)).

DNR plans to manage and protect streams that are part of ILFP mitigation sites utilizing the tools described in the Prospectus, Section VI - Ownership and Long-Term Management of the ILFP Project Sites. The long-term management of individual stream compensatory mitigation sites will be included in the site-specific mitigation plans. Any subsequent use of streams mitigated under the Alaska ILFP would be compatible with the goals and objectives of the given SA.

6.3 Marine Service Areas

DNR may or may not need to develop real estate instruments to provide long-term protection of compensatory mitigation lands within tidal and subtidal lands owned by the State of Alaska within the marine SAs. These lands are very dynamic and subject to natural coastal forces and outside influences that cannot be managed or influenced by DNR (33 CFR §332.7(a)). These dynamic resources will require appropriate long-term protection to be reviewed and approved by the DE for each compensatory mitigation project through project specific long-term management plans (33 CFR §332.4(c)(11)). To the greatest extent practicable, the Alaska ILFP will manage compensatory mitigation sites within the marine SAs to achieve the stated goals and objectives.

7.0 Periodic Evaluation and Reporting

The Alaska ILFP, in consultation with USACE and IRT and as required by 33 CFR §332.8 (c)(2)(x), will produce a status and trends report every 5 years following approval of the Final Instrument. The evaluation report will detail all mitigation activities and objectives achieved over the preceding 5-year interval within each SA. The report will discuss how projects advanced the ILFP toward reaching its goals and objectives. If necessary, the report will also include recommended revisions to the CPF in order to adapt to changing conditions within the SAs.

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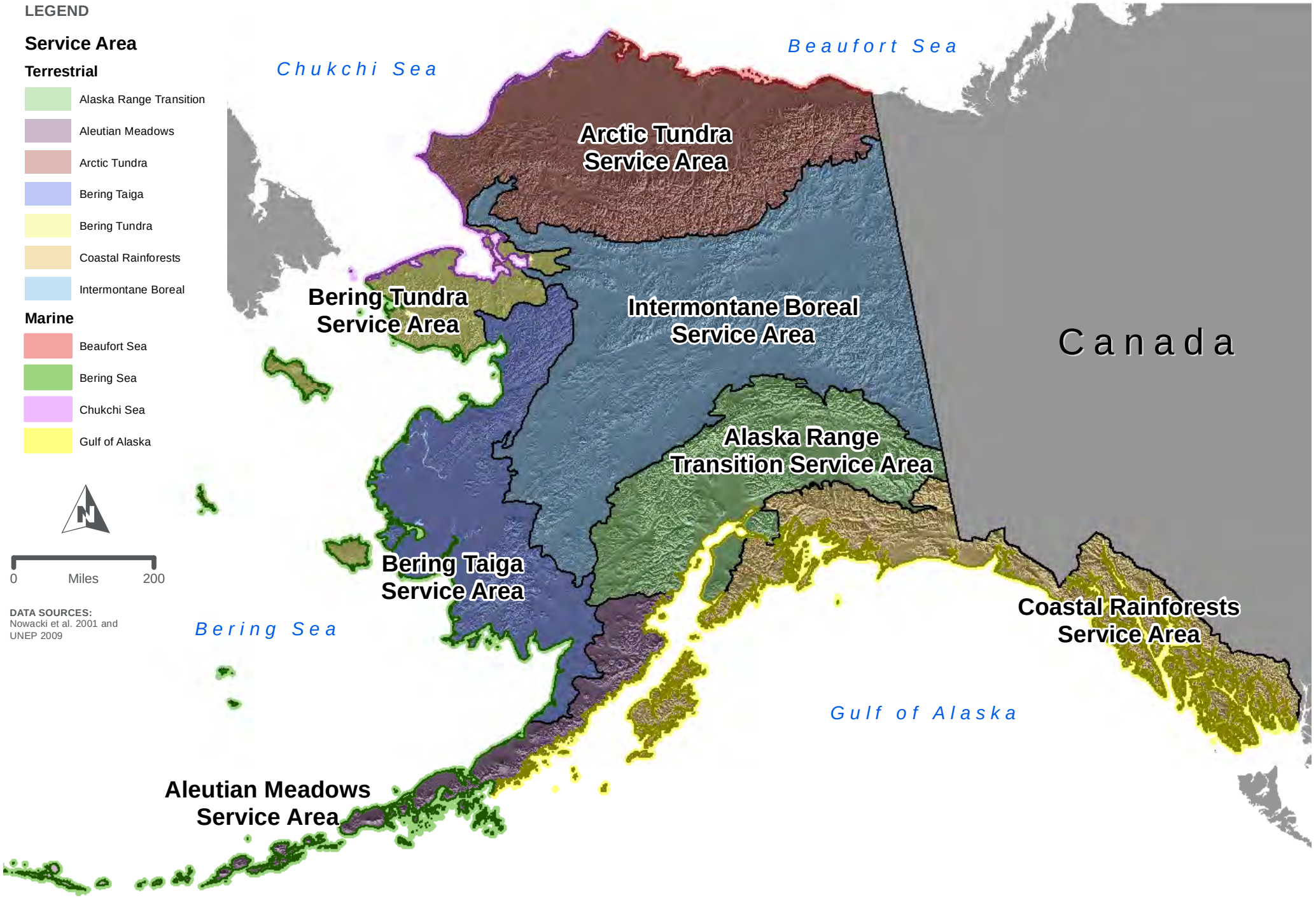

STATE OF ALASKA IN-LIEU FEE PROGRAM

FIGURE 1
PROPOSED SERVICE AREAS

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Prioritization Strategy for Compensatory Mitigation Site Selection

State of Alaska
Department of Natural Resources
In-Lieu Fee Compensatory Mitigation Program

July 1, 2021

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Contents

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Acronyms and Abbreviations

AAC	Alaska Administrative Code
ADF&G	Alaska Department of Fish and Game
ASGDC	Alaska State Geo-Spatial Data Clearinghouse
ATV	All-terrain Vehicle
AWC	Anadromous Waters Catalog
BLM	Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CPF	Compensation Planning Framework
CWA	Clean Water Act
DCED	Alaska Department of Community and Economic Development
DNR	Alaska Department of Natural Resources
DOD	Department of Defense
DOT&PF	Alaska Department of Transportation and Public Facilities
DPS	Distinct Population Segment
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FR	*Federal Register*
FUDS	Formerly Used Defense Sites
GIS	Geographic Information System
HUC	Hydrologic Unit Code
IBA	Important Bird Area
ILFP	In-Lieu Fee Program
LDA	Legislatively Designated Area
NLCD	National Land Cover Database
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NWI	National Wetlands Inventory
SA	Service Areas
STIP	Statewide Transportation Improvement Program
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service

USGS	U.S. Geological Survey
WQS	Water Quality Standards

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1.0 Introduction

The Alaska Department of Natural Resources (DNR) is developing a statewide In-Lieu Fee Program (ILFP) to mitigate losses of terrestrial and marine aquatic resources in accordance with the 2008 Federal Final Rule on *Compensatory Mitigation for Losses of Aquatic Resources* (2008 Mitigation Rule; 33 Code of Federal Regulations [CFR] §332). DNR is currently developing a Draft Prospectus for the ILFP for submittal to the Alaska District of the U.S. Army Corps of Engineers (USACE). Per the requirements of the 2008 Mitigation Rule, the Prospectus includes a compensation planning framework (CPF) that describes the methods that will be used to select, secure, and implement aquatic resource restoration, establishment, enhancement, and/or preservation activities under the ILFP (33 CFR §332.8(c)).

The CPF identified service areas (SAs) for the ILFP and presented a prioritization strategy for selecting compensatory mitigation sites within the SAs under a watershed approach. The prioritization strategy is essential to evaluating State-owned lands in order to target compensatory mitigation activities toward aquatic resources that function similarly to aquatic resources affected within the same SA. This document provides additional detail to the conceptual prioritization strategy presented in the CPF.

2.0 Objectives

The objective of the prioritization strategy is to identify areas within each SA in which aquatic resources on State-owned lands are most suitable for compensatory mitigation. It is intended to provide a high-level assessment of the each SA, which will allow DNR to target the most suitable lands for further assessment and project development.

2.1 State Land Ownership

The Alaska Statehood Act granted the State of Alaska ownership of 28 percent, or approximately 104 million acres, of the state's total land area. To date, approximately 96 percent of this area (100 million acres) has been conveyed by the federal government to the State. DNR manages all State-owned land, as well as Alaska's 65 million acres of tidelands, shorelands, submerged lands, and all of the State's water resources.

DNR manages State-owned lands (that have not been legislatively designated for special uses) for multiple uses, including resource extraction, fish and wildlife habitat management, and recreation. DNR develops land use plans to guide the use, development, and disposal of State lands for the maximum public benefit, as required by the Alaska State Constitution (Section 2, Article VIII). In accordance with this constitutional mandate, DNR has determined that compensatory mitigation activities can provide for the maximum public benefit on State-owned lands.

Approximately 165 million acres of State-owned land are potentially eligible for inclusion in a State-sponsored ILFP. This land is distributed across the state. Individual assessment of all State-owned land for potential use as compensatory mitigation sites is not practicable and would likely not result in identification of the most valuable sites without a method for a large-scale comparison of all areas. The prioritization strategy designed for this ILFP provides a high-level, flexible tool for DNR to assess all lands under its management in a consistent manner. The resulting prioritization will enable DNR to identify aquatic resources for more detailed study.

2.2 Regulatory Requirements

The prioritization strategy was developed in accordance with requirements of the 2008 Mitigation Rule.

2.2.1 Watershed Approach

The 2008 Mitigation Rule requires the use of a watershed approach to compensatory mitigation. A watershed approach is an analytical decision-making process to guide compensatory mitigation activities. The goal of a watershed approach is "to maintain and improve the quality and quantity of aquatic resources within watersheds through strategic selection of compensatory mitigation sites" (33 CFR §332.3(c)). A watershed approach requires the consideration of the needs of the watershed, and of how locations and types of compensatory mitigation activities address those needs. The 2008 Mitigation Rule (33 CFR §332.3(c)(2-3) specifies that the following components be considered in a watershed approach:

- Landscape position
- Aquatic resource types
- Desired aquatic resource functions
- Habitat requirements of important species
- Habitat loss and conversion trends
- Sources of watershed impairment
- Current development trends
- Requirement of other regulatory and non-regulatory programs
- Locational factors (e.g., hydrology, land use)
- Historic and existing aquatic resources
- Potential sites for aquatic resource restoration
- Chronic environmental problems (e.g., flooding, poor drinking water)

For development of an ILFP, a watershed approach must be used to select compensatory mitigation sites. This document describes how the prioritization strategy employs a watershed approach to site selection within each of the 11 SAs.

2.2.2 Preservation

Compensatory mitigation activities under this ILFP will involve aquatic resource preservation or aquatic resource preservation in conjunction with a restoration, establishment, and/or enhancement activity. In either case, the 2008 Mitigation Rule requires that the following five criteria are met in order to receive credits from preservation (33 CFR §332.3(h)(1)):

1) The resources to be preserved provide important physical, chemical, and biological functions for the watershed.
2) The resources to be preserved contribute significantly to the ecological sustainability of the watershed.
3) Preservation is determined by the district engineer to be appropriate and practicable.
4) The resources are under threat of destruction or adverse modification.
5) The preserved site will be permanently protected through an appropriate real estate or other legal instrument.

3.0 Prioritization Framework

3.1 Prioritization Criteria

The prioritization strategy for the ILFP analyzes geospatial data in a Geographic Information System (GIS) environment to evaluate State-owned lands using three **prioritization criteria**: (1) current health of the watershed; (2) important natural resources; and (3) threat of development. These criteria encompass the requirements of the first, second, and fourth preservation criteria from the 2008 Mitigation Rule (see Section 2.2.2 above).[1] The prioritization criteria were developed in order to combine the requirements of the preservation criteria with the considerations of a watershed approach and produce comprehensive, concise criteria for evaluating State-owned land for suitability for compensatory mitigation.

Although the prioritization criteria are based on the preservation requirements from the 2008 Mitigation Rule, areas that are identified by the prioritization will be considered suitable for compensatory mitigation activities, including restoration, enhancement, and preservation, depending on site-specific circumstances. The prioritization criteria were developed to identify high-value aquatic resources that are threatened with development in watersheds that have experienced previous and ongoing impacts; the ILFP considers these areas the most appropriate locations for all forms of compensatory mitigation. The specific activities that will ultimately be performed at prioritized locations will be dependent on factors that include goals for the service area, needs of the watershed, and opportunities for mitigation.

The GIS-based prioritization model analyzes available existing geospatial data to identify and rank State-owned lands that meet all three prioritization criteria. The output of the prioritization model is a dataset identifying and ranking State-owned aquatic resources within each SA that are suitable for use as compensatory mitigation per the requirements of the 2008 Mitigation Rule, and that will maintain and improve the quantity and quality of aquatic resources within their watersheds. Further discussion of the prioritization criteria is included in the following sections.

3.1.1 Current Health of the Watershed

This prioritization criterion relates to previous impacts to aquatic resources, ongoing sources of watershed impairment, and development trends within watersheds. Most of Alaska's aquatic

[1] The ways in the ILFP will satisfy the third and fifth preservation criteria are addressed in other sections of the Prospectus.

resources are in pristine condition and have experienced little to no disturbance or impact. Identifying areas that have experienced higher levels of previous disturbance and impacts will ensure that compensatory mitigation activities are targeted to meet the needs of the SA. These areas are also the most likely to contain opportunities for restoration and enhancement.

Datasets that were identified as indicators of this criterion include areas of resource development and extraction (historic and ongoing logging, mining, and oil and gas developments), impaired waters, and sources of potential contamination (airstrips, ports, landfill seepage, Formerly Used Defense Sites, and fish processing sites). Datasets that are indicators of this criterion capture the following considerations of a watershed approach:

- Habitat loss and conversion trends
- Sources of watershed impairments
- Current development trends
- Requirements of other regulatory and non-regulatory programs
- Historic and existing aquatic resources
- Potential sites for aquatic resource restoration
- Chronic environmental problems

3.1.2 Important Natural Resources

This prioritization criterion focuses on the identification of areas likely to contain high value and important aquatic resources. Identification of high-value resources is essential for targeting compensatory mitigation activities toward maintaining the quality and quantity of aquatic resources within a watershed. These areas, when selected with consideration for other factors, are most likely to maintain the sustainability of an SA. Selection of sites containing important resources is a requirement for preservation as compensatory mitigation, but is also desirable in the selection of sites for restoration or enhancement.

Datasets that were identified as indicators of this criterion include habitat for important species (i.e., federally designated critical habitat, important bird areas, marine mammal haulout sites), designated conservation areas (i.e., anadromous waters, State Legislatively Designated Areas, federal conservation units), and locational factors (i.e., headwaters, proximity to protected areas, marine and estuarine areas). Datasets that are indicators of this criterion capture the following considerations of a watershed approach:

- Landscape position
- Aquatic resource types
- Desired aquatic resource functions
- Habitat requirements of important species
- Habitat loss and conversion trends
- Requirements of other regulatory and non-regulatory programs
- Locational factors
- Potential sites for aquatic resource restoration

3.1.3 Threat of Development

This third prioritization criterion identifies areas in which aquatic resources are most likely to be affected by development. Aquatic resources that are most likely to experience destruction, fragmentation, and adverse modification (providing they also satisfy other selection criteria) are the most desirable for compensatory mitigation. The 2008 Mitigation Rule defines preservation as "the removal of a threat to, or preventing the decline of, aquatic resources" (33 CFR §332.2). Consideration of development trends is also a key component of a watershed approach, because areas where development is most likely to occur are also areas where compensatory mitigation will be most beneficial.

Datasets that were identified as indicators of this criterion include areas of resource exploration, development, and extraction (i.e., active logging, mining, and oil and gas developments, known mineral deposits, planned major projects), proximity to communities (i.e., municipal and village boundaries, distance to airports and ports) and proximity to transportation corridors (i.e., distance to roads and railroads). Datasets that are indicators of this criterion capture the following considerations of a watershed approach:

- Habitat loss and conversion trends
- Sources of watershed impairment
- Current development trends
- Locational factors
- Potential sites for aquatic resource restoration

3.2 Data Layers

The prioritization strategy uses overlapping data layers to identify areas for compensatory mitigation projects on State-owned aquatic resources. Only areas that have aquatic resources on State-owned landed are included in the analyses. The following data layers were used as the base for determining these areas. Approximately 88 million acres or approximately 5.7 million pixels were determined to be State-owned aquatic resources.

- State-owned land
- U.S. Fish and Wildlife Service National Wetland Inventory mapping of Alaska[2,3]
- U.S. Geological Survey (USGS) National Land Cover mapping[4,5]

[2] U.S. Fish and Wildlife Service. 2017. National Wetland Inventory mapping. Downloaded from https://www.fws.gov/wetlands/Data/Data-Download.html on June 6, 2017.
[3] All polygons except polygons attributed with U (Upland).
[4] Homer, C.G., Dewitz, J.A., Yang, L., Jin, S., Danielson, P., Xian, G., Coulston, J., Herold, N.D., Wickham, J.D., and Megown, K., 2015, Completion of the 2011 National Land Cover Database for the conterminous United States-Representing a decade of land cover change information. *Photogrammetric Engineering and Remote Sensing*, v. 81, no. 5, p. 345-354.
[5] National Land Cover polygons with one of the following attributes: Open Water, Sedge, Herbaceous, Woody Wetlands, or Emergent Herbaceous Wetlands.

In addition to the three base datasets, DNR compiled 47 GIS datasets for the prioritization. Datasets were downloaded from publicly accessible sources and requested from State and federal agencies (including the Alaska Department of Environmental Conservation, Alaska Department of Fish and Game, National Oceanic and Atmospheric Administration, and Alaska Department of Transportation and Public Facilities). Table 1 shows each data set and how each of these data layers helps target areas that meet the preservation criteria as well as achieve the goals of a watershed approach. A list of the datasets used and discussion of their application in the prioritization model is attached as to this document as Appendix A. Detailed information on the datasets and their use in the model, is included in a technical memorandum titled *DNR Prioritization Model Run #1 and Model Design Information*, prepared by HDR Alaska, Inc. (HDR), dated June 1, 2021.

There are several limitations to the data used in the prioritization model. Due to the large scale of the prioritization, a course-scale pixel resolution (pixel resolution of 250 meters) was used. In addition to the resolution, only readily available datasets from publicly accessible sources and cooperating agencies were used. Some datasets do not cover the entire state; generally, data coverage is greater in communities and developed areas. Some datasets used in the prioritization are secondary analyses of primary datasets, which may also reduce the granularity of the input data.

Table 1. Watershed approach considerations of the data layers used in the prioritization

		WATERSHED APPROACH CONSIDERATIONS											
	DATA LAYER	LANDSCAPE POSITION	AQUATIC RESOURCE TYPES	DESIRED AQUATIC RESOURCE FUNCTIONS	HABITAT REQUIREMENTS OF IMPORTANT SPECIES	HABITAT LOSS AND CONVERSION TRENDS	SOURCES OF WATERSHED IMPAIRMENTS	CURRENT DEVELOPMENT TRENDS	REQUIREMENT OF OTHER REGULATORY AND NON-REGULATORY PROGRAMS	LOCATIONAL FACTORS	HISTORIC AND EXISTING AQUATIC RESOURCES	POTENTIAL SITES FOR AQUATIC RESOURCE RESTORATION	CHRONIC ENVIRONMENTAL PROBLEMS
WATERSHED HEALTH IMPACTS	Active Oil and Gas Leases					X	X	X					
	Airstrips and Airports					X	X	X					
	Culverted Streams					X	X	X				X	X
	Federal Timber Harvest					X	X	X				X	
	Fish Processing Sites						X						
	Formerly Used Defense Sites					X	X		X			X	X
	Impervious Surfaces					X	X	X					X
	Incorporated City Boundaries					X	X	X				X	X
	List of Impaired Waters						X		X		X	X	X
	Log Transfer Facilities					X	X	X					X
	Mining Activities					X	X	X				X	X
	Permitted Mixing Zones						X		X				X
	Placer Mine Districts					X	X	X				X	X
	Ports and Harbors					X	X	X				X	X
	Solid Waste Sites						X		X				X
	State Timber Sales					X	X					X	
	Tidal Easements and Leases, and Municipal Tidelands												
	Trails					X	X	X					
IMPORTANT NATURAL RESOURCES	Anadromous Streams	X	X	X	X				X	X	X		
	Coastal Aquatic Resources	X	X	X	X					X	X		
	Eelgrass	X	X	X	X					X	X		
	Essential Fish Habitat – Marine Waters	X	X	X	X				X	X	X		
	Estuarine Streams	X	X	X	X					X	X		
	Federal Conservation System Units			X	X				X				
	Headwater Aquatic Resources	X	X	X						X	X		
	Important Bird Areas			X	X								
	Kelp	X	X	X	X						X		
	Marine Mammal Haulout Sites			X	X				X				
	Salt Marsh Vegetation	X	X	X	X					X	X		
	State Legislatively Designated Areas			X	X				X	X			
	Streams and Waterbodies	X	X	X	X					X	X		
	Threatened, Endangered, and Sensitive Species Critical Habitat			X	X	X	X	X	X			X	X
THREAT OF DEVELOPMENT	Airport or Airstrip					X	X	X				X	
	Electric Lines					X	X	X				X	
	Federal Timber Harvest						X	X				X	
	Incorporated City Boundaries					X	X	X				X	X
	Major Projects					X		X					
	Mining Sites					X	X	X				X	X
	Pipelines					X	X	X				X	
	Placer Mine Districts					X	X	X				X	
	Ports and Harbors					X	X	X		X		X	X
	Private Ownership					X	X	X				X	
	Railroad					X	X	X				X	
	Roads					X	X	X		X		X	
	State Oil and Gas Leases					X	X	X				X	
	State Timber Sales					X	X	X				X	
	Statewide Transportation Improvements					X		X					

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3.3 Site Selection

The prioritization is intended to guide selection of compensatory mitigation sites for the ILFP by producing a GIS-based model that identifies State-owned lands with aquatic resources that meet all three prioritization criteria.

In order to identify appropriate sites for compensatory mitigation, data layers are overlaid in GIS. Depending on the data input, criteria are established to identify the pixels or areas that should be given a value for that variable. A corresponding weight for each variable is also attributed to the pixel. All of the data inputs were then summed for each pixel to get an overall score for the pixel with the highest scoring pixels determined suitable for compensatory mitigation project selection.

The model data input layers were generally used in three different ways: a buffer of the data layer was used to select State-owned aquatic resources adjacent to the data layer; the data layer was intersected with State-owned aquatic resources to select those resources within the data input, or the data input was used to select all State-owned aquatic resources within the same 10-digit Hydrologic Unit Code (HUC).

An example of the use of a buffer is the road input for the “Threat of Development” criteria. All aquatic resources within a buffer of the road are assumed to have a higher threat of development than aquatic resources outside of the buffer.

An example of data inputs intersected with State-owned aquatic resources are important bird areas (IBAs) established by the National Audubon Society for the “Important Natural Resources” criteria. All State-owned aquatic resources intersecting an IBA are assumed to be important natural resources.

The 10-digit HUCs containing the data input were generally used for the “Watershed Health Impacts” categories. This was used for solid waste sites (landfills) to indicate watershed health impacts. The 10-digit HUC containing a solid waste site was assumed to have general watershed impairment and would be preferable for a compensatory mitigation site.

The description of each data layer, its use in the model, and its justification for use in the model are described in Appendix A. The prioritization variables (i.e., size of the buffer and weight of the variable) can be altered at each model run and are described for each model run in an accompanying document. For the initial model run, these parameters are described in the technical memorandum titled DNR *Prioritization Model Run #1 and Model Design Information*. This technical memorandum also describes the output of the model, which identifies where the greatest numbers of input overlap for each SA.

The uneven coverage of the input datasets typically focuses the prioritization more heavily toward communities and developed areas. However, these results are not considered incompatible with the goal of the prioritization. Most previous impacts to aquatic resources within the state have occurred within communities and developed areas. These areas likely

provide greater opportunities for compensatory mitigation activities, such as restoration and enhancement of previously affected resources, or preservation of resources that are important to the health of the watershed.

4.0 Model Results and Analysis

Each time the GIS-based model is run, the model outputs a raster dataset that has values for each pixel (area). The values of each pixel are the sum of the inputs. If the pixel meets the criteria of 5 variables, each with a weight of 1, the value of the pixel will be 5. The highest ranking pixels are the areas that are best suited for compensatory mitigation projects. In additional to this overall score, separate scores for each prioritization criteria (Watershed Health Impacts, Important Natural Resources, and Threat of Development) are also provided in order to ensure that the highest ranking sites meet each one of the criteria. This data can be analyzed within any specified area (i.e., SA, ecoregion, HUC). The range and distribution of the pixels within the region should be evaluated to determine which areas should be examined further as part of the ILFP. For an example of how model results can be analyzed, please refer to the technical memorandum *DNR Prioritization Model Run #1 and Model Design Information*.

If determined appropriate, the model can also be run on a project-specific basis. For larger projects with greater credit demands, it may be beneficial to weight certain characteristics higher. For example, if a project is affecting anadromous fish streams, and agencies determine that this is the primary impact to offset, then the weight of the anadromous fish stream input can be increased to focus compensatory mitigation projects toward those areas.

Appendix A: Data Layers

The prioritization model for the Alaska Department of Natural Resources (DNR) In-Lieu Fee Program (ILFP) uses available existing geospatial datasets to identify those areas of Alaska in which State-owned lands are best suited for compensatory mitigation activities. This appendix provides the rationale for the use of these datasets in the prioritization model from an ecological and regulatory standpoint. This appendix also provides a brief description of the datasets, describes their use in the prioritization model, provides justification for the selection of these datasets as indicators of the prioritization criteria, lists which SAs where they are present, and describes any limitations to the datasets.

Additional details on the datasets, including creation and download dates, are provided in the technical memorandum *DNR Prioritization Model Run #1 and Model Design Information,* dated June 1, 2021, which describes the output of the initial run of the prioritization model.

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Watershed Health Impacts

Active Oil and Gas Leases
Source: DNR – Division of Oil and Gas

Data Description: Statewide active lease boundaries for oil, gas, shallow natural gas, geothermal, and exploration license.

Use in Model: All 10-digit Hydrologic Unit Code (HUC) watersheds that contain an active lease.

Justification: Impacts to aquatic resources from oil and gas activities include direct loss within the footprint of facilities and associated infrastructure, increased sedimentation due to erosion and dust from gravel infrastructure, loss of hydrologic connectivity, and potential introduction of contaminants due to oil spills, vehicle operation, and other chemicals.

Active leases are considered indicative of existing watershed impairment.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X			X	X	X	X	X	X

Limitations: Data is assembled from numerous sources and is to be used for informational purposes only.

Airstrips and Airports
Source: DNR/Alaska State Geo-Spatial Data Clearinghouse (ASGDC)

Data Description: Airstrips and airports.

Use in Model: All 10-digit HUC watersheds that contain an airstrip or airport.

Justification: Airstrips and airports are potential sources of contamination as runoff may carry fuel, oil, deicing fluid, detergents, and other potential pollutants associated with aircraft and ground vehicle operation, maintenance, and repair into the surrounding areas.

Airstrips and airports are considered indicative of existing watershed impairment.

Limitations: All historically active airstrips may not be included.

Culverted Streams
Source: Alaska Department of Fish and Game (ADF&G)

Data Description: Culverts rated “Red” or “Gray” in the ADF&G Fish Passage Inventory Database.

Use in Model: Buffer

Justification: The ADF&G Fish Passage Inventory Database contains data on more than 2,500 stream crossings assessed for fish passage by ADF&G since 2001.[6] ADF&G gives culverts a rating of "Green," "Gray," or "Red," indicating whether conditions at the site are likely to be adequate, may be inadequate, or likely to be inadequate for fish passage, respectively. Culverts that are perched, undersized, damaged, or otherwise impaired can restrict fish passage, cutting fish off from valuable habitat. Underperforming culverts can also cause additional impacts up- and downstream, including ponding and flooding, scour and erosion, and channel migration.

Underperforming culverts can affect aquatic resources within a large distance from the culvert, and are indicative of an impaired watershed.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X		X		X

Limitations: Only culverts that have been surveyed by ADF&G are included in the Fish Passage Inventory Database.

Federal Timber Harvest
Source: U.S. Forest Service (USFS)

Data Description: Area of timber harvest activities that are planned or that have been accomplished through the USFS timber harvest program.

Use in Model: All 10-digit HUC watersheds that contain USFS timber harvest areas.

Justification: Timber harvest activities can result in impacts to aquatic resources through loss of forested wetlands, increased soil erosion, decreased water quality, decreased stream bank stabilization, and reduced and fragmented habitat.

This dataset consists of timber harvest on federal land, which is not included in the ILFP. Aquatic resources within watersheds where timber harvest has occurred are considered likely to have experienced impacts from these activities.

[6] ADF&G. 2017. "Fish Passage Improvement Program: Fish Passage Inventory Database." Accessed at http://www.adfg.alaska.gov/index.cfm?adfg=fishpassage.database on June 1, 2017.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X					X					X

Limitations: Activities are self-reported through the Natural Resource Manager Forest Activity Tracking System.

Fish Processing Sites
Source: Alaska Department of Environmental Conservation (ADEC)

Data Description: Locations of seafood processing locations and discharge points permitted under the Alaska Pollutant Discharge Elimination System permit program.

Use in Model: Buffer

Justification: ADEC issues permits to operators of seafood processing facilities to discharge specific amounts of seafood waste and wastewater.[7] Discharge of large amounts of effluent from seafood processing facilities can cause impacts to aquatic resources, including smothering of substrates and benthic life by accumulation of wastes on the seabed, increased biochemical oxygen demand from bacterial decomposition, increased total suspended solids, increased nutrients that can produce harmful algae blooms, and excessive discharge of fish oil.

Use of this dataset is not intended to capture discharges of seafood waste and wastewater that are allowable under ADEC permits; rather, fish processing sites are considered indicative of existing watershed impairment.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X		X	X	X			X		X

Limitations: Data was developed using best available information, but may differ from conditions on the ground. Only onshore fish processing sites that are permitted to discharge seafood waste and wastewater are included. ADEC also issues permits to offshore seafood processors to discharge in State waters between 0.5 and 3 miles from shore. However, offshore processors do not have a fixed location and could not be included in the prioritization model.

[7] 18 Alaska Administrative Code (AAC) 34

Formerly Used Defense Sites
Source: U.S. Army Corps of Engineers (USACE)

Data Description: Locations of active and closed Formerly Used Defense Sites (FUDS) properties in Alaska. Contains 616 sites within Alaska.

Use in Model: All 10-digit HUC watersheds that contain a FUDS property.

Justification: FUDS are properties that were formerly owned by, leased to, or otherwise possessed by the United States and under the jurisdiction of the Department of Defense (DOD). Many of these properties contain environmental contamination relating to their use by the DOD, and the DOD is responsible for their environmental restoration under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Inclusion of this dataset within the prioritization model is not intended to capture any contamination at FUDS properties, or to suggest that closed FUDS properties require additional restoration beyond what DOD has performed under the requirements of CERCLA; rather, FUDS are considered indicative of previous or existing sources of watershed impairment.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: Dataset is not considered comprehensive.

Impervious Surfaces
Source: USGS –National Land Cover Database (NLCD)

Data Description: The NLCD provides 30-meter resolution classification of land cover and percent impervious surface area based on analysis of Landsat imagery.[8] The percent impervious surface area layer maps impervious surfaces, such as pavement, expressed as a percentage of each pixel. The coverage is statewide.

Use in Model: All 10-digit HUC watersheds with at least 0.05 percent surface area covered by impervious surfaces.

Justification: Impervious surfaces are those areas covered by impenetrable materials or compacted soils that inhibit vegetation growth and eliminate water infiltration and groundwater

[8] Homer, C.G., J.A. Dewitz, L. Yang, S. Jin, P. Danielson, G. Zian, J. Coulston, N.D. Herold, J.D. Wickham, and K. Megown. 2015. Completion of the 2011 National Land Cover Database for the conterminous United States – Representing a decade of land cover change information. *Photogrammetric Engineering and Remote Sensing*. Vol. 81, No. 5, pp. 345-384.

recharge. Depending on landscape position, impervious surfaces are indicative of likely previous aquatic resource loss. Impervious surfaces also increase floodflows, carry pollutants and sediment in runoff, and inhibit groundwater recharge. Increased solar heat collection in impervious surfaces can also heat runoff, raising temperatures and reducing dissolved oxygen in receiving waters.

Increased impervious surfaces within watersheds are considered indicative of existing watershed impairment. These watersheds also contain concentrated developments, where developments are more likely to occur. Of all 10-digit HUC watersheds that have a mapped impervious surface, approximately half have greater than 0.05 percent coverage.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x	x	x	x	x	x

Limitations: Limitations of the NLCD data include low resolution, minimum mapping units that lump smaller cover types into larger and more prevalent cover types, and inherent inaccuracy of imagery-based modeling.[9]

Incorporated City Boundaries
Source: Alaska Department of Community and Economic Development (DCED)

Data Description: The administrative boundaries of all incorporated cities in Alaska, according to DCED.

Use in Model: Any 10-digit HUC that contains an incorporated city.

Justification: Most of the previous development in Alaska has occurred within communities, and likely included previous direct impacts to aquatic resources. Developments within communities also have ongoing primary and secondary impacts to aquatic resources, such as increased runoff and sedimentation, alteration of floodplains and stream channels, and fragmentation of habitats.

The presence of a community is considered one of the top indicators of existing watershed impairment.

[9] USGS. 2017. "Land Cover Data and Modeling." Accessed at https://gapanalysis.usgs.gov/gaplandcover/data/ on May 30, 2017.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: The administrative boundary of a community is generally larger than the developed area within the community. Limited to communities with more than 400 residents. Dataset based on 2002 population data.

List of Impaired Waters
Source: ADEC

Data Description: Waters that have been determined to be impaired under Section 303(d) of the Clean Water Act (CWA).

Use in Model: Any 10-digit HUC that contains an impaired water.

Justification: Section 303(d) of the CWA requires states to develop lists of waters that do not meet water quality standards (WQS) for one or more criteria.[10] Waters that exceed WQS are considered impaired. Alaska WQS are set for 12 pollutants, including fecal coliform bacteria, dissolved oxygen, petroleum products, pH, temperature, and turbidity.[11]

Due to Alaska's sparse population and concentrated developments, the vast majority of the state's water resources are pristine. Waters in urban settings are predominantly impaired from sediment, turbidity, and fecal coliform bacteria contamination caused by urban and stormwater runoff. Other sources of impairment include sediment and turbidity from mining activity (Interior), residues from seafood processing facilities (coastal areas), contaminated military sites (Southcentral and Southwest), bark and wood residues from timber processing and transfer facilities (Southeast), and petroleum products from motorized watercraft, oil spills, and fuel leaks (across the state).[12]

Known impaired waters are likely highly suitable compensatory mitigation sites. Compensatory mitigation activities within impaired waters may also be planned to satisfy water quality improvement requirements under Section 303(d). Impaired waters are also considered indicative of existing watershed impairment. Other aquatic resources within watersheds that contain an impaired water are considered most likely to experience ongoing or future degradation from similar activities. Compensatory mitigation activities within these watersheds

[10] 33 U.S. Code §1313(d)
[11] 18 AAC 70
[12] ADEC. 2013. *Alaska's Final 2012 Integrated Water Quality Monitoring and Assessment Report*.

are likely to provide improvement in quantity and quality of aquatic resources. In 2012, there were 64 waters on Alaska's Impaired Waters list.[13]

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X		X		X	X		X		X

Limitations: Alaska's Impaired Waters list is in the process of being updated.

Log Transfer Facilities
Source: USFS

Data Description: Existing marine access log transfer facility sites on the Tongass National Forest.

Use in Model: Buffer

Justification: Log transfer and storage facilities located in marine and estuarine environments are sources of previous and ongoing impacts to aquatic resource. The types of aquatic resource losses and impacts from log transfer and storage facilities include bark and wood deposited into the marine environment, compression of soil substrate, shading of the water column around facilities, shoreline and intertidal area modifications, and secondary impacts from associated facilities such as fuel transfer sites, camps, and docks.

Log transfer facilities are considered indicative of previous watershed impairment, as they represent areas where timber harvest activities have likely occurred, in addition to being likely sources of impacts to estuarine and marine aquatic resources.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
					X					X

Limitations: Only includes data for the Tongass National Forest. May include proposed log transfer facilities not yet built.

[13] *Ibid.*

Mining Activities
Source: DNR/ASGDC, Bureau of Land Management (BLM)

Data Description: State mining claims, State mining leases, and federal mining claims. Areas with discovered minerals where mineral rights are acquired.

Use in Model: Any 10-digit HUC that contains a State mining claim, State mining lease, or federal mining claim.

Justification: Ownership of mineral rights within a watershed is indicative of watershed impairment. Impacts from mining activities include short-term impacts during construction and long-term impacts resulting from conversion or degradation of aquatic resources. The footprint of the mine and associated facilities, buildings, and roads directly impact wetlands, streams, and waterbodies, and ongoing activities are indicative of overall watershed impairment.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x	x		x	x	x

Limitations: Non-surveyed boundaries plotted based on rough sketches, claimant maps, or physical descriptions.

Permitted Mixing Zones
Source: ADEC

Data Description: Mixing zones authorized under ADEC's wastewater discharge permit program. The mixing zones are for various program sectors, including publicly owned treatment works, seafood processing facilities, and other industrial wastewater discharges.

Use in Model: Buffer

Justification: Permitted discharges to State waters can exceed Alaska WQS within ADEC-approved mixing zones.[14] Waters immediately outside permitted mixing zones are required to meet all water quality criteria. Mixing zones are permitted for municipal wastewater treatment facilities, seafood processors, oil and gas wastewater discharges, mining activities, and cruise ship wastewater discharges. Alaska regulations prohibit mixing zones in spawning areas of anadromous Pacific salmon and certain other fish species.

[14] 18 AAC 70.240

Inclusion of this dataset within the prioritization model is not intended to capture permitted WQS exceedances within mixing zones; rather, mixing zones are considered to be indicative of areas where other activities that may affect aquatic resources are likely occurring.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X		X	X	X	X

Limitations: The dataset does not include all authorized mixing zones within Alaska.

Placer Mine Districts
Source: DNR/ASGDC

Data Description: Placer mine district boundaries referring to a group of geologically or geographically related placer deposits, as derived from published sources or from general usage.

Use in Model: All 10-digit HUC watersheds that contain a placer mine district.

Justification: Due to the fluvial nature of placer deposits, placer mining necessitates in-water activities. Impacts to aquatic resources from placer mining include diversion of streams, withdrawal of water from streams for sluicing, discharge of sediment from sluicing into streams, and other in-stream activities, including operation of heavy machinery and construction of dams, dikes, and settling ponds.

Placer mines are considered indicative of existing watershed impairment. Areas where placer mining has occurred are likely to have also experienced impacts to aquatic resources from these activities.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X		X	X	X	X	X		X	X	X

Limitations: Data provided by DNR is for informational purposes only.

Ports and Harbors
Source: Alaska Department of Transportation and Public Facilities (DOT&PF)

Data Description: Ports and harbors maintained by DOT&PF. Facilities in both marine and riverine environments are included in the dataset.

Use in Model: Buffer

Justification: Ports and harbors are located within communities and near commercial or industrial facilities. These areas are likely to experience onshore development in support of harbor operations. Ports and harbors also frequently require dredging to maintain access. Additionally, harbors are sources of contamination from sources that include spills, accidents, improper disposal of sewage, and regular vessel traffic, maintenance, and operation.

Ports and harbors are transportation hubs for areas of Alaska not connected to the road or rail system. Previous, existing, or future activities that may impact aquatic resources are most likely to occur in proximity to ports and harbors.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x	x		x	x	x

Limitations: This dataset does not include port, harbor, or marina facilities that are privately operated or operated by another entity such as USACE.

Solid Waste Sites
Source: ADEC

Data Description: Solid waste sites (landfills) identified by the ADEC-Solid Waste Program. More than 330 sites are included in this dataset.

Use in Model: All 10-digit HUC watersheds that contain a solid waste site.

Justification: ADEC regulates environmental compliance at landfills and at waste storage, treatment, and disposal facilities.[15] Solid waste sites may be a source of direct and indirect impacts to adjacent and downstream aquatic resources. Potential impacts include surface water and groundwater contamination from leachate, hazardous materials, and bacteria; dispersion of trash via wind, runoff, or scavengers; and explosions or fires caused by gas production.

Solid waste sites are considered indicative of existing sources of watershed impairment. Compensatory mitigation activities may also be targeted to watersheds containing solid waste sites known to cause chronic environmental problems.

[15] 18 AAC 60

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: This dataset has known inaccuracies and is continuously being updated and corrected.

State Timber Sales
Source: DNR/ASGDC

Data Description: Area of timber sales that have occurred on State land through the Division of Forestry's timber management program, whether for commercial or personal use, competitive or non-competitive.

Use in Model: Intersect

Justification: Timber harvest activities can result in impacts to aquatic resources through loss of forested wetlands, increased soil erosion, decreased water quality, decreased stream bank stabilization, and reduced and fragmented habitat. Previous timber harvest is considered indicative of existing watershed impairment.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X		X			X	X				

Limitations: Data is for informational purposes only and has been extracted from data sets used to produce the State status plats. There are also three legislatively designated State Forests in Alaska: Haines State Forest, Tanana Valley State Forest, and Southeast State Forest. These areas are managed for timber harvest activities, and the associated impacts to aquatic resources are evaluated under the forest management plans. These State Forests are not included in this dataset.

Tidal Easements and Leases, and Municipal Tidelands
Source: DNR/ASGDC

Data Description: Areas of tidal easements, tidal leases, and tidelands that have been sold or conveyed to communities.

Use in Model: Buffer

Justification: The State of Alaska owns most of the tide and submerged lands within 3 miles of the coast. As a general rule, the State cannot sell tidelands, but DNR does issue easements and leases for tidelands. Additionally, coastal communities are allowed to select tidelands necessary for the development of transportation corridors, water-related businesses, and other developments.

Tidal easements and leases and municipal tidelands are generally issued for the purposes of development. They are generally sought in areas in proximity to existing developments. These areas are considered indicative of existing watershed impairment.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x	x		x	x	x

Limitations: Data is converted from the State status plat maps. Data is for informational purposes only.

Trails
Source: DNR/ASGDC

Data Description: Mapped trails, including all-terrain vehicle (ATV), hiking, dog sledding, and multiuse trails.

Use in Model: Buffer

Justification: Establishment of trails can impact aquatic resources by compacting soils, disrupting hydrology, and trampling vegetation. Trails that receive heavy use can cause secondary impacts to aquatic resources due to increased off-trail travel and erosion. Off-trail ATV use is particularly damaging to wetlands and streams, as ATV traffic damages soil and vegetation, disrupts hydrology, and affects spawning habitat.

Trails are considered indicative of existing watershed impairment.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: The dataset does not include all existing trails. Unofficial trails that receive regular use may not be included.

Important Natural Resources

Anadromous Streams
Source: ADF&G

Data Description: Streams included in ADF&G's *Anadromous Waters Catalog* (AWC).

Use in Model: Buffer

Justification: The AWC currently contains more than 19,000 streams, rivers, and lakes around Alaska that have been specified as important for the spawning, rearing, or migration of anadromous fish.[16] Waters included in the AWC support anadromous fish species, primarily Pacific salmon, but also Dolly Varden, cutthroat and steelhead trout, Bering cisco, eulachon, whitefish, and lamprey. In addition to the functions and values provided by aquatic resources within floodplains and riparian areas, those resources adjacent to anadromous streams perform additional anadromous species and fish and wildlife support functions.

Aquatic resources in proximity to anadromous streams are considered important natural resources.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: The AWC contains anadromous waters that have been sampled and nominated for inclusion to date, but the dataset is not considered comprehensive and does not capture all anadromous habitat. Areas of the state where more sampling has been conducted have a larger number of documented anadromous streams. Anadromous lakes and ponds are not included in this dataset.

Coastal Aquatic Resources
Source: DNR/ASGDC

Data Description: Aquatic resources in proximity to the coast. Estuarine and freshwater wetlands are included. These areas are identified using an inland buffer of Alaska's coastline.

Use in Model: Buffer (inland from coastline).

Justification: Coastal aquatic resources are located where saltwater and freshwater ecosystems converge. Their location relative to the coast typically allows these areas to perform specific

[16] ADF&G. 2017. "Anadromous Waters Catalog – Overview." Accessed at https://www.adfg.alaska.gov/sf/SARR/AWC/ on June 1, 2017.

functions, including shoreline protection, erosion reduction, floodflow moderation, water filtration, and fish and wildlife habitat.

Aquatic resources in proximity to coastal areas are considered important natural resources.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: The Alaska coastline is mapped at a course (1:63,360) that does not account for the complexities of the Alaska coast.

Eelgrass

Source: National Oceanic and Atmospheric Administration (NOAA)/ National Marine Fisheries Service (NMFS)

Data Description: Eelgrass beds mapped in the Alaska ShoreZone Coastal Mapping system. The Alaska ShoreZone Coastal Mapping system classifies Alaska's coastline by both geomorphic and biological resources.[17] This dataset shows the length of shoreline cataloged as eelgrass beds.

Use in Model: Buffer (seaward buffer of coastline mapped as eelgrass beds).

Justification: Eelgrass beds are an aquatic habitat of special concern. They provide habitat for many species of fish and invertebrates, particularly spawning habitat and rearing habitat for juveniles, as they are productive communities and provide refuge from predators.

Eelgrass beds are considered important natural resources.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X		X	X	X			X		X

Limitations: Dataset covers only areas surveyed and classified by Alaska ShoreZone Coastal Mapping. Alaska ShoreZone Coastal Mapping classifies the length of the coastline based on

[17] NOAA NMFS, Alaska Regional Office. 2017. "Alaska ShoreZone Coastal Mapping and Imagery." Accessed at https://alaskafisheries.noaa.gov/habitat/shorezone on June 1, 2017.

both physical habitat and the associated biota. A strict buffer of the coastline may under-represent the area of eelgrass habitats in some areas and may over-represent it in others.

Essential Fish Habitat – Marine Waters
Source: NOAA

Data Description: Mapped Essential Fish Habitat (EFH) for federally managed species.

Use in Model: Intersect. Three different marine areas were categorized: areas providing EFH for 1–5 species, areas providing EFH for 6–15 species, and areas providing EFH for 16–25 species.

Justification: EFH refers to areas federally designated as habitat for species that are federally managed under the Magnuson-Stevens Fishery Conservation and Management Act. These areas support species spawning, rearing, and feeding, and may include areas that provide many important functions, are sensitive to decline, are under stress from development, or represent rare habitat types. In Alaska, the North Pacific Fishery Management Council has designated EFH for 39 species of fish, crab, and mollusks under six fishery management plans.[18,19,20,21,22,23] For the purposes of this prioritization model, if an area was designated as essential for any life stage of a particular species, it was considered EFH for that species.

Areas designated as EFH are considered important natural resources.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X		X	X	X			X	X	X

Limitations: Marine EFH has been designated for 39 species of fish, crab, and mollusks. Freshwater EFH for federally managed species is not covered in this dataset.

Estuarine Streams
Source: U.S. Fish and Wildlife Service (USFWS)

[18] North Pacific Fishery Management Council. 2009. Fishery Management Plan for Fish Resources of the Arctic Management Area.
[19] North Pacific Fishery Management Council. 2017. Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area.
[20] North Pacific Fishery Management Council. 2016. Fishery Management Plan for Groundfish of the Gulf of Alaska.
[21] North Pacific Fishery Management Council. 2011. Fishery Management Plan for Bering Sea/Aleutian Islands King and Tanner Crabs.
[22] North Pacific Fishery Management Council. 2014. Fishery Management Plan for the Scallop Fishery off Alaska.
[23] North Pacific Fishery Management Council. 2012. Fishery Management Plan for the Salmon Fisheries in the EEZ off Alaska.

Data Description: Estuarine streams mapped in USFWS's National Wetlands Inventory (NWI) mapping.

Use in Model: Buffer

Justification: Estuarine areas perform important functions that maintain aquatic resources up- and downstream. Estuarine streams and aquatic resources adjacent to them are important fish nurseries, perform water quality enhancement functions, and protect inland areas from erosion and flooding.

Aquatic resources in proximity to estuarine streams are considered important natural resources.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x		x	x	x	x

Limitations: For Alaska, NWI mapping is conducted at a coarse scale (1:63,360) that does not capture all aquatic resources. NWI mapping has not been produced for the entire state.

Federal Conservation System Units
Source: DNR/ASGDC

Data Description: The boundaries of units within the federal conservation system, which includes the National Park System, the National Wildlife Refuge System, the National Wild and Scenic Rivers System, the National Trails System, the National Wilderness Preservation System, and the National Forest Monument System.

Use in Model: Buffer

Justification: State lands are located within and adjacent to the boundaries of federal conservation system units. State lands in proximity to these areas likely contain aquatic resources similar to the valuable resources protected within the units and provide important habitat connectivity.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x	x	x	x	x	x

Limitations: Dataset does not include all of the Alaska Maritime Wildlife Refuge and does include the National Petroleum Reserve of Alaska (which is not considered a federal Conservation System Unit). Data has been compiled from different sources at different scales. Data is for informational purposes only and should generally be used at a 63,360 scale.

Headwater Aquatic Resources
Source: USGS

Data Description: Smaller watersheds, as defined by USGS, that are located at the upper reaches of large watersheds.

Use in Model: 10-digit HUC watersheds intersecting 4-digit HUC watershed boundaries, and 12-digit HUC watersheds intersecting the boundary of 6-digit HUC watersheds. HUCs directly adjacent to the coast are not included.

Justification: Aquatic resources located at the headwaters of streams are important for maintaining base flows of large rivers and for transporting sediment, organic matter, organisms, and nutrients critical to downstream ecosystems.

Headwater aquatic resources located at the headwaters of rivers and streams are considered important natural resources.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x	x		x	x	x

Limitations: Only headwaters of 4-digit and 6-digit HUCs are included within the dataset. Dataset was created at course scale (1:63,360). Watersheds that contain stream headwaters and the stream's confluence with marine waters are not included.

Important Bird Areas
Source: National Audubon Society

Data Description: Important Bird Areas (IBAs).

Use in Model: Intersect

Justification: IBAs are recognized at state, continental, and global levels as the most important places for bird populations. They include areas that are important to species of conservation concern, areas that support species with restricted ranges or habitats, and areas that support large congregations of individuals from multiple species. Many IBAs in Alaska include large wetland complexes that provide waterfowl breeding and migration staging areas.

IBAs identify habitat requirements of important species, but IBA designation does not confer any formal protection or conservation status. This dataset identifies areas that include important natural resources but that may not be protected accordingly.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: There are large gaps in spatial data, especially on non-federal lands. Not all IBAs have been identified.

Kelp
Source: NOAA/NMFS

Data Description: Canopy kelp beds mapped in the Alaska ShoreZone Coastal Mapping system. This dataset shows the length of shoreline cataloged as partial or complete coverage of bull kelp, dragon kelp, and giant kelp.

Use in Model: Buffer (seaward buffer of coastline mapped as kelp beds)

Justification: Canopy kelp beds are important for many species of marine organisms. They have a dramatic impact on the strength of ocean currents, creating important spawning and rearing habitat for fish and invertebrates, as well as feeding habitat for sea otters and other large marine mammals.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X				X			X		X

Limitations: Alaska ShoreZone Coastal Mapping classifies the length of the coastline based on both physical habitat as well as the associated biota. A buffer applied to both the complete and partial coverage classifications will likely over-represent the actual areas of kelp beds. Data does not exist for the entire Alaskan coastline.

Marine Mammal Haulout Sites
Source: NOAA/NMFS

Data Description: Mapped marine mammal haulout sites as part of NMFS Office of Response and Restoration Environmental Sensitivity Index Maps. Marine mammal haulout sites are

digitally available for the following regions: Aleutian Island, Bristol Bay, Cook Inlet and Kenai Peninsula, Kodiak Island and Shelikof Straight, Northwest Arctic, Prince William Sound, and Southeast Alaska.

Use in Model: Buffer (seaward from haulout site)

Justification: Haulouts are important habitat where pinnipeds (seals, sea lions, fur seals, and walruses) mate, give birth, rest, avoid predators, and engage in social interactions. For Endangered Species Act (ESA)-listed species, haulouts are protected critical habitat. For other marine mammal species, congregations of individuals are protected under the Marine Mammal Protection Act.

Haulouts are mostly rocky outcrops or prominences on islands and coasts. Marine aquatic resources in proximity to marine mammal congregations provide important foraging habitat for marine mammals.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
	x		x	x	x			x	x	x

Limitations: Dataset includes only regions mapped by Environmental Sensitivity Index Maps. Data includes marine aquatic resources.

Salt Marsh Vegetation
Source: NOAA/NMFS

Data Description: Areas mapped as salt marsh in the Alaska ShoreZone Coastal Mapping system. This dataset shows the length of shoreline cataloged as partial or complete coverage of sedges, salt marsh vegetation, and salt marsh.

Use in Model: Buffer

Justification: Wetlands in coastal areas perform specific functions based on their landscape position, including shoreline protection, erosion reduction, floodflow moderation, water filtration, and fish and wildlife habitat.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x	x	x	x	x	x

Limitations: Alaska ShoreZone Coastal Mapping classifies the length of the coastline based on both physical habitat as well as the associated biota. A buffer applied to both the complete and partial coverage classifications will likely over-represent the actual areas of salt marsh. Data does not exist for the entire Alaska coastline.

State Legislatively Designated Areas
Source: DNR/ASGDC

Data Description: The boundaries of Legislatively Designated Areas (LDAs). These areas are established for management of forest, recreational, and historical purposes in order to protect and preserve natural habitat for fish and/or wildlife.

Use in Model: Buffer

Justification: Approximately 12 million acres of State-owned land is included within LDAs. These areas have been designated by the Alaska State Legislature for special uses, and include refuges, sanctuaries, critical habitat areas, ranges, special management areas, forests, parks, recreation areas, preserves, public use areas, recreation rivers, and recreational mining areas. LDAs are managed according to the requirements of the legislation specific to the site and the general class of LDA, and any subsequent management plans or regulations that implement the requirements of the legislation.

Land use and management within LDAs is legislatively designated. State lands in proximity to these areas likely contain resources similar to the valuable resources protected within the LDA. State lands preserved in the vicinity of existing LDAs may be able to be managed concurrently.

As of 2014, the Alaska State Legislature has designated 34 State Wildlife Areas (excluding joint State/national refuges) totaling 3,427,895 acres, 52 State Park Areas totaling 3,357,393 acres, 3 State Forest Areas totaling 2,280,872 acres, and 14 other State Multiple Use Areas totaling 2,915,979 acres. The total acreage of land within the boundaries of these areas (excluding joint State/national refuges) is 11,982,139 acres.[24]

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: Couse-scale data provided for informational purposes only.

Streams and Waterbodies
Source: DNR/ASGDC

[24] DNR Division of Mining, Land & Water. 2014. “Fact sheet: State of Alaska Legislatively Designated Areas.” September 2014.

Data Description: Alaskan streams mapped through Environmental Systems Research Institute, Inc., Digital Chart of the World.

Use in Model: Buffer

Justification: Rivers, streams, and waterbodies and their associated floodplains and riparian areas contain valuable aquatic resources that perform many important services and functions, including floodflow moderation, reduction of erosion and sedimentation, groundwater recharge and discharge, nutrient export, and fish and wildlife habitat.

Aquatic resources in proximity to rivers, streams, and waterbodies are considered important natural resources.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: The data is mapped at a course scale (1:1,000,000) and is not a comprehensive coverage of all Alaska streams and waterbodies.

Threatened, Endangered, and Sensitive Species Critical Habitat
Source: USFWS, NMFS

Data Description: Federally designated critical habitat for species listed under the ESA.

Use in Model: Intersect

Justification: Under the ESA, USFWS and the NOAA/NMFS designate certain geographic areas as critical habitat for ESA-listed species. Critical habitat is the specific areas that contain the physical or biological features essential to the conservation of threatened and endangered species. Aquatic resources within critical habitat provide direct and indirect support functions to ESA-listed species and their habitat.

Critical habitat has been designated for seven ESA-listed species in Alaska: spectacled eider,[25] Steller's eider,[26] Steller sea lion (western Distinct Population Segment [DPS]),[27] North Pacific right whale,[28] beluga whale (Cook Inlet DPS),[29] northern sea otter (Southwest Alaska DPS),[30] and polar bear.[31]

[25] 66 *Federal Register* (FR) 9146-9185 (2001)
[26] 66 FR 8850-8884 (2001)
[27] 64 FR 14052-14077 (1999)
[28] 73 FR 19000-19014 (2008)
[29] 76 FR 20180-20214 (2011)
[30] 74 FR 51988-52012 (2009)
[31] 75 FR 76086-76137 (2010)

Aquatic resources within designated critical habitat are considered important natural resources.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x		x	x	x	x

Limitations: Dataset includes only species for which critical habitat has been designated; many threatened, endangered, and sensitive species within Alaska do not have designated critical habitat.

Threat of Development

Airport or Airstrip
Source: DNR/ASGDC

Data Description: The data depicts airports, airstrips, and runway locations from USGS quadrangles.

Use in Model: Buffer

Justification: In many communities not connected to the road system, air travel is the primary form of transportation and method of delivering goods and materials. Developments are more likely to occur in proximity to airports or airstrips.

The proximity of airports and airstrips to communities is indicative of likely development in the area surrounding the facility.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x	x	x	x	x	x

Limitations: All historically active airstrips may not be included. Information was digitized from 1:24,000, 1:63,360, and 1:250,000 USGS quadrangles.

Electric Lines
Source: DNR/ASGDC

Data Description: Mapped electric lines from USGS quadrangles.

Use in Model: Buffer

Justification: Electric lines represent connections to existing power sources. Developments are more likely to occur in proximity to a power supply.

Aquatic resources on State-owned land near electric lines are considered more likely to experience impacts from development.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X		X	X	X	X		X

Limitations: Information was digitized from 1:24,000, 1:63,360, and 1:250,000 USGS Quadrangles.

Federal Timber Harvest
Source: USFS

Data Description: Area of timber harvest activities that are planned or that have been accomplished through the USFS timber harvest program.

Use in Model: Intersect

Justification: Timber harvest activities can result in impacts to aquatic resources through loss of forested wetlands, increased soil erosion, decreased water quality, decreased stream bank stabilization, and reduced and fragmented habitat.

This dataset consists of timber harvest on federal land, which is not included in the ILFP. Aquatic resources adjacent to areas where a federal timber harvest is planned are considered to be under threat of degradation.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X					X					X

Limitations: Activities are self-reported through the Natural Resource Manager Forest Activity Tracking System. Includes areas where timber harvest may have already occurred.

Incorporated City Boundaries
Source: DCED

Data Description: The administrative boundaries of all incorporated cities in Alaska, according to DCED.

Use in Model: Buffer

Justification: Most of the development in Alaska has occurred within communities, and land use trends across the state are toward increased urbanization. As more of Alaska's population becomes concentrated in cities and towns, increased development and infrastructure will impact aquatic resources within and near population hubs.

Land within and near communities is considered likely to experience impacts from development.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: The administrative boundary of a community is generally larger than the developed area within the community. Limited to communities with greater than 400 residents. Dataset based on 2002 population data.

Major Projects
Source: Publicly available data

Data Description: Proposed "major projects." This dataset includes the most recent publicly available estimates of the areas of impact for the following projects: Susitna-Watana Hydroelectric Project, Pebble Project, Ambler Mining District Industrial Access Project, Alaska Liquefied Natural Gas Project, Juneau Access Improvements Project, Alberta to Alaska Railroad, West Susitna Access, King Cove Road, Pikka project, and Donlin Gold.

Use in Model: Buffer

Justification: "Major Projects" are commonly understood to be large-scale projects that require significant amounts of investment in both planning and design, as well as construction, to develop. Projects may be proposed and financed by the State or private companies, or may be "Public-Private Partnerships." The included projects range from resource development and energy production to transportation links and access projects. All projects would result in direct impacts to aquatic resources within their footprints, as well as within the footprints of any associated infrastructure, and would likely result in secondary impacts to aquatic resources as well.

Development of these projects is highly dependent on many factors, including economic and political environments, and the included projects are not certain to be developed within the next 5 to 10 years. However, many of these projects have been studied and planned, and could move forward quickly if market conditions change.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X			X	X	X			X

Limitations: This dataset includes a select list of projects and does not capture all "major projects" that have been proposed. The publicly available estimates of the areas of impact are planning level data.

Mining Sites

Source: DNR, BLM, and USGS

Data Description: State mining claims, State mining leases, federal mining claims, and significant metalliferous lode deposit locations. Areas with discovered minerals where mineral rights may or may not be acquired.

Use in Model: Buffer

Justification: Construction of mines and expansion of existing mines are the most likely sources of impacts to aquatic resources. Construction of new mines includes short-term impacts during construction and long-term impacts resulting from conversion or degradation of aquatic resources. The footprint of the mine and associated facilities, buildings, and roads directly impact wetlands, streams, and waterbodies.

Continued exploration of deposits occurs concurrently with active mining operations, as the mining infrastructure already in place reduces the high cost of exploring new deposits. Mining exploration projects also represent sources of likely impacts to aquatic resources, although development of prospects depends strongly on commodities prices and market conditions.

Aquatic resources adjacent to significant metalliferous lode deposits, as well as an acquired federal or State mining claim, are considered under threat of degradation from development or exploration.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X		X	X	X

Limitations: This dataset does not capture potential leases and claims.

Pipelines
Source: DNR/ASGDC

Data Description: Mapped pipelines from USGS quadrangles.

Use in Model: Buffer

Justification: Pipelines carry oil, natural gas, and associated fluids, and connection to pipelines is critical for oil and natural gas exploration and development. Developments are more likely to occur in proximity to pipelines.

Aquatic resources on State-owned lands near pipelines are considered more likely to experience impacts from future development.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: Information was digitized from 1:24,000, 1:63,360, and 1:250,000 USGS quadrangles.

Placer Mine Districts
Source: DNR/ASGDC

Data Description: Placer mine district boundaries referring to a group of geologically or geographically related placer deposits, as derived from published sources or from general usage.

Use in Model: Intersect

Justification: Due to the fluvial nature of placer deposits, placer mining necessitates in-water activities. Impacts to aquatic resources from placer mining include diversion of streams, withdrawal of water from streams for sluicing, discharge of sediment from sluicing into streams, and other in-stream activities, including operation of heavy machinery and construction of dams, dikes, and settling ponds.

Placer mine districts are indicative of where impacts to aquatic resources may occur.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X		X	X	X	X	X		X		X

Limitations: Data provided by DNR is for informational purposes only.

Ports and Harbors
Source: DOT&PF

Data Description: Ports and harbors maintained by DOT&PF.

Use in Model: Buffer

Justification: Ports and harbors are located within communities and near commercial or industrial facilities. These areas are likely to experience onshore development in support of harbor operations. Ports and harbors also frequently require dredging to maintain access. In coastal communities, marine traffic is a primary form of transportation and method of delivering goods and materials. Ports and harbors also support resource development opportunities such as mines. Facilities in both marine and riverine environments are included in the dataset.

The presence of ports and harbors is indicative of likely development in the area surrounding the facility.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X		X	X	X

Limitations: This dataset does not include port, harbor, or marina facilities that are privately operated or operated by another entity, such as USACE.

Private Ownership
Source: DNR/ASGDC

Data Description: All privately owned lands.

Use in Model: Buffer

Justification: Privately owned land is owned by entities other than federal, State, or Native Corporations. This includes Native allotments, municipalities, and land owned by private citizens. There are few restrictions or constraints on developing privately owned land for residential and commercial uses in Alaska, although permitting and zoning requirements vary between communities.

Due to the limited amount of privately owned available land, private ownership is considered an indicator of likely development. Aquatic resources on State-owned lands near existing or future private developments are considered more likely to experience impacts from development.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X		X	X	X	X	X		X	X	X

Limitations: Data resolution is at the Public Land Survey System section level.

Railroad
Source: DNR/ASGDC

Data Description: Mapped railroads from ESRI's Digital Chart of the World.

Use in Model: Buffer

Justification: Railroads represent an efficient way to move bulk goods, materials, and equipment. Land and resources in proximity to existing roads are more easily developed.

Aquatic resources on State-owned land near railroads are easier to access than remote locations and are considered more likely to experience impacts from future development.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X					X	X				X

Limitations: The scale of the data is 1:1,000,000.

Roads
Source: DNR/ASGDC

Data Description: Mapped major roads.

Use in Model: Buffer

Justification: While Alaska's road system is limited, roads provide access to many areas and allow for easy transport of goods, materials, and equipment. Land and resources in proximity to existing roads are more easily developed.

Aquatic resources on State-owned land near roads are easier to access than remote locations and are considered more likely to experience impacts from development.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: Scale of the data is 1:1,000,000 and includes only major roads. Smaller roads, non-DOT&PF-maintained roads, and privately owned roads are not included.

State Oil and Gas Leases
Source: DNR – Division of Oil and Gas

Data Description: Active oil and gas leases and statewide lease sale boundaries identified in the Five-Year Oil and Gas Leasing Program.

Use in Model: Intersect

Justification: Construction of new oil and gas extraction fields, as well as expansion of existing fields, is the most likely source of impacts to aquatic resources from oil and gas activities. Development of new fields and associated infrastructure depends strongly on oil and gas prices and market conditions, as new fields will require significant investment to develop required infrastructure. Development of new production wells closer to existing infrastructure (e.g., roads, pipelines, production facilities, and worker housing) reduces the high cost of new developments.

All active State oil and gas leases are within two units: North Slope and Cook Inlet. Leases identified in the Five-Year Oil and Gas Leasing Program are within five units: North Slope, Cook Inlet, Alaska Peninsula, Beaufort Sea, and North Slope Foothills.

Aquatic resources in proximity to active oil and gas leases and prospective oil and gas leases are considered likely to be affected by future exploration and development activities.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X				X	X	X	8	X

Limitations: Dataset is for informational purposes only and is not a legal record.

State Timber Sales
Source: DNR/ASGDC

Data Description: Area of timber sales that have occurred on State land through the Division of Forestry's timber management program, whether for commercial or personal use, competitive or non-competitive.

Use in Model: Buffer

Justification: Timber harvest over purchased areas, expansion of previous timber harvest, or development of associated infrastructure is a likely source of impacts to aquatic resources from timber activities.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X		X			X	X	X			X

Limitations: Data is for informational purposes only and has been extracted from data sets used to produce the State status plats. Includes historical data that may no longer be under threat.

Statewide Transportation Improvements
Source: DOT&PF and Alaska DNR

Data Description: Locations of all physical projects included in the 2020-2023 Statewide Transportation Improvement Program (STIP) and in the Arctic Strategic Transportation and Resources (ASTAR) project.

Use in Model: Buffer

Justification: DOT&PF manages the STIP, a 4-year program that identifies priority transportation projects and improvements across the state.[32] Construction of new transportation infrastructure (e.g., roads, docks, and ferry terminal buildings) and expansion or improvement of existing infrastructure (e.g., road widening, bridge replacements, and dock relocations) are likely to result in impacts to aquatic resources. Projects with new footprints may fill aquatic resources, alter hydrology, increase runoff from impervious surfaces, and introduce contaminants from vehicles and equipment during construction and use. Additionally, new and improved transportation infrastructure will facilitate further development of land and resources via improved access. Aquatic resources in proximity to planned and federally funded transportation projects included in the STIP are considered likely to be affected by development of the projects.

Alaska DNR has initiated the Arctic Strategic Transportation and Resources (ASTAR) project in order to identify projects to connect communities and develop infrastructure within the entire North Slope Region. Aquatic resources in proximity to these state funded transportation projects included in the ASTAR project are considered likely to be affected by development of the projects.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X		X	X	X

Limitations: STIP Dataset does not include projects involving airports or non-ferry-related ports and harbors. STIP projects may involve road improvements within the current footprint of the highway that would not result in any additional impact to aquatic resources.

ASTAR projects are planning level only with multiple corridors identified for development.

[32] DOT&PF. 2020. 2020-2023 Statewide Transportation Improvement Program. Approved December 1, 2020.

Watershed Approach for Mitigation Site Selection

	Indicators	Terrestrial Service Areas							Marine Service Areas			
		Arctic Tundra	Bering Tundra	Bering Taiga	Aleutian Meadows	Intermontane Boreal	Alaska Range Transition	Coastal Rainforests	Beaufort Sea	Chukchi Sea	Bering Sea	Gulf of Alaska
Watershed Health Impacts	ADEC List of Impaired Waters	x	x	x	x	x	x	x				
	ADEC Sewage Release Sites	x	x	x	x	x	x	x				
	Landfill Seepage											
	Municipal and Village Boundaries	x	x	x	x	x	x	x				
	- Airstrips	x	x	x	x	x	x	x				
	- Impervious Surfaces	x	x	x	x	x	x	x				
	- Land Use	x	x	x	x	x	x	x				
	- High Social Use of Resources	x	x	x	x	x	x	x				
	- Ports	x	x	x	x		x	x	x	x	x	x
	Placer Mine Sites	x										
	Logging Activities	x	x			x	x	x				
	- Roads	x	x			x	x	x				
	- Cuts	x	x			x	x	x				
	Log Transfer Facilities							x				
	Map of Culverts	x	x	x	x	x	x	x				
	Active Oil and Gas Leases	x	x	x	x	x	x	x	x	x		x
	Past Oil and Gas Leases Rehabilitation Sites	x					x					
	Fish Processing Sites										x	x
	Active Large-scale Mines	x	x	x		x	x	x				
	ORV Trails	x	x	x	x	x	x	x				
	Foot Traffic Impacts Along Fishing Streams				x	x	x	x				
	Remote Airstrips	x	x	x	x	x	x	x				
	Marine Debris Accumulation Sites								x	x	x	x
	Formerly Used Defense Sites (FUDS)	x	x	x	x	x	x	x	x	x	x	x
Important Natural Resources	Important Bird Areas Identified by Agencies or Organizations	x	x	x	x	x	x	x	x	x	x	x
	ESA/Sensitive Species and Critical Habitat	x	x	x	x	x	x	x	x	x	x	x
	EFH Anadromous Waters	x	x	x	x	x	x	x	x	x	x	x
	Marine Waters								x	x	x	x
	Floodplains											
	Headwater Streams	x	x	x	x	x	x	x				
	Old Growth Forests							x				
	Riparian Areas	x	x	x	x	x	x	x	x	x	x	x
	- X-feet from Streams	x	x	x	x	x	x	x	x	x	x	x
	- X-feet from Anadromous Streams	x	x	x	x	x	x	x	x	x	x	x
	- X-feet from Estuarine Streams	x	x	x	x		x	x	x	x	x	x
	Marine Mammal Haulout Sites								x	x	x	x
	Proximity to Protected Areas	x	x	x	x	x	x	x	x	x	x	x
	- Wilderness	x	x	x	x	x	x	x	x	x	x	x
	- National Parks	x	x	x		x	x	x	x	x	x	x
	- State Parks	x	x	x	x	x	x	x	x	x	x	x
	- Critical Habitat Areas	x	x	x	x	x	x	x	x	x	x	x
	- State and Federal Refuges	x	x	x	x	x	x	x	x	x	x	x
	- Sanctuaries	x	x	x	x	x	x	x	x	x	x	x
	- Wild and Scenic Rivers	x	x	x	x	x	x	x	x	x	x	x
	Submerged Aquatic Sites in Marine Waters	x	x	x	x	x	x	x	x	x	x	x
Threat of Development	State or Local Government Ownership	x	x	x	x	x	x	x	x	x	x	x
	Private Ownership	x	x	x	x	x	x	x				
	Proximity Factors	x	x	x	x	x	x	x	x	x	x	x
	- Distance to Road	x	x	x	x	x	x	x	x	x	x	x
	- Distance to Utility Line	x	x	x	x	x	x	x	x	x	x	x
	- Distance to Pipeline	x	x	x	x	x	x	x	x	x		x
	- Distance to Railroad					x	x	x				x
	- Distance to Airport or Airstrip	x	x	x	x	x	x	x	x	x	x	x
	- Distance to Mine Material Site	x	x	x	x	x	x	x	x	x	x	x
	- Distance to Known Mineral Deposit	x	x	x	x	x	x	x	x	x	x	x
	State or Federal Oil and Gas Lease	x	x	x	x	x	x	x	x	x	x	x
	Surface Transportation Projects (STIP, ASTAR)	x	x	x	x	x	x	x	x	x	x	x
	State Timber Sales	x	x	x	x	x	x	x				
	Mining Districts	x	x	x	x	x	x	x	x	x	x	x
	Mineral Leases	x	x	x	x	x	x	x	x	x	x	x
	Mining Claims	x	x	x	x	x	x	x	x	x	x	x
	Capital Project Requests	x	x	x	x	x	x	x	x	x	x	x
	Major Projects	x	x	x	x	x	x	x	x	x	x	x
	Alaska Native Corporation Ownership	x	x	x	x	x	x	x	x	x	x	x

Prioritization Strategy for Compensatory Mitigation Site Selection

State of Alaska
Department of Natural Resources
In-Lieu Fee Compensatory Mitigation Program

July 1, 2021

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Contents

Tables

Appendices

Acronyms and Abbreviations

AAC	Alaska Administrative Code
ADF&G	Alaska Department of Fish and Game
ASGDC	Alaska State Geo-Spatial Data Clearinghouse
ATV	All-terrain Vehicle
AWC	Anadromous Waters Catalog
BLM	Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CPF	Compensation Planning Framework
CWA	Clean Water Act
DCED	Alaska Department of Community and Economic Development
DNR	Alaska Department of Natural Resources
DOD	Department of Defense
DOT&PF	Alaska Department of Transportation and Public Facilities
DPS	Distinct Population Segment
EFH	Essential Fish Habitat
ESA	Endangered Species Act
FR	*Federal Register*
FUDS	Formerly Used Defense Sites
GIS	Geographic Information System
HUC	Hydrologic Unit Code
IBA	Important Bird Area
ILFP	In-Lieu Fee Program
LDA	Legislatively Designated Area
NLCD	National Land Cover Database
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NWI	National Wetlands Inventory
SA	Service Areas
STIP	Statewide Transportation Improvement Program
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service

USGS	U.S. Geological Survey
WQS	Water Quality Standards

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1.0 Introduction

The Alaska Department of Natural Resources (DNR) is developing a statewide In-Lieu Fee Program (ILFP) to mitigate losses of terrestrial and marine aquatic resources in accordance with the 2008 Federal Final Rule on *Compensatory Mitigation for Losses of Aquatic Resources* (2008 Mitigation Rule; 33 Code of Federal Regulations [CFR] §332). DNR is currently developing a Draft Prospectus for the ILFP for submittal to the Alaska District of the U.S. Army Corps of Engineers (USACE). Per the requirements of the 2008 Mitigation Rule, the Prospectus includes a compensation planning framework (CPF) that describes the methods that will be used to select, secure, and implement aquatic resource restoration, establishment, enhancement, and/or preservation activities under the ILFP (33 CFR §332.8(c)).

The CPF identified service areas (SAs) for the ILFP and presented a prioritization strategy for selecting compensatory mitigation sites within the SAs under a watershed approach. The prioritization strategy is essential to evaluating State-owned lands in order to target compensatory mitigation activities toward aquatic resources that function similarly to aquatic resources affected within the same SA. This document provides additional detail to the conceptual prioritization strategy presented in the CPF.

2.0 Objectives

The objective of the prioritization strategy is to identify areas within each SA in which aquatic resources on State-owned lands are most suitable for compensatory mitigation. It is intended to provide a high-level assessment of the each SA, which will allow DNR to target the most suitable lands for further assessment and project development.

2.1 State Land Ownership

The Alaska Statehood Act granted the State of Alaska ownership of 28 percent, or approximately 104 million acres, of the state's total land area. To date, approximately 96 percent of this area (100 million acres) has been conveyed by the federal government to the State. DNR manages all State-owned land, as well as Alaska's 65 million acres of tidelands, shorelands, submerged lands, and all of the State's water resources.

DNR manages State-owned lands (that have not been legislatively designated for special uses) for multiple uses, including resource extraction, fish and wildlife habitat management, and recreation. DNR develops land use plans to guide the use, development, and disposal of State lands for the maximum public benefit, as required by the Alaska State Constitution (Section 2, Article VIII). In accordance with this constitutional mandate, DNR has determined that compensatory mitigation activities can provide for the maximum public benefit on State-owned lands.

Approximately 165 million acres of State-owned land are potentially eligible for inclusion in a State-sponsored ILFP. This land is distributed across the state. Individual assessment of all State-owned land for potential use as compensatory mitigation sites is not practicable and would likely not result in identification of the most valuable sites without a method for a large-scale comparison of all areas. The prioritization strategy designed for this ILFP provides a high-level, flexible tool for DNR to assess all lands under its management in a consistent manner. The resulting prioritization will enable DNR to identify aquatic resources for more detailed study.

2.2 Regulatory Requirements

The prioritization strategy was developed in accordance with requirements of the 2008 Mitigation Rule.

2.2.1 Watershed Approach

The 2008 Mitigation Rule requires the use of a watershed approach to compensatory mitigation. A watershed approach is an analytical decision-making process to guide compensatory mitigation activities. The goal of a watershed approach is "to maintain and improve the quality and quantity of aquatic resources within watersheds through strategic selection of compensatory mitigation sites" (33 CFR §332.3(c)). A watershed approach requires the consideration of the needs of the watershed, and of how locations and types of compensatory mitigation activities address those needs. The 2008 Mitigation Rule (33 CFR §332.3(c)(2-3) specifies that the following components be considered in a watershed approach:

- Landscape position
- Aquatic resource types
- Desired aquatic resource functions
- Habitat requirements of important species
- Habitat loss and conversion trends
- Sources of watershed impairment
- Current development trends
- Requirement of other regulatory and non-regulatory programs
- Locational factors (e.g., hydrology, land use)
- Historic and existing aquatic resources
- Potential sites for aquatic resource restoration
- Chronic environmental problems (e.g., flooding, poor drinking water)

For development of an ILFP, a watershed approach must be used to select compensatory mitigation sites. This document describes how the prioritization strategy employs a watershed approach to site selection within each of the 11 SAs.

2.2.2 Preservation

Compensatory mitigation activities under this ILFP will involve aquatic resource preservation or aquatic resource preservation in conjunction with a restoration, establishment, and/or enhancement activity. In either case, the 2008 Mitigation Rule requires that the following five criteria are met in order to receive credits from preservation (33 CFR §332.3(h)(1)):

1) The resources to be preserved provide important physical, chemical, and biological functions for the watershed.
2) The resources to be preserved contribute significantly to the ecological sustainability of the watershed.
3) Preservation is determined by the district engineer to be appropriate and practicable.
4) The resources are under threat of destruction or adverse modification.
5) The preserved site will be permanently protected through an appropriate real estate or other legal instrument.

3.0 Prioritization Framework

3.1 Prioritization Criteria

The prioritization strategy for the ILFP analyzes geospatial data in a Geographic Information System (GIS) environment to evaluate State-owned lands using three **prioritization criteria**: (1) current health of the watershed; (2) important natural resources; and (3) threat of development. These criteria encompass the requirements of the first, second, and fourth preservation criteria from the 2008 Mitigation Rule (see Section 2.2.2 above).[1] The prioritization criteria were developed in order to combine the requirements of the preservation criteria with the considerations of a watershed approach and produce comprehensive, concise criteria for evaluating State-owned land for suitability for compensatory mitigation.

Although the prioritization criteria are based on the preservation requirements from the 2008 Mitigation Rule, areas that are identified by the prioritization will be considered suitable for compensatory mitigation activities, including restoration, enhancement, and preservation, depending on site-specific circumstances. The prioritization criteria were developed to identify high-value aquatic resources that are threatened with development in watersheds that have experienced previous and ongoing impacts; the ILFP considers these areas the most appropriate locations for all forms of compensatory mitigation. The specific activities that will ultimately be performed at prioritized locations will be dependent on factors that include goals for the service area, needs of the watershed, and opportunities for mitigation.

The GIS-based prioritization model analyzes available existing geospatial data to identify and rank State-owned lands that meet all three prioritization criteria. The output of the prioritization model is a dataset identifying and ranking State-owned aquatic resources within each SA that are suitable for use as compensatory mitigation per the requirements of the 2008 Mitigation Rule, and that will maintain and improve the quantity and quality of aquatic resources within their watersheds. Further discussion of the prioritization criteria is included in the following sections.

3.1.1 Current Health of the Watershed

This prioritization criterion relates to previous impacts to aquatic resources, ongoing sources of watershed impairment, and development trends within watersheds. Most of Alaska's aquatic

[1] The ways in the ILFP will satisfy the third and fifth preservation criteria are addressed in other sections of the Prospectus.

resources are in pristine condition and have experienced little to no disturbance or impact. Identifying areas that have experienced higher levels of previous disturbance and impacts will ensure that compensatory mitigation activities are targeted to meet the needs of the SA. These areas are also the most likely to contain opportunities for restoration and enhancement.

Datasets that were identified as indicators of this criterion include areas of resource development and extraction (historic and ongoing logging, mining, and oil and gas developments), impaired waters, and sources of potential contamination (airstrips, ports, landfill seepage, Formerly Used Defense Sites, and fish processing sites). Datasets that are indicators of this criterion capture the following considerations of a watershed approach:

- Habitat loss and conversion trends
- Sources of watershed impairments
- Current development trends
- Requirements of other regulatory and non-regulatory programs
- Historic and existing aquatic resources
- Potential sites for aquatic resource restoration
- Chronic environmental problems

3.1.2 Important Natural Resources

This prioritization criterion focuses on the identification of areas likely to contain high value and important aquatic resources. Identification of high-value resources is essential for targeting compensatory mitigation activities toward maintaining the quality and quantity of aquatic resources within a watershed. These areas, when selected with consideration for other factors, are most likely to maintain the sustainability of an SA. Selection of sites containing important resources is a requirement for preservation as compensatory mitigation, but is also desirable in the selection of sites for restoration or enhancement.

Datasets that were identified as indicators of this criterion include habitat for important species (i.e., federally designated critical habitat, important bird areas, marine mammal haulout sites), designated conservation areas (i.e., anadromous waters, State Legislatively Designated Areas, federal conservation units), and locational factors (i.e., headwaters, proximity to protected areas, marine and estuarine areas). Datasets that are indicators of this criterion capture the following considerations of a watershed approach:

- Landscape position
- Aquatic resource types
- Desired aquatic resource functions
- Habitat requirements of important species
- Habitat loss and conversion trends
- Requirements of other regulatory and non-regulatory programs
- Locational factors
- Potential sites for aquatic resource restoration

3.1.3 Threat of Development

This third prioritization criterion identifies areas in which aquatic resources are most likely to be affected by development. Aquatic resources that are most likely to experience destruction, fragmentation, and adverse modification (providing they also satisfy other selection criteria) are the most desirable for compensatory mitigation. The 2008 Mitigation Rule defines preservation as "the removal of a threat to, or preventing the decline of, aquatic resources" (33 CFR §332.2). Consideration of development trends is also a key component of a watershed approach, because areas where development is most likely to occur are also areas where compensatory mitigation will be most beneficial.

Datasets that were identified as indicators of this criterion include areas of resource exploration, development, and extraction (i.e., active logging, mining, and oil and gas developments, known mineral deposits, planned major projects), proximity to communities (i.e., municipal and village boundaries, distance to airports and ports) and proximity to transportation corridors (i.e., distance to roads and railroads). Datasets that are indicators of this criterion capture the following considerations of a watershed approach:

- Habitat loss and conversion trends
- Sources of watershed impairment
- Current development trends
- Locational factors
- Potential sites for aquatic resource restoration

3.2 Data Layers

The prioritization strategy uses overlapping data layers to identify areas for compensatory mitigation projects on State-owned aquatic resources. Only areas that have aquatic resources on State-owned landed are included in the analyses. The following data layers were used as the base for determining these areas. Approximately 88 million acres or approximately 5.7 million pixels were determined to be State-owned aquatic resources.

- State-owned land
- U.S. Fish and Wildlife Service National Wetland Inventory mapping of Alaska[2,3]
- U.S. Geological Survey (USGS) National Land Cover mapping[4,5]

[2] U.S. Fish and Wildlife Service. 2017. National Wetland Inventory mapping. Downloaded from https://www.fws.gov/wetlands/Data/Data-Download.html on June 6, 2017.
[3] All polygons except polygons attributed with U (Upland).
[4] Homer, C.G., Dewitz, J.A., Yang, L., Jin, S., Danielson, P., Xian, G., Coulston, J., Herold, N.D., Wickham, J.D., and Megown, K., 2015, Completion of the 2011 National Land Cover Database for the conterminous United States-Representing a decade of land cover change information. *Photogrammetric Engineering and Remote Sensing*, v. 81, no. 5, p. 345-354.
[5] National Land Cover polygons with one of the following attributes: Open Water, Sedge, Herbaceous, Woody Wetlands, or Emergent Herbaceous Wetlands.

In addition to the three base datasets, DNR compiled 47 GIS datasets for the prioritization. Datasets were downloaded from publicly accessible sources and requested from State and federal agencies (including the Alaska Department of Environmental Conservation, Alaska Department of Fish and Game, National Oceanic and Atmospheric Administration, and Alaska Department of Transportation and Public Facilities). Table 1 shows each data set and how each of these data layers helps target areas that meet the preservation criteria as well as achieve the goals of a watershed approach. A list of the datasets used and discussion of their application in the prioritization model is attached as to this document as Appendix A. Detailed information on the datasets and their use in the model, is included in a technical memorandum titled *DNR Prioritization Model Run #1 and Model Design Information*, prepared by HDR Alaska, Inc. (HDR), dated June 1, 2021.

There are several limitations to the data used in the prioritization model. Due to the large scale of the prioritization, a course-scale pixel resolution (pixel resolution of 250 meters) was used. In addition to the resolution, only readily available datasets from publicly accessible sources and cooperating agencies were used. Some datasets do not cover the entire state; generally, data coverage is greater in communities and developed areas. Some datasets used in the prioritization are secondary analyses of primary datasets, which may also reduce the granularity of the input data.

Table 1. Watershed approach considerations of the data layers used in the prioritization

		WATERSHED APPROACH CONSIDERATIONS											
	DATA LAYER	LANDSCAPE POSITION	AQUATIC RESOURCE TYPES	DESIRED AQUATIC RESOURCE FUNCTIONS	HABITAT REQUIREMENTS OF IMPORTANT SPECIES	HABITAT LOSS AND CONVERSION TRENDS	SOURCES OF WATERSHED IMPAIRMENTS	CURRENT DEVELOPMENT TRENDS	REQUIREMENT OF OTHER REGULATORY AND NON-REGULATORY PROGRAMS	LOCATIONAL FACTORS	HISTORIC AND EXISTING AQUATIC RESOURCES	POTENTIAL SITES FOR AQUATIC RESOURCE RESTORATION	CHRONIC ENVIRONMENTAL PROBLEMS
WATERSHED HEALTH IMPACTS	Active Oil and Gas Leases					X	X	X					
	Airstrips and Airports					X	X	X					
	Culverted Streams					X	X	X				X	X
	Federal Timber Harvest					X	X	X				X	
	Fish Processing Sites						X						
	Formerly Used Defense Sites					X	X		X			X	X
	Impervious Surfaces					X	X	X					X
	Incorporated City Boundaries					X	X	X				X	X
	List of Impaired Waters						X		X		X	X	X
	Log Transfer Facilities					X	X	X					X
	Mining Activities					X	X	X				X	X
	Permitted Mixing Zones						X		X				X
	Placer Mine Districts					X	X	X				X	X
	Ports and Harbors					X	X	X				X	X
	Solid Waste Sites						X		X				X
	State Timber Sales					X	X					X	
	Tidal Easements and Leases, and Municipal Tidelands												
	Trails					X	X	X					
IMPORTANT NATURAL RESOURCES	Anadromous Streams	X	X	X	X				X	X	X		
	Coastal Aquatic Resources	X	X	X	X					X	X		
	Eelgrass	X	X	X	X					X	X		
	Essential Fish Habitat – Marine Waters	X	X	X	X				X	X	X		
	Estuarine Streams	X	X	X	X					X	X		
	Federal Conservation System Units			X	X				X				
	Headwater Aquatic Resources	X	X	X						X	X		
	Important Bird Areas			X	X								
	Kelp	X	X	X	X						X		
	Marine Mammal Haulout Sites			X	X				X				
	Salt Marsh Vegetation	X	X	X	X					X	X		
	State Legislatively Designated Areas			X	X				X	X			
	Streams and Waterbodies	X	X	X	X					X	X		
	Threatened, Endangered, and Sensitive Species Critical Habitat			X	X	X	X	X	X			X	X
THREAT OF DEVELOPMENT	Airport or Airstrip					X	X	X				X	
	Electric Lines					X	X	X				X	
	Federal Timber Harvest						X	X				X	
	Incorporated City Boundaries					X	X	X				X	X
	Major Projects					X		X					
	Mining Sites					X	X	X				X	X
	Pipelines					X	X	X				X	
	Placer Mine Districts					X	X	X				X	
	Ports and Harbors					X	X	X		X		X	X
	Private Ownership					X	X	X				X	
	Railroad					X	X	X				X	
	Roads					X	X	X		X		X	
	State Oil and Gas Leases					X	X	X				X	
	State Timber Sales					X	X	X				X	
	Statewide Transportation Improvements					X		X					

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3.3 Site Selection

The prioritization is intended to guide selection of compensatory mitigation sites for the ILFP by producing a GIS-based model that identifies State-owned lands with aquatic resources that meet all three prioritization criteria.

In order to identify appropriate sites for compensatory mitigation, data layers are overlaid in GIS. Depending on the data input, criteria are established to identify the pixels or areas that should be given a value for that variable. A corresponding weight for each variable is also attributed to the pixel. All of the data inputs were then summed for each pixel to get an overall score for the pixel with the highest scoring pixels determined suitable for compensatory mitigation project selection.

The model data input layers were generally used in three different ways: a buffer of the data layer was used to select State-owned aquatic resources adjacent to the data layer; the data layer was intersected with State-owned aquatic resources to select those resources within the data input, or the data input was used to select all State-owned aquatic resources within the same 10-digit Hydrologic Unit Code (HUC).

An example of the use of a buffer is the road input for the “Threat of Development” criteria. All aquatic resources within a buffer of the road are assumed to have a higher threat of development than aquatic resources outside of the buffer.

An example of data inputs intersected with State-owned aquatic resources are important bird areas (IBAs) established by the National Audubon Society for the “Important Natural Resources” criteria. All State-owned aquatic resources intersecting an IBA are assumed to be important natural resources.

The 10-digit HUCs containing the data input were generally used for the “Watershed Health Impacts” categories. This was used for solid waste sites (landfills) to indicate watershed health impacts. The 10-digit HUC containing a solid waste site was assumed to have general watershed impairment and would be preferable for a compensatory mitigation site.

The description of each data layer, its use in the model, and its justification for use in the model are described in Appendix A. The prioritization variables (i.e., size of the buffer and weight of the variable) can be altered at each model run and are described for each model run in an accompanying document. For the initial model run, these parameters are described in the technical memorandum titled DNR *Prioritization Model Run #1 and Model Design Information*. This technical memorandum also describes the output of the model, which identifies where the greatest numbers of input overlap for each SA.

The uneven coverage of the input datasets typically focuses the prioritization more heavily toward communities and developed areas. However, these results are not considered incompatible with the goal of the prioritization. Most previous impacts to aquatic resources within the state have occurred within communities and developed areas. These areas likely

provide greater opportunities for compensatory mitigation activities, such as restoration and enhancement of previously affected resources, or preservation of resources that are important to the health of the watershed.

4.0 Model Results and Analysis

Each time the GIS-based model is run, the model outputs a raster dataset that has values for each pixel (area). The values of each pixel are the sum of the inputs. If the pixel meets the criteria of 5 variables, each with a weight of 1, the value of the pixel will be 5. The highest ranking pixels are the areas that are best suited for compensatory mitigation projects. In additional to this overall score, separate scores for each prioritization criteria (Watershed Health Impacts, Important Natural Resources, and Threat of Development) are also provided in order to ensure that the highest ranking sites meet each one of the criteria. This data can be analyzed within any specified area (i.e., SA, ecoregion, HUC). The range and distribution of the pixels within the region should be evaluated to determine which areas should be examined further as part of the ILFP. For an example of how model results can be analyzed, please refer to the technical memorandum *DNR Prioritization Model Run #1 and Model Design Information*.

If determined appropriate, the model can also be run on a project-specific basis. For larger projects with greater credit demands, it may be beneficial to weight certain characteristics higher. For example, if a project is affecting anadromous fish streams, and agencies determine that this is the primary impact to offset, then the weight of the anadromous fish stream input can be increased to focus compensatory mitigation projects toward those areas.

Appendix A: Data Layers

The prioritization model for the Alaska Department of Natural Resources (DNR) In-Lieu Fee Program (ILFP) uses available existing geospatial datasets to identify those areas of Alaska in which State-owned lands are best suited for compensatory mitigation activities. This appendix provides the rationale for the use of these datasets in the prioritization model from an ecological and regulatory standpoint. This appendix also provides a brief description of the datasets, describes their use in the prioritization model, provides justification for the selection of these datasets as indicators of the prioritization criteria, lists which SAs where they are present, and describes any limitations to the datasets.

Additional details on the datasets, including creation and download dates, are provided in the technical memorandum *DNR Prioritization Model Run #1 and Model Design Information,* dated June 1, 2021, which describes the output of the initial run of the prioritization model.

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Watershed Health Impacts

Active Oil and Gas Leases
Source: DNR – Division of Oil and Gas

Data Description: Statewide active lease boundaries for oil, gas, shallow natural gas, geothermal, and exploration license.

Use in Model: All 10-digit Hydrologic Unit Code (HUC) watersheds that contain an active lease.

Justification: Impacts to aquatic resources from oil and gas activities include direct loss within the footprint of facilities and associated infrastructure, increased sedimentation due to erosion and dust from gravel infrastructure, loss of hydrologic connectivity, and potential introduction of contaminants due to oil spills, vehicle operation, and other chemicals.

Active leases are considered indicative of existing watershed impairment.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X			X	X	X	X	X	X

Limitations: Data is assembled from numerous sources and is to be used for informational purposes only.

Airstrips and Airports
Source: DNR/Alaska State Geo-Spatial Data Clearinghouse (ASGDC)

Data Description: Airstrips and airports.

Use in Model: All 10-digit HUC watersheds that contain an airstrip or airport.

Justification: Airstrips and airports are potential sources of contamination as runoff may carry fuel, oil, deicing fluid, detergents, and other potential pollutants associated with aircraft and ground vehicle operation, maintenance, and repair into the surrounding areas.

Airstrips and airports are considered indicative of existing watershed impairment.

Limitations: All historically active airstrips may not be included.

Culverted Streams
Source: Alaska Department of Fish and Game (ADF&G)

Data Description: Culverts rated “Red” or “Gray” in the ADF&G Fish Passage Inventory Database.

Use in Model: Buffer

Justification: The ADF&G Fish Passage Inventory Database contains data on more than 2,500 stream crossings assessed for fish passage by ADF&G since 2001.[6] ADF&G gives culverts a rating of "Green," "Gray," or "Red," indicating whether conditions at the site are likely to be adequate, may be inadequate, or likely to be inadequate for fish passage, respectively. Culverts that are perched, undersized, damaged, or otherwise impaired can restrict fish passage, cutting fish off from valuable habitat. Underperforming culverts can also cause additional impacts up- and downstream, including ponding and flooding, scour and erosion, and channel migration.

Underperforming culverts can affect aquatic resources within a large distance from the culvert, and are indicative of an impaired watershed.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X		X		X

Limitations: Only culverts that have been surveyed by ADF&G are included in the Fish Passage Inventory Database.

Federal Timber Harvest
Source: U.S. Forest Service (USFS)

Data Description: Area of timber harvest activities that are planned or that have been accomplished through the USFS timber harvest program.

Use in Model: All 10-digit HUC watersheds that contain USFS timber harvest areas.

Justification: Timber harvest activities can result in impacts to aquatic resources through loss of forested wetlands, increased soil erosion, decreased water quality, decreased stream bank stabilization, and reduced and fragmented habitat.

This dataset consists of timber harvest on federal land, which is not included in the ILFP. Aquatic resources within watersheds where timber harvest has occurred are considered likely to have experienced impacts from these activities.

[6] ADF&G. 2017. "Fish Passage Improvement Program: Fish Passage Inventory Database." Accessed at http://www.adfg.alaska.gov/index.cfm?adfg=fishpassage.database on June 1, 2017.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X					X					X

Limitations: Activities are self-reported through the Natural Resource Manager Forest Activity Tracking System.

Fish Processing Sites
Source: Alaska Department of Environmental Conservation (ADEC)

Data Description: Locations of seafood processing locations and discharge points permitted under the Alaska Pollutant Discharge Elimination System permit program.

Use in Model: Buffer

Justification: ADEC issues permits to operators of seafood processing facilities to discharge specific amounts of seafood waste and wastewater.[7] Discharge of large amounts of effluent from seafood processing facilities can cause impacts to aquatic resources, including smothering of substrates and benthic life by accumulation of wastes on the seabed, increased biochemical oxygen demand from bacterial decomposition, increased total suspended solids, increased nutrients that can produce harmful algae blooms, and excessive discharge of fish oil.

Use of this dataset is not intended to capture discharges of seafood waste and wastewater that are allowable under ADEC permits; rather, fish processing sites are considered indicative of existing watershed impairment.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X		X	X	X			X		X

Limitations: Data was developed using best available information, but may differ from conditions on the ground. Only onshore fish processing sites that are permitted to discharge seafood waste and wastewater are included. ADEC also issues permits to offshore seafood processors to discharge in State waters between 0.5 and 3 miles from shore. However, offshore processors do not have a fixed location and could not be included in the prioritization model.

[7] 18 Alaska Administrative Code (AAC) 34

Formerly Used Defense Sites
Source: U.S. Army Corps of Engineers (USACE)

Data Description: Locations of active and closed Formerly Used Defense Sites (FUDS) properties in Alaska. Contains 616 sites within Alaska.

Use in Model: All 10-digit HUC watersheds that contain a FUDS property.

Justification: FUDS are properties that were formerly owned by, leased to, or otherwise possessed by the United States and under the jurisdiction of the Department of Defense (DOD). Many of these properties contain environmental contamination relating to their use by the DOD, and the DOD is responsible for their environmental restoration under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Inclusion of this dataset within the prioritization model is not intended to capture any contamination at FUDS properties, or to suggest that closed FUDS properties require additional restoration beyond what DOD has performed under the requirements of CERCLA; rather, FUDS are considered indicative of previous or existing sources of watershed impairment.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: Dataset is not considered comprehensive.

Impervious Surfaces
Source: USGS –National Land Cover Database (NLCD)

Data Description: The NLCD provides 30-meter resolution classification of land cover and percent impervious surface area based on analysis of Landsat imagery.[8] The percent impervious surface area layer maps impervious surfaces, such as pavement, expressed as a percentage of each pixel. The coverage is statewide.

Use in Model: All 10-digit HUC watersheds with at least 0.05 percent surface area covered by impervious surfaces.

Justification: Impervious surfaces are those areas covered by impenetrable materials or compacted soils that inhibit vegetation growth and eliminate water infiltration and groundwater

[8] Homer, C.G., J.A. Dewitz, L. Yang, S. Jin, P. Danielson, G. Zian, J. Coulston, N.D. Herold, J.D. Wickham, and K. Megown. 2015. Completion of the 2011 National Land Cover Database for the conterminous United States – Representing a decade of land cover change information. *Photogrammetric Engineering and Remote Sensing*. Vol. 81, No. 5, pp. 345-384.

recharge. Depending on landscape position, impervious surfaces are indicative of likely previous aquatic resource loss. Impervious surfaces also increase floodflows, carry pollutants and sediment in runoff, and inhibit groundwater recharge. Increased solar heat collection in impervious surfaces can also heat runoff, raising temperatures and reducing dissolved oxygen in receiving waters.

Increased impervious surfaces within watersheds are considered indicative of existing watershed impairment. These watersheds also contain concentrated developments, where developments are more likely to occur. Of all 10-digit HUC watersheds that have a mapped impervious surface, approximately half have greater than 0.05 percent coverage.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x	x	x	x	x	x

Limitations: Limitations of the NLCD data include low resolution, minimum mapping units that lump smaller cover types into larger and more prevalent cover types, and inherent inaccuracy of imagery-based modeling.[9]

Incorporated City Boundaries
Source: Alaska Department of Community and Economic Development (DCED)

Data Description: The administrative boundaries of all incorporated cities in Alaska, according to DCED.

Use in Model: Any 10-digit HUC that contains an incorporated city.

Justification: Most of the previous development in Alaska has occurred within communities, and likely included previous direct impacts to aquatic resources. Developments within communities also have ongoing primary and secondary impacts to aquatic resources, such as increased runoff and sedimentation, alteration of floodplains and stream channels, and fragmentation of habitats.

The presence of a community is considered one of the top indicators of existing watershed impairment.

[9] USGS. 2017. "Land Cover Data and Modeling." Accessed at https://gapanalysis.usgs.gov/gaplandcover/data/ on May 30, 2017.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: The administrative boundary of a community is generally larger than the developed area within the community. Limited to communities with more than 400 residents. Dataset based on 2002 population data.

List of Impaired Waters
Source: ADEC

Data Description: Waters that have been determined to be impaired under Section 303(d) of the Clean Water Act (CWA).

Use in Model: Any 10-digit HUC that contains an impaired water.

Justification: Section 303(d) of the CWA requires states to develop lists of waters that do not meet water quality standards (WQS) for one or more criteria.[10] Waters that exceed WQS are considered impaired. Alaska WQS are set for 12 pollutants, including fecal coliform bacteria, dissolved oxygen, petroleum products, pH, temperature, and turbidity.[11]

Due to Alaska's sparse population and concentrated developments, the vast majority of the state's water resources are pristine. Waters in urban settings are predominantly impaired from sediment, turbidity, and fecal coliform bacteria contamination caused by urban and stormwater runoff. Other sources of impairment include sediment and turbidity from mining activity (Interior), residues from seafood processing facilities (coastal areas), contaminated military sites (Southcentral and Southwest), bark and wood residues from timber processing and transfer facilities (Southeast), and petroleum products from motorized watercraft, oil spills, and fuel leaks (across the state).[12]

Known impaired waters are likely highly suitable compensatory mitigation sites. Compensatory mitigation activities within impaired waters may also be planned to satisfy water quality improvement requirements under Section 303(d). Impaired waters are also considered indicative of existing watershed impairment. Other aquatic resources within watersheds that contain an impaired water are considered most likely to experience ongoing or future degradation from similar activities. Compensatory mitigation activities within these watersheds

[10] 33 U.S. Code §1313(d)
[11] 18 AAC 70
[12] ADEC. 2013. *Alaska's Final 2012 Integrated Water Quality Monitoring and Assessment Report*.

are likely to provide improvement in quantity and quality of aquatic resources. In 2012, there were 64 waters on Alaska's Impaired Waters list.[13]

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X		X		X	X		X		X

Limitations: Alaska's Impaired Waters list is in the process of being updated.

Log Transfer Facilities
Source: USFS

Data Description: Existing marine access log transfer facility sites on the Tongass National Forest.

Use in Model: Buffer

Justification: Log transfer and storage facilities located in marine and estuarine environments are sources of previous and ongoing impacts to aquatic resource. The types of aquatic resource losses and impacts from log transfer and storage facilities include bark and wood deposited into the marine environment, compression of soil substrate, shading of the water column around facilities, shoreline and intertidal area modifications, and secondary impacts from associated facilities such as fuel transfer sites, camps, and docks.

Log transfer facilities are considered indicative of previous watershed impairment, as they represent areas where timber harvest activities have likely occurred, in addition to being likely sources of impacts to estuarine and marine aquatic resources.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
					X					X

Limitations: Only includes data for the Tongass National Forest. May include proposed log transfer facilities not yet built.

[13] *Ibid.*

Mining Activities
Source: DNR/ASGDC, Bureau of Land Management (BLM)

Data Description: State mining claims, State mining leases, and federal mining claims. Areas with discovered minerals where mineral rights are acquired.

Use in Model: Any 10-digit HUC that contains a State mining claim, State mining lease, or federal mining claim.

Justification: Ownership of mineral rights within a watershed is indicative of watershed impairment. Impacts from mining activities include short-term impacts during construction and long-term impacts resulting from conversion or degradation of aquatic resources. The footprint of the mine and associated facilities, buildings, and roads directly impact wetlands, streams, and waterbodies, and ongoing activities are indicative of overall watershed impairment.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x	x		x	x	x

Limitations: Non-surveyed boundaries plotted based on rough sketches, claimant maps, or physical descriptions.

Permitted Mixing Zones
Source: ADEC

Data Description: Mixing zones authorized under ADEC's wastewater discharge permit program. The mixing zones are for various program sectors, including publicly owned treatment works, seafood processing facilities, and other industrial wastewater discharges.

Use in Model: Buffer

Justification: Permitted discharges to State waters can exceed Alaska WQS within ADEC-approved mixing zones.[14] Waters immediately outside permitted mixing zones are required to meet all water quality criteria. Mixing zones are permitted for municipal wastewater treatment facilities, seafood processors, oil and gas wastewater discharges, mining activities, and cruise ship wastewater discharges. Alaska regulations prohibit mixing zones in spawning areas of anadromous Pacific salmon and certain other fish species.

[14] 18 AAC 70.240

Inclusion of this dataset within the prioritization model is not intended to capture permitted WQS exceedances within mixing zones; rather, mixing zones are considered to be indicative of areas where other activities that may affect aquatic resources are likely occurring.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X		X	X	X	X

Limitations: The dataset does not include all authorized mixing zones within Alaska.

Placer Mine Districts
Source: DNR/ASGDC

Data Description: Placer mine district boundaries referring to a group of geologically or geographically related placer deposits, as derived from published sources or from general usage.

Use in Model: All 10-digit HUC watersheds that contain a placer mine district.

Justification: Due to the fluvial nature of placer deposits, placer mining necessitates in-water activities. Impacts to aquatic resources from placer mining include diversion of streams, withdrawal of water from streams for sluicing, discharge of sediment from sluicing into streams, and other in-stream activities, including operation of heavy machinery and construction of dams, dikes, and settling ponds.

Placer mines are considered indicative of existing watershed impairment. Areas where placer mining has occurred are likely to have also experienced impacts to aquatic resources from these activities.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X		X	X	X	X	X		X	X	X

Limitations: Data provided by DNR is for informational purposes only.

Ports and Harbors
Source: Alaska Department of Transportation and Public Facilities (DOT&PF)

Data Description: Ports and harbors maintained by DOT&PF. Facilities in both marine and riverine environments are included in the dataset.

Use in Model: Buffer

Justification: Ports and harbors are located within communities and near commercial or industrial facilities. These areas are likely to experience onshore development in support of harbor operations. Ports and harbors also frequently require dredging to maintain access. Additionally, harbors are sources of contamination from sources that include spills, accidents, improper disposal of sewage, and regular vessel traffic, maintenance, and operation.

Ports and harbors are transportation hubs for areas of Alaska not connected to the road or rail system. Previous, existing, or future activities that may impact aquatic resources are most likely to occur in proximity to ports and harbors.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x	x		x	x	x

Limitations: This dataset does not include port, harbor, or marina facilities that are privately operated or operated by another entity such as USACE.

Solid Waste Sites
Source: ADEC

Data Description: Solid waste sites (landfills) identified by the ADEC-Solid Waste Program. More than 330 sites are included in this dataset.

Use in Model: All 10-digit HUC watersheds that contain a solid waste site.

Justification: ADEC regulates environmental compliance at landfills and at waste storage, treatment, and disposal facilities.[15] Solid waste sites may be a source of direct and indirect impacts to adjacent and downstream aquatic resources. Potential impacts include surface water and groundwater contamination from leachate, hazardous materials, and bacteria; dispersion of trash via wind, runoff, or scavengers; and explosions or fires caused by gas production.

Solid waste sites are considered indicative of existing sources of watershed impairment. Compensatory mitigation activities may also be targeted to watersheds containing solid waste sites known to cause chronic environmental problems.

[15] 18 AAC 60

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x	x	x	x	x	x

Limitations: This dataset has known inaccuracies and is continuously being updated and corrected.

State Timber Sales
Source: DNR/ASGDC

Data Description: Area of timber sales that have occurred on State land through the Division of Forestry's timber management program, whether for commercial or personal use, competitive or non-competitive.

Use in Model: Intersect

Justification: Timber harvest activities can result in impacts to aquatic resources through loss of forested wetlands, increased soil erosion, decreased water quality, decreased stream bank stabilization, and reduced and fragmented habitat. Previous timber harvest is considered indicative of existing watershed impairment.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x		x			x	x				

Limitations: Data is for informational purposes only and has been extracted from data sets used to produce the State status plats. There are also three legislatively designated State Forests in Alaska: Haines State Forest, Tanana Valley State Forest, and Southeast State Forest. These areas are managed for timber harvest activities, and the associated impacts to aquatic resources are evaluated under the forest management plans. These State Forests are not included in this dataset.

Tidal Easements and Leases, and Municipal Tidelands
Source: DNR/ASGDC

Data Description: Areas of tidal easements, tidal leases, and tidelands that have been sold or conveyed to communities.

Use in Model: Buffer

Justification: The State of Alaska owns most of the tide and submerged lands within 3 miles of the coast. As a general rule, the State cannot sell tidelands, but DNR does issue easements and leases for tidelands. Additionally, coastal communities are allowed to select tidelands necessary for the development of transportation corridors, water-related businesses, and other developments.

Tidal easements and leases and municipal tidelands are generally issued for the purposes of development. They are generally sought in areas in proximity to existing developments. These areas are considered indicative of existing watershed impairment.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x	x		x	x	x

Limitations: Data is converted from the State status plat maps. Data is for informational purposes only.

Trails
Source: DNR/ASGDC

Data Description: Mapped trails, including all-terrain vehicle (ATV), hiking, dog sledding, and multiuse trails.

Use in Model: Buffer

Justification: Establishment of trails can impact aquatic resources by compacting soils, disrupting hydrology, and trampling vegetation. Trails that receive heavy use can cause secondary impacts to aquatic resources due to increased off-trail travel and erosion. Off-trail ATV use is particularly damaging to wetlands and streams, as ATV traffic damages soil and vegetation, disrupts hydrology, and affects spawning habitat.

Trails are considered indicative of existing watershed impairment.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: The dataset does not include all existing trails. Unofficial trails that receive regular use may not be included.

Important Natural Resources

Anadromous Streams
Source: ADF&G

Data Description: Streams included in ADF&G's *Anadromous Waters Catalog* (AWC).

Use in Model: Buffer

Justification: The AWC currently contains more than 19,000 streams, rivers, and lakes around Alaska that have been specified as important for the spawning, rearing, or migration of anadromous fish.[16] Waters included in the AWC support anadromous fish species, primarily Pacific salmon, but also Dolly Varden, cutthroat and steelhead trout, Bering cisco, eulachon, whitefish, and lamprey. In addition to the functions and values provided by aquatic resources within floodplains and riparian areas, those resources adjacent to anadromous streams perform additional anadromous species and fish and wildlife support functions.

Aquatic resources in proximity to anadromous streams are considered important natural resources.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: The AWC contains anadromous waters that have been sampled and nominated for inclusion to date, but the dataset is not considered comprehensive and does not capture all anadromous habitat. Areas of the state where more sampling has been conducted have a larger number of documented anadromous streams. Anadromous lakes and ponds are not included in this dataset.

Coastal Aquatic Resources
Source: DNR/ASGDC

Data Description: Aquatic resources in proximity to the coast. Estuarine and freshwater wetlands are included. These areas are identified using an inland buffer of Alaska's coastline.

Use in Model: Buffer (inland from coastline).

Justification: Coastal aquatic resources are located where saltwater and freshwater ecosystems converge. Their location relative to the coast typically allows these areas to perform specific

[16] ADF&G. 2017. "Anadromous Waters Catalog – Overview." Accessed at https://www.adfg.alaska.gov/sf/SARR/AWC/ on June 1, 2017.

functions, including shoreline protection, erosion reduction, floodflow moderation, water filtration, and fish and wildlife habitat.

Aquatic resources in proximity to coastal areas are considered important natural resources.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: The Alaska coastline is mapped at a course (1:63,360) that does not account for the complexities of the Alaska coast.

Eelgrass

Source: National Oceanic and Atmospheric Administration (NOAA)/ National Marine Fisheries Service (NMFS)

Data Description: Eelgrass beds mapped in the Alaska ShoreZone Coastal Mapping system. The Alaska ShoreZone Coastal Mapping system classifies Alaska's coastline by both geomorphic and biological resources.[17] This dataset shows the length of shoreline cataloged as eelgrass beds.

Use in Model: Buffer (seaward buffer of coastline mapped as eelgrass beds).

Justification: Eelgrass beds are an aquatic habitat of special concern. They provide habitat for many species of fish and invertebrates, particularly spawning habitat and rearing habitat for juveniles, as they are productive communities and provide refuge from predators.

Eelgrass beds are considered important natural resources.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X		X	X	X			X		X

Limitations: Dataset covers only areas surveyed and classified by Alaska ShoreZone Coastal Mapping. Alaska ShoreZone Coastal Mapping classifies the length of the coastline based on

[17] NOAA NMFS, Alaska Regional Office. 2017. "Alaska ShoreZone Coastal Mapping and Imagery." Accessed at https://alaskafisheries.noaa.gov/habitat/shorezone on June 1, 2017.

both physical habitat and the associated biota. A strict buffer of the coastline may under-represent the area of eelgrass habitats in some areas and may over-represent it in others.

Essential Fish Habitat – Marine Waters
Source: NOAA

Data Description: Mapped Essential Fish Habitat (EFH) for federally managed species.

Use in Model: Intersect. Three different marine areas were categorized: areas providing EFH for 1–5 species, areas providing EFH for 6–15 species, and areas providing EFH for 16–25 species.

Justification: EFH refers to areas federally designated as habitat for species that are federally managed under the Magnuson-Stevens Fishery Conservation and Management Act. These areas support species spawning, rearing, and feeding, and may include areas that provide many important functions, are sensitive to decline, are under stress from development, or represent rare habitat types. In Alaska, the North Pacific Fishery Management Council has designated EFH for 39 species of fish, crab, and mollusks under six fishery management plans.[18,19,20,21,22,23] For the purposes of this prioritization model, if an area was designated as essential for any life stage of a particular species, it was considered EFH for that species.

Areas designated as EFH are considered important natural resources.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X		X	X	X			X	X	X

Limitations: Marine EFH has been designated for 39 species of fish, crab, and mollusks. Freshwater EFH for federally managed species is not covered in this dataset.

Estuarine Streams
Source: U.S. Fish and Wildlife Service (USFWS)

[18] North Pacific Fishery Management Council. 2009. Fishery Management Plan for Fish Resources of the Arctic Management Area.
[19] North Pacific Fishery Management Council. 2017. Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area.
[20] North Pacific Fishery Management Council. 2016. Fishery Management Plan for Groundfish of the Gulf of Alaska.
[21] North Pacific Fishery Management Council. 2011. Fishery Management Plan for Bering Sea/Aleutian Islands King and Tanner Crabs.
[22] North Pacific Fishery Management Council. 2014. Fishery Management Plan for the Scallop Fishery off Alaska.
[23] North Pacific Fishery Management Council. 2012. Fishery Management Plan for the Salmon Fisheries in the EEZ off Alaska.

Data Description: Estuarine streams mapped in USFWS's National Wetlands Inventory (NWI) mapping.

Use in Model: Buffer

Justification: Estuarine areas perform important functions that maintain aquatic resources up- and downstream. Estuarine streams and aquatic resources adjacent to them are important fish nurseries, perform water quality enhancement functions, and protect inland areas from erosion and flooding.

Aquatic resources in proximity to estuarine streams are considered important natural resources.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x		x	x	x	x

Limitations: For Alaska, NWI mapping is conducted at a coarse scale (1:63,360) that does not capture all aquatic resources. NWI mapping has not been produced for the entire state.

Federal Conservation System Units
Source: DNR/ASGDC

Data Description: The boundaries of units within the federal conservation system, which includes the National Park System, the National Wildlife Refuge System, the National Wild and Scenic Rivers System, the National Trails System, the National Wilderness Preservation System, and the National Forest Monument System.

Use in Model: Buffer

Justification: State lands are located within and adjacent to the boundaries of federal conservation system units. State lands in proximity to these areas likely contain aquatic resources similar to the valuable resources protected within the units and provide important habitat connectivity.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x	x	x	x	x	x

Limitations: Dataset does not include all of the Alaska Maritime Wildlife Refuge and does include the National Petroleum Reserve of Alaska (which is not considered a federal Conservation System Unit). Data has been compiled from different sources at different scales. Data is for informational purposes only and should generally be used at a 63,360 scale.

Headwater Aquatic Resources
Source: USGS

Data Description: Smaller watersheds, as defined by USGS, that are located at the upper reaches of large watersheds.

Use in Model: 10-digit HUC watersheds intersecting 4-digit HUC watershed boundaries, and 12-digit HUC watersheds intersecting the boundary of 6-digit HUC watersheds. HUCs directly adjacent to the coast are not included.

Justification: Aquatic resources located at the headwaters of streams are important for maintaining base flows of large rivers and for transporting sediment, organic matter, organisms, and nutrients critical to downstream ecosystems.

Headwater aquatic resources located at the headwaters of rivers and streams are considered important natural resources.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x	x		x	x	x

Limitations: Only headwaters of 4-digit and 6-digit HUCs are included within the dataset. Dataset was created at course scale (1:63,360). Watersheds that contain stream headwaters and the stream's confluence with marine waters are not included.

Important Bird Areas
Source: National Audubon Society

Data Description: Important Bird Areas (IBAs).

Use in Model: Intersect

Justification: IBAs are recognized at state, continental, and global levels as the most important places for bird populations. They include areas that are important to species of conservation concern, areas that support species with restricted ranges or habitats, and areas that support large congregations of individuals from multiple species. Many IBAs in Alaska include large wetland complexes that provide waterfowl breeding and migration staging areas.

IBAs identify habitat requirements of important species, but IBA designation does not confer any formal protection or conservation status. This dataset identifies areas that include important natural resources but that may not be protected accordingly.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: There are large gaps in spatial data, especially on non-federal lands. Not all IBAs have been identified.

Kelp
Source: NOAA/NMFS

Data Description: Canopy kelp beds mapped in the Alaska ShoreZone Coastal Mapping system. This dataset shows the length of shoreline cataloged as partial or complete coverage of bull kelp, dragon kelp, and giant kelp.

Use in Model: Buffer (seaward buffer of coastline mapped as kelp beds)

Justification: Canopy kelp beds are important for many species of marine organisms. They have a dramatic impact on the strength of ocean currents, creating important spawning and rearing habitat for fish and invertebrates, as well as feeding habitat for sea otters and other large marine mammals.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X				X			X		X

Limitations: Alaska ShoreZone Coastal Mapping classifies the length of the coastline based on both physical habitat as well as the associated biota. A buffer applied to both the complete and partial coverage classifications will likely over-represent the actual areas of kelp beds. Data does not exist for the entire Alaskan coastline.

Marine Mammal Haulout Sites
Source: NOAA/NMFS

Data Description: Mapped marine mammal haulout sites as part of NMFS Office of Response and Restoration Environmental Sensitivity Index Maps. Marine mammal haulout sites are

digitally available for the following regions: Aleutian Island, Bristol Bay, Cook Inlet and Kenai Peninsula, Kodiak Island and Shelikof Straight, Northwest Arctic, Prince William Sound, and Southeast Alaska.

Use in Model: Buffer (seaward from haulout site)

Justification: Haulouts are important habitat where pinnipeds (seals, sea lions, fur seals, and walruses) mate, give birth, rest, avoid predators, and engage in social interactions. For Endangered Species Act (ESA)-listed species, haulouts are protected critical habitat. For other marine mammal species, congregations of individuals are protected under the Marine Mammal Protection Act.

Haulouts are mostly rocky outcrops or prominences on islands and coasts. Marine aquatic resources in proximity to marine mammal congregations provide important foraging habitat for marine mammals.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
	x		x	x	x			x	x	x

Limitations: Dataset includes only regions mapped by Environmental Sensitivity Index Maps. Data includes marine aquatic resources.

Salt Marsh Vegetation
Source: NOAA/NMFS

Data Description: Areas mapped as salt marsh in the Alaska ShoreZone Coastal Mapping system. This dataset shows the length of shoreline cataloged as partial or complete coverage of sedges, salt marsh vegetation, and salt marsh.

Use in Model: Buffer

Justification: Wetlands in coastal areas perform specific functions based on their landscape position, including shoreline protection, erosion reduction, floodflow moderation, water filtration, and fish and wildlife habitat.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x	x	x	x	x	x

Limitations: Alaska ShoreZone Coastal Mapping classifies the length of the coastline based on both physical habitat as well as the associated biota. A buffer applied to both the complete and partial coverage classifications will likely over-represent the actual areas of salt marsh. Data does not exist for the entire Alaska coastline.

State Legislatively Designated Areas
Source: DNR/ASGDC

Data Description: The boundaries of Legislatively Designated Areas (LDAs). These areas are established for management of forest, recreational, and historical purposes in order to protect and preserve natural habitat for fish and/or wildlife.

Use in Model: Buffer

Justification: Approximately 12 million acres of State-owned land is included within LDAs. These areas have been designated by the Alaska State Legislature for special uses, and include refuges, sanctuaries, critical habitat areas, ranges, special management areas, forests, parks, recreation areas, preserves, public use areas, recreation rivers, and recreational mining areas. LDAs are managed according to the requirements of the legislation specific to the site and the general class of LDA, and any subsequent management plans or regulations that implement the requirements of the legislation.

Land use and management within LDAs is legislatively designated. State lands in proximity to these areas likely contain resources similar to the valuable resources protected within the LDA. State lands preserved in the vicinity of existing LDAs may be able to be managed concurrently.

As of 2014, the Alaska State Legislature has designated 34 State Wildlife Areas (excluding joint State/national refuges) totaling 3,427,895 acres, 52 State Park Areas totaling 3,357,393 acres, 3 State Forest Areas totaling 2,280,872 acres, and 14 other State Multiple Use Areas totaling 2,915,979 acres. The total acreage of land within the boundaries of these areas (excluding joint State/national refuges) is 11,982,139 acres.[24]

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: Couse-scale data provided for informational purposes only.

Streams and Waterbodies
Source: DNR/ASGDC

[24] DNR Division of Mining, Land & Water. 2014. “Fact sheet: State of Alaska Legislatively Designated Areas.” September 2014.

Data Description: Alaskan streams mapped through Environmental Systems Research Institute, Inc., Digital Chart of the World.

Use in Model: Buffer

Justification: Rivers, streams, and waterbodies and their associated floodplains and riparian areas contain valuable aquatic resources that perform many important services and functions, including floodflow moderation, reduction of erosion and sedimentation, groundwater recharge and discharge, nutrient export, and fish and wildlife habitat.

Aquatic resources in proximity to rivers, streams, and waterbodies are considered important natural resources.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: The data is mapped at a course scale (1:1,000,000) and is not a comprehensive coverage of all Alaska streams and waterbodies.

Threatened, Endangered, and Sensitive Species Critical Habitat
Source: USFWS, NMFS

Data Description: Federally designated critical habitat for species listed under the ESA.

Use in Model: Intersect

Justification: Under the ESA, USFWS and the NOAA/NMFS designate certain geographic areas as critical habitat for ESA-listed species. Critical habitat is the specific areas that contain the physical or biological features essential to the conservation of threatened and endangered species. Aquatic resources within critical habitat provide direct and indirect support functions to ESA-listed species and their habitat.

Critical habitat has been designated for seven ESA-listed species in Alaska: spectacled eider,[25] Steller's eider,[26] Steller sea lion (western Distinct Population Segment [DPS]),[27] North Pacific right whale,[28] beluga whale (Cook Inlet DPS),[29] northern sea otter (Southwest Alaska DPS),[30] and polar bear.[31]

[25] 66 *Federal Register* (FR) 9146-9185 (2001)
[26] 66 FR 8850-8884 (2001)
[27] 64 FR 14052-14077 (1999)
[28] 73 FR 19000-19014 (2008)
[29] 76 FR 20180-20214 (2011)
[30] 74 FR 51988-52012 (2009)
[31] 75 FR 76086-76137 (2010)

Aquatic resources within designated critical habitat are considered important natural resources.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x		x	x	x	x

Limitations: Dataset includes only species for which critical habitat has been designated; many threatened, endangered, and sensitive species within Alaska do not have designated critical habitat.

Threat of Development

Airport or Airstrip
Source: DNR/ASGDC

Data Description: The data depicts airports, airstrips, and runway locations from USGS quadrangles.

Use in Model: Buffer

Justification: In many communities not connected to the road system, air travel is the primary form of transportation and method of delivering goods and materials. Developments are more likely to occur in proximity to airports or airstrips.

The proximity of airports and airstrips to communities is indicative of likely development in the area surrounding the facility.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x	x	x	x	x	x

Limitations: All historically active airstrips may not be included. Information was digitized from 1:24,000, 1:63,360, and 1:250,000 USGS quadrangles.

Electric Lines
Source: DNR/ASGDC

Data Description: Mapped electric lines from USGS quadrangles.

Use in Model: Buffer

Justification: Electric lines represent connections to existing power sources. Developments are more likely to occur in proximity to a power supply.

Aquatic resources on State-owned land near electric lines are considered more likely to experience impacts from development.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X		X	X	X	X		X

Limitations: Information was digitized from 1:24,000, 1:63,360, and 1:250,000 USGS Quadrangles.

Federal Timber Harvest
Source: USFS

Data Description: Area of timber harvest activities that are planned or that have been accomplished through the USFS timber harvest program.

Use in Model: Intersect

Justification: Timber harvest activities can result in impacts to aquatic resources through loss of forested wetlands, increased soil erosion, decreased water quality, decreased stream bank stabilization, and reduced and fragmented habitat.

This dataset consists of timber harvest on federal land, which is not included in the ILFP. Aquatic resources adjacent to areas where a federal timber harvest is planned are considered to be under threat of degradation.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X					X					X

Limitations: Activities are self-reported through the Natural Resource Manager Forest Activity Tracking System. Includes areas where timber harvest may have already occurred.

Incorporated City Boundaries
Source: DCED

Data Description: The administrative boundaries of all incorporated cities in Alaska, according to DCED.

Use in Model: Buffer

Justification: Most of the development in Alaska has occurred within communities, and land use trends across the state are toward increased urbanization. As more of Alaska's population becomes concentrated in cities and towns, increased development and infrastructure will impact aquatic resources within and near population hubs.

Land within and near communities is considered likely to experience impacts from development.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: The administrative boundary of a community is generally larger than the developed area within the community. Limited to communities with greater than 400 residents. Dataset based on 2002 population data.

Major Projects
Source: Publicly available data

Data Description: Proposed "major projects." This dataset includes the most recent publicly available estimates of the areas of impact for the following projects: Susitna-Watana Hydroelectric Project, Pebble Project, Ambler Mining District Industrial Access Project, Alaska Liquefied Natural Gas Project, Juneau Access Improvements Project, Alberta to Alaska Railroad, West Susitna Access, King Cove Road, Pikka project, and Donlin Gold.

Use in Model: Buffer

Justification: "Major Projects" are commonly understood to be large-scale projects that require significant amounts of investment in both planning and design, as well as construction, to develop. Projects may be proposed and financed by the State or private companies, or may be "Public-Private Partnerships." The included projects range from resource development and energy production to transportation links and access projects. All projects would result in direct impacts to aquatic resources within their footprints, as well as within the footprints of any associated infrastructure, and would likely result in secondary impacts to aquatic resources as well.

Development of these projects is highly dependent on many factors, including economic and political environments, and the included projects are not certain to be developed within the next 5 to 10 years. However, many of these projects have been studied and planned, and could move forward quickly if market conditions change.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X			X	X	X			X

Limitations: This dataset includes a select list of projects and does not capture all "major projects" that have been proposed. The publicly available estimates of the areas of impact are planning level data.

Mining Sites
Source: DNR, BLM, and USGS

Data Description: State mining claims, State mining leases, federal mining claims, and significant metalliferous lode deposit locations. Areas with discovered minerals where mineral rights may or may not be acquired.

Use in Model: Buffer

Justification: Construction of mines and expansion of existing mines are the most likely sources of impacts to aquatic resources. Construction of new mines includes short-term impacts during construction and long-term impacts resulting from conversion or degradation of aquatic resources. The footprint of the mine and associated facilities, buildings, and roads directly impact wetlands, streams, and waterbodies.

Continued exploration of deposits occurs concurrently with active mining operations, as the mining infrastructure already in place reduces the high cost of exploring new deposits. Mining exploration projects also represent sources of likely impacts to aquatic resources, although development of prospects depends strongly on commodities prices and market conditions.

Aquatic resources adjacent to significant metalliferous lode deposits, as well as an acquired federal or State mining claim, are considered under threat of degradation from development or exploration.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X		X	X	X

Limitations: This dataset does not capture potential leases and claims.

Pipelines
Source: DNR/ASGDC

Data Description: Mapped pipelines from USGS quadrangles.

Use in Model: Buffer

Justification: Pipelines carry oil, natural gas, and associated fluids, and connection to pipelines is critical for oil and natural gas exploration and development. Developments are more likely to occur in proximity to pipelines.

Aquatic resources on State-owned lands near pipelines are considered more likely to experience impacts from future development.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X	X	X	X	X

Limitations: Information was digitized from 1:24,000, 1:63,360, and 1:250,000 USGS quadrangles.

Placer Mine Districts
Source: DNR/ASGDC

Data Description: Placer mine district boundaries referring to a group of geologically or geographically related placer deposits, as derived from published sources or from general usage.

Use in Model: Intersect

Justification: Due to the fluvial nature of placer deposits, placer mining necessitates in-water activities. Impacts to aquatic resources from placer mining include diversion of streams, withdrawal of water from streams for sluicing, discharge of sediment from sluicing into streams, and other in-stream activities, including operation of heavy machinery and construction of dams, dikes, and settling ponds.

Placer mine districts are indicative of where impacts to aquatic resources may occur.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X		X	X	X	X	X		X		X

Limitations: Data provided by DNR is for informational purposes only.

Ports and Harbors
Source: DOT&PF

Data Description: Ports and harbors maintained by DOT&PF.

Use in Model: Buffer

Justification: Ports and harbors are located within communities and near commercial or industrial facilities. These areas are likely to experience onshore development in support of harbor operations. Ports and harbors also frequently require dredging to maintain access. In coastal communities, marine traffic is a primary form of transportation and method of delivering goods and materials. Ports and harbors also support resource development opportunities such as mines. Facilities in both marine and riverine environments are included in the dataset.

The presence of ports and harbors is indicative of likely development in the area surrounding the facility.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X		X	X	X

Limitations: This dataset does not include port, harbor, or marina facilities that are privately operated or operated by another entity, such as USACE.

Private Ownership
Source: DNR/ASGDC

Data Description: All privately owned lands.

Use in Model: Buffer

Justification: Privately owned land is owned by entities other than federal, State, or Native Corporations. This includes Native allotments, municipalities, and land owned by private citizens. There are few restrictions or constraints on developing privately owned land for residential and commercial uses in Alaska, although permitting and zoning requirements vary between communities.

Due to the limited amount of privately owned available land, private ownership is considered an indicator of likely development. Aquatic resources on State-owned lands near existing or future private developments are considered more likely to experience impacts from development.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X		X	X	X	X	X		X	X	X

Limitations: Data resolution is at the Public Land Survey System section level.

Railroad
Source: DNR/ASGDC

Data Description: Mapped railroads from ESRI's Digital Chart of the World.

Use in Model: Buffer

Justification: Railroads represent an efficient way to move bulk goods, materials, and equipment. Land and resources in proximity to existing roads are more easily developed.

Aquatic resources on State-owned land near railroads are easier to access than remote locations and are considered more likely to experience impacts from future development.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X					X	X				X

Limitations: The scale of the data is 1:1,000,000.

Roads
Source: DNR/ASGDC

Data Description: Mapped major roads.

Use in Model: Buffer

Justification: While Alaska's road system is limited, roads provide access to many areas and allow for easy transport of goods, materials, and equipment. Land and resources in proximity to existing roads are more easily developed.

Aquatic resources on State-owned land near roads are easier to access than remote locations and are considered more likely to experience impacts from development.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
x	x	x	x	x	x	x	x	x	x	x

Limitations: Scale of the data is 1:1,000,000 and includes only major roads. Smaller roads, non-DOT&PF-maintained roads, and privately owned roads are not included.

State Oil and Gas Leases
Source: DNR – Division of Oil and Gas

Data Description: Active oil and gas leases and statewide lease sale boundaries identified in the Five-Year Oil and Gas Leasing Program.

Use in Model: Intersect

Justification: Construction of new oil and gas extraction fields, as well as expansion of existing fields, is the most likely source of impacts to aquatic resources from oil and gas activities. Development of new fields and associated infrastructure depends strongly on oil and gas prices and market conditions, as new fields will require significant investment to develop required infrastructure. Development of new production wells closer to existing infrastructure (e.g., roads, pipelines, production facilities, and worker housing) reduces the high cost of new developments.

All active State oil and gas leases are within two units: North Slope and Cook Inlet. Leases identified in the Five-Year Oil and Gas Leasing Program are within five units: North Slope, Cook Inlet, Alaska Peninsula, Beaufort Sea, and North Slope Foothills.

Aquatic resources in proximity to active oil and gas leases and prospective oil and gas leases are considered likely to be affected by future exploration and development activities.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X				X	X	X	8	X

Limitations: Dataset is for informational purposes only and is not a legal record.

State Timber Sales
Source: DNR/ASGDC

Data Description: Area of timber sales that have occurred on State land through the Division of Forestry's timber management program, whether for commercial or personal use, competitive or non-competitive.

Use in Model: Buffer

Justification: Timber harvest over purchased areas, expansion of previous timber harvest, or development of associated infrastructure is a likely source of impacts to aquatic resources from timber activities.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X		X			X	X	X			X

Limitations: Data is for informational purposes only and has been extracted from data sets used to produce the State status plats. Includes historical data that may no longer be under threat.

Statewide Transportation Improvements
Source: DOT&PF and Alaska DNR

Data Description: Locations of all physical projects included in the 2020-2023 Statewide Transportation Improvement Program (STIP) and in the Arctic Strategic Transportation and Resources (ASTAR) project.

Use in Model: Buffer

Justification: DOT&PF manages the STIP, a 4-year program that identifies priority transportation projects and improvements across the state.[32] Construction of new transportation infrastructure (e.g., roads, docks, and ferry terminal buildings) and expansion or improvement of existing infrastructure (e.g., road widening, bridge replacements, and dock relocations) are likely to result in impacts to aquatic resources. Projects with new footprints may fill aquatic resources, alter hydrology, increase runoff from impervious surfaces, and introduce contaminants from vehicles and equipment during construction and use. Additionally, new and improved transportation infrastructure will facilitate further development of land and resources via improved access. Aquatic resources in proximity to planned and federally funded transportation projects included in the STIP are considered likely to be affected by development of the projects.

Alaska DNR has initiated the Arctic Strategic Transportation and Resources (ASTAR) project in order to identify projects to connect communities and develop infrastructure within the entire North Slope Region. Aquatic resources in proximity to these state funded transportation projects included in the ASTAR project are considered likely to be affected by development of the projects.

Service Area Presence:

Alaska Range Transition	Aleutian Meadows	Arctic Tundra	Bering Taiga	Bering Tundra	Coastal Rainforests	Intermontane Boreal	Beaufort Sea	Bering Sea	Chukchi Sea	Gulf of Alaska
X	X	X	X	X	X	X		X	X	X

Limitations: STIP Dataset does not include projects involving airports or non-ferry-related ports and harbors. STIP projects may involve road improvements within the current footprint of the highway that would not result in any additional impact to aquatic resources.

ASTAR projects are planning level only with multiple corridors identified for development.

[32] DOT&PF. 2020. 2020-2023 Statewide Transportation Improvement Program. Approved December 1, 2020.