MANAGEMENT PLAN
2021-2026

This management plan has been developed in accordance with NOAA regulations, including all provisions for public involvement. It is consistent with the congressional intent of Section 315 of the Coastal Zone Management Act of 1972, as amended.

Table of Contents

Acronyms

AAC – Alaska Administrative Code
ACCS – Alaska Center for Conservation Science (UAA)
ADEC – Alaska Department of Environmental Conservation
ADF&G – Alaska Department of Fish and Game
ADNR – Alaska Department of Natural Resources
ADOT – Alaska Department of Transportation
AMHT – Alaska Mental Health Trust
DPOR – Division of Parks and Outdoor Recreation, ADNR
AIOVC – Alaska Islands and Ocean Visitor Center
AMNWR – Alaska Maritime National Wildlife Refuge
AOOS – Alaska Ocean Observing System
AS – Alaska Statute
BAL – Bay Avenue Laboratory, KBNERR
BLM – U.S. Bureau of Land Management
CACS – Center for Alaskan Coastal Studies
CCFHR – Center for Coastal Fisheries and Habitat Research
CDMO – Centralized Data Management Office, NERRS
CESU – Cooperative Ecosystem Studies Unit
CFR – Code of Federal Regulations
CHA – Critical Habitat Area
CIRCAC – Cook Inlet Regional Citizens Advisory Council
CRRC – Chugach Regional Resources Commission
CTP – Coastal Training Program
CWA – Clean Water Act
CZMA – Coastal Zone Management Act
DML&W – Division of Mining, Land and Water, ADNR
DOA – Division of Agriculture, ADNR
DPOR (or 'State Parks') – Division of Parks and Outdoor Recreation, ADNR
EPA – U.S. Environmental Protection Agency
EVOS – Exxon Valdez Oil Spill
GIS – Geographic Information System
HAB – Harmful Algal Bloom
HSWCD – Homer Soil and Water Conservation District
KAP – Kenai Area Plan
KBEEA – Kachemak Bay Environmental Education Alliance
KBL – Kasitsna Bay Laboratory
KBNERR – Kachemak Bay National Estuarine Research Reserve
KBSC – Kachemak Bay Science Conference
KBSP – Kachemak Bay State Park
KBSWP – Kachemak Bay State Wilderness Park, ADNR DPOR
KEEP – K-12 Estuarine Education Program
KGKP (or 'Project GRAD') – Project GRAD Kenai Peninsula
KHLT – Kachemak Heritage Land Trust
KPB – Kenai Peninsula Borough
KPBSD – Kenai Peninsula Borough School District
KPC – Kenai Peninsula College
KPFHP – Kenai Peninsula Fish Habitat Partnership
LDA – Legislatively Designated Areas
LiDAR – Light Detection and Ranging
MAPP – Mobilizing for Action through Planning and Partnerships
MOU – Memorandum of Understanding
NITC – Naturalist in the Classroom
NCCOS – National Center for Coastal and Ocean Sciences, NOAA

NERR – National Estuarine Research Reserve
NERRA – National Estuarine Research Reserve Association
NERRS – National Estuarine Research Reserve System
NGO – Non-Governmental Organization
NOAA – National Oceanic and Atmospheric Administration
NOS – National Ocean Service, NOAA
OA – Ocean Acidification
OCM – Office for Coastal Management, NOAA
PAC – Procurement, Acquisition, Construction
PWSRCAC – Prince William Sound Regional Citizens Advisory Council\
PWSSC – Prince William Sound Science Center
R&M – Research and Monitoring, KBNERR
SCUBA – Self Contained Underwater Breathing Apparatus
SEAS – School for Environment and Sustainability, UM
SNA – Seldovia Native Association
SWMP – System-Wide Monitoring Program
TOTE – Teachers on The Estuary
UA – University of Alaska
UAA – University of Alaska, Anchorage
UAF – University of Alaska, Fairbanks
UM – University of Michigan
USACE – United States Army Corps of Engineers
USC – United States Code
USFWS – United States Fish and Wildlife Service

List of figures

List of tables

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Executive summary

Plan purpose and scope[1]

This plan provides a framework to guide NERR activities for the period 2021-2026. It applies to lands and water within KBNERR boundaries and is intended to inform not only the Reserve but also partners and stakeholders. The plan focuses on the Reserve's core activities—Research, Monitoring, Education, and Training. In particular, the Reserve Strategic Plan articulates goals, objectives, and specific strategic actions that core programs will pursue during the plan's five-year timeframe. This will enable KBNERR, and state and federal partners at the University of Alaska Anchorage (UAA), and NOAA to track program progress and success in achieving stewardship outcomes and realize opportunities for improvement and growth. Finally, this plan can guide evaluations of KBNERR operations and accomplishments under Section 312 and 315 of the CZMA and enable the Reserve to acquire construction and program funds.

Reserve Context

The staff of the Reserve recognize that we are long-term visitors to this borderland of the Dena'ina and Sugpiaq people. We have learned these shores are called Tuggeht by the Dena'ina, by the bay named Qacimak by the Sugpiaq. We are thankful for past and present stewardship of the waters, the plants and animals of this place.

The 372,000-acre KBNERR was established in 1999 and is headquartered in the city of Homer on the Kenai Peninsula, Alaska. Like other National Estuarine Research Reserves (NERRs), KBNERR is a state/federal partnership responsive to local needs. In Alaska, this partnership brings together UAA's ACCS, as the lead agency for managing the Reserve, and NOAA's OCM. This partnership is strengthened by the involvement of other state and federal agencies, divisions of local (city of Homer) and borough (Kenai Peninsula Borough [KPB]) governments, tribes (Ninilchik Traditional Council, Seldovia (*Angagkitaqnuuq)*, Tyonek (*Qaggeyshlat)*, Chugachmiut and Cook Inlet Regional Corporations) and a variety of statewide, regional, and community organizations representing the full breadth of stakeholder interests, from education to resource use and management and conservation. A Community Council provides guidance, feedback, and support reflecting local community perspectives on issues, concerns, priorities, and partnerships.

Priority Management Issues and Reserve Goals

The KBNERR is the NERR system's only glacial fjord type estuary. Kachemak Bay represents a diverse cross-section of the habitats and peoples that comprise the northern Gulf of Alaska biogeographic region. As a result, KBNERR has the opportunity and responsibility to research, monitor, and outreach information to encourage stewardship of this area. The priorities that drive these actions are the need for:

- Understanding Environmental Change
- Understanding Land Use and Human Impacts
- Community Relevant Engagement
- Long-Term Ecosystem Monitoring

Over the next 5 years, KBNERR will focus its programmatic energies on the three goals listed below. These reflect local and regional priorities and are supported by objectives and strategies outlined in section 3 Reserve strategic plan. These goals dovetail with those of KBNERR's state and federal partners and incorporate NOAA's focus on climate resilience—including understanding climate processes, adapting to changing conditions, and mitigating effects.

- Goal 1: Conduct monitoring and research to develop knowledge relevant to coastal communities.
- Goal 2: Provide opportunities for all learners to improve coastal science literacy.
- Goal 3: Build capacity for coastal stewardship through information exchange, skills-building, and partnerships.

[1] This management plan was drafted in accordance with *Reserve System Management Plan Guidelines and Resources – 2013* (NOAA NERRS) and *The National Estuarine Research Reserve System Strategic Plan 2017-2022*, (NOAA Office of Coastal Management).

This plan reflects an adaptive management strategy—as new information becomes available the plan can be amended to incorporate and adapt through required annual and five-year reviews. KBNERR assesses their success by tracking evaluation metrics specific to their programs. The evaluation metrics include a five-year target and provide a quantitative reference for each program about how well it is meeting the goals and objectives it has identified as important to the program. Adaptive strategies recognize the dynamic nature of coastal and marine environments and help promote resilience and sustainability of these ecosystems so that they can provide services and benefits to local communities and other stakeholders.

The success of this plan depends on the skills, creativity, and commitment of Reserve staff and on appropriate support from local, state, and federal partners. With effective planning and execution, KBNERR will continue to be a leader in coastal research, monitoring, education, and training throughout Southcentral Alaska.

Reserve Niche

The fundamental elements of the Reserve's niche are:

- KBNERR research is place-based and regionally meaningful—focused on conditions and processes in, around, and affecting Kachemak Bay and surrounding areas;
- KBNERR respects the needs of its many audiences—data collected and shared is timely, high quality, useful and relevant to, and understandable by, students, local communities, decision-makers, and other audiences;
- KBNERR values partnerships and works collaboratively with diverse partners including agencies, tribes, non-profits, private sector, academia, and policy makers.
- KBNERR is non-regulatory, but designed to provide high-quality information to a spectrum of decision makers to better inform local and regional land management and natural resource management

Program Overview

KBNERR integrates research, monitoring, education, and training activities for improving the scientific understanding and management of natural resources in and around Kachemak Bay. Reserve programs consist of required activities supported by NERRS, including Research and Education coordination, and maintaining NERR initiatives, including the System Wide Monitoring Program (SWMP), a Coastal Training Program (CTP), a K-12 Estuarine Education Program (KEEP), and Teachers on the Estuary (TOTE) Training. Reserve activities are responsive to community needs, informing and encouraging resource stewardship practices that will maintain the ecosystem services of this area. The collaborative nature of Reserve programs, both among staff and with our partners, allows the Reserve to accomplish much more programmatically than funding would permit if all activities were conducted in isolation of each other.

1 Introduction to the National Estuarine Research Reserve System

The National Estuarine Research Reserve System (NERRS) is a network of 29 protected estuarine areas that represent different biogeographic regions and estuarine types within the United States (Figure 1). Reserves are protected for long-term research, monitoring, education and coastal stewardship. The NERRS, created by the Coastal Zone Management Act of 1972, currently protects over one million acres of estuarine lands and waters. The system is managed in accordance with federal regulations at 15 CFR Part 921.

Each reserve has a unique boundary based on the nature of its ecosystem. The boundaries include the land and water areas needed to protect an intact ecological unit. Reserves classify their land and water areas as either "core" or "buffer," which determines the level of protection and the types of activities allowed within each area. Each reserve develops the programming most appropriate for its location while also delivering required system-wide programs focused on research and monitoring, education, training, and stewardship.

The NERRS is a partnership program between the NOAA and the coastal states. NOAA provides funding, national guidance, and technical assistance for reserve operations and system-wide programs, facilities construction and land acquisition, graduate fellowships, and collaborative science projects. The state partner manages the reserve on a daily basis and works collaboratively with local and regional partners. NOAA also leads projects that integrate data or support decision-making at the national level.

Figure 1. National Estuarine Research Reserve System showing biogeographic regions

Each reserve is required to develop a management plan that contains the goals, objectives, and strategies for that reserve. Management plans are updated every five years, and must be approved by NOAA. These plans enable the reserves and NOAA to track progress and realize opportunities for growth. Each plan describes how the reserve will carry out its foundational research, education, and training programs. Each plan also outlines administration, resource protection, public access, land acquisition, and facility plans, as well as restoration and resource manipulation plans if applicable. The plans also incorporate strategies designed to help the reserve contribute to the system's national goals. NOAA periodically evaluates reserves for compliance with federal requirements and their approved management plan.

The most recent strategic plan for the NERRS can be found at coast.noaa.gov/data/docs/nerrs/StrategicPlan.pdf. It describes the following goals for the system.

- **Protecting Places:** Enhance and inspire stewardship, protection, and management of estuaries and their watersheds in coastal communities through place-based approaches.
- **Applying Science:** Improve the scientific understanding of estuaries and their watersheds through the development and application of reserve research, data, and tools.
- **Educating Communities:** Advance environmental appreciation and scientific literacy, allowing for science-based decisions that positively affect estuaries, watersheds, and coastal communities.

1.1 Biogeographic Regions and Boundaries of the National Estuarine Research Reserve System

NOAA has identified 11 distinct biogeographic regions and 29 subregions in the United States, each of which contains several types of estuarine ecosystems (15 CFR Part 921 Appendix I and II). When complete, the system will contain examples of estuarine hydrologic and biological types characteristic of each biogeographic region.

Each reserve boundary will vary depending on the nature of the ecosystem. Boundaries must include an adequate portion of the key land and water areas of the natural system to approximate an ecological unit and to ensure effective conservation. Reserve boundaries encompass areas for which adequate state control has been or will be established by the managing entity over human activities occurring within the reserve. Reserve boundaries include a "core" area of key land and water encompassing resources representative of the total ecosystem, which if compromised could endanger the research objectives of the reserve, as well as a "buffer" area designed to protect the core area and provide additional protection for estuarine-dependent species, including those that are rare or endangered. Buffer areas may also include areas necessary for facilities required for research and interpretation. Additionally, buffer areas are identified to accommodate a shift of the core area as a result of biological, ecological, or geomorphological change that could be reasonably expected to occur (15 CFR Part 921.11 (c)(3)).

1.2 National Estuarine Research Reserve Administrative Framework

The process for federal designation of a national estuarine research reserve has many steps and involves many individuals and organizations. While each reserve is a partnership program between NOAA and a coastal state, many entities collaborate to support the designation of a reserve. Other partners include federal and state agencies, nonprofit groups, universities, and members of the local community. For more information on the designation process, see coast.noaa.gov/nerrs.

Upon designation, the reserve implements the approved management plan and is eligible for NOAA financial assistance on a cost-share basis with the state. Management plans provide a vision and framework to guide reserve activities during a five-year period and enable the reserves and NOAA to track progress and realize opportunities for growth. Each management plan contains the reserve goals, objectives, and strategies supported by programs focused on research and monitoring, education and outreach, training, and stewardship. They also outline administration, public access, land acquisition, and facility plans and needs, as well as restoration and resource manipulation plans, if applicable.

Reserves are increasingly confronted with complex questions regarding new uses in or near reserves that may or may not be compatible with the reserve system's mission. A thoughtful and comprehensive management plan provides a foundation for addressing these challenges to protect and manage reserve resources wisely and ensure that the public and coastal decision makers value and protect coastal resources.

NOAA administers the reserve system and establishes standards for designating and operating reserves, provides support for reserve operations and system-wide programming, undertakes projects that benefit the reserve system, and integrates information from individual reserves and programs to support decision-making at the national level. Additionally, NOAA periodically evaluates reserves for compliance with federal requirements and with the individual reserve's federally approved management plan, as mandated under Section 312 of the CZMA (15 CFR Part 921.40).

NOAA currently provides leadership and support for three system-wide programs, including the SMWP, the K-12 Estuarine Education Program, and the CTP, as well as a national program to support collaborative research in the reserve system. NOAA also provides support for initiatives focused on the reserve system's priorities.

2 Introduction to Kachemak Bay National Estuarine Research Reserve

2.1 History of the Reserve

Here we provide a very brief overview of the people living around Kachemak Bay. For more information on the archaeology and history of the Kachemak Bay area, see the Kachemak Bay Ecological Characterization (KBNERR and NOAA CSC, 2001).

The lives of people in the KBNERR area have always been linked to Kachemak Bay. The Kachemak Alaska Native tradition and the Kahtnuht'ana Dena'ina, Athabascan Peoples, whose descendants inhabit the Kenai Peninsula, have thousands of years of history and culture surrounding salmon (Workman and Workman, 2010). Kachemak Bay has several hundred prehistoric sites. The oldest local archeological sites are at the water's edge; with the oldest sites documenting human activity occurring as early as 8,000 BP (Klein and Zollars, 2004). Reverence for and dependence on natural resources continues to be at the center of traditional and contemporary livelihoods of the Indigenous Peoples of the Kenai Lowlands region.

Non-Native Alaskans also highly value natural resources (KBNERR and NOAA, 2001; Flaherty et al., 2019). The historic period dates to about 1770, when Russian fur traders first reported on the area's riches, and in 1778, Captain Cook explored Cook Inlet. Commercial fishing has been an economic mainstay of the Kachemak Bay area during much of the historic period. From about 1911 to 1930, hundreds of people arrived in Kachemak Bay to harvest herring; and the Halibut Cove community was created in 1911 to service the herring fishery. By 1928, herring populations had crashed, and the fleet moved elsewhere. Commercial salmon catch records in Kachemak Bay also date back to 1911, and commercial salmon fishing remains economically important. The shellfish industry flourished in Kachemak Bay during the 1950s and 1960s; three species of crabs and several species of shrimp were harvested. By the late 1970s, however, catches declined, and today those species are no longer harvested commercially in local waters.

The federal government created many legislative programs to transfer land into private ownership, including homesteading, trade and manufacturing sites, and land lotteries. Farming and ranching have been important subsistence activities and minor commercial activities since the 1800s. Small-scale logging has been ongoing, and several small sawmills operated on the Homer Spit from the 1930s to the 1960s, providing lumber for local construction. While forestry has remained minimal, in recent years agriculture has increased with many small-scale, diversified farming operations.

The City of Homer began as a coal town in the late 1800s with the Cook Inlet Coal Fields Company. The surrounding area was settled by homesteaders and those buying land. Homer became Kachemak Bay's economic,

cultural, and recreational hub with completion of the Sterling Highway in 1950, the opening of the Homer small boat harbor in 1964, and damage and depopulation of Seldovia from the 1964 earthquake.

Fishing and farming were core economic drivers in Kachemak Bay until tourism grew in importance in the late 1960s and early 1970s. The remarkable beauty and productivity of Kachemak Bay has led to several legislative designations: in 1970 Alaska's first state was established as the Kachemak Bay State Park (KBSP)—in 1972, of the Kachemak Bay State Wilderness Park (KBSWP) and Fox River Flats Critical Habitat Area (CHA); in 1974, the Kachemak Bay CHA; in 1985, the Anchor River-Fritz Creek CHA; and, in 1999, establishment of KBNERR.

Some things have changed little since people first settled in Kachemak Bay over 5,000 years ago. People are still drawn to exploring, fishing, collecting clams and mussels, picking berries and harvesting edible plants, walking the beaches, hunting moose and bear, boating, and observing wildlife. Charter fishing operations, art galleries, museums, restaurants, water taxis, nature tours, accommodations, and many other visitor services have multiplied in recent decades.

2.2 Local management of the Reserve

The area within KBNERR boundaries, shown in red in the map below, represents approximately 372,000 acres of almost exclusively state-owned and managed lands and waters. As outlined in section 6 Resource protection plan, the overwhelming majority of the Reserve's area is managed by two divisions of state government: Alaska Department of Fish and Game's (ADF&G) Habitat Division and Alaska Department of Natural Resources' (ADNR) Division of Parks and Outdoor Recreation (DPOR or 'State Parks'). ADF&G Habitat Division manages the Fox River Flats CHA and Kachemak Bay CHA; State Parks manages KBSP and KBSWP. A small amount of the Reserve area is managed by the City of Homer. Relevant Memorandums of Understanding (MOUs) are contained in Appendix E.

Management of Reserve activities and resources also reflects collaboration and coordination between NOAA's OCM, NERRS (https://coast.noaa.gov/nerrs/), and UAA's ACCS (http://accs.uaa.alaska.edu/about/).

Finally, KBNERR management incorporates input from local communities, especially through the KBNERR Community Council. KBNERR provides quarterly reports to the council that summarize activities and accomplishments. publicly online and at quarterly council meetings. The Community Council (https://kbaycouncil.wordpress.com/) is made up of community members and state and federal agency partners and is described further in section 5.5 Advisory committees and purpose.

KBNERR recognizes the power of partnerships in accomplishing its mission and goals. The Reserve has cultivated close and ongoing working relationships with many local, borough, state, and federal entities in order to share information and promote effective, mutually beneficial efforts. Working together in a coordinated and integrated fashion helps KBNERR and its partners better understand and support one another's goals, priorities, needs, and activities. Entities with whom the Reserve maintains partnerships in various capacities through research, monitoring, education and training activities are identified in Appendix A.

2.3 Ecological characteristics and key species

Kachemak Bay is a 63-km (39-mi) arm of Cook Inlet located on the southwest side of the Kenai Peninsula in Southcentral Alaska. At 372,000 acres, Kachemak Bay is the largest reserve by acreage in the NERRS. Unlike many coastal areas in the continental U.S., large, contiguous tracts of relatively undeveloped lands and waters remain intact along Alaska's coastline, and this is true for most areas in and around Kachemak Bay. Reserve ecosystems support a diversity of marine, estuarine, and freshwater habitats and an abundance of fish, wildlife, invertebrates and plant communities- see the KBNERR Site Profile for species lists (Field and Walker, 2003). Species of high cultural and economic importance include migratory shorebirds and waterfowl, anadromous fish, groundfish, especially halibut, shellfish, especially butter, little neck and razor clams, marine and terrestrial mammals, especially moose, black and brown bears, whales, sea lions, otters, seals. Pacific salmon, especially Coho Salmon (*Onchorynchus kisutch*), Chinook Salmon (*O. tshawytscha),* Steelhead *(O. mykiss)*and Dolly Varden char (*Salvelinus malma),* are examples of focal species for the Reserve's watershed research. These

species are also the subject of study for the Reserve's growing research in nearshore habitats, along with other forage fishes, for example sand lance, herring , cods and sculpins. Full list of species found in Appendix F.

KBNERR staff compiled comprehensive overviews of Reserve lands and waters, including their ecological processes and key species when the Reserve was designated. These overviews are provided in three key publications. For general information on Reserve habitats and species, refer to these overviews.

- *Kachemak Bay Ecological Characterization*, published on CD-ROM in 2001 and available by request to Coowe Walker, cmwalker9@alaska.edu
- A 'site profile', published in 2012,updating KBEC and summarizing the then-current state of knowledge for research, monitoring, and education: *Kachemak Bay Ecological Characterization, A Site Profile of the Kachemak Bay Research Reserve: A Unit of the National Estuarine Research Reserve System* (found at https:/coast.noaa.gov/data/docs/nerrs/Reserves_KBA_SiteProfile.pdf)
- Reserve management plans—the first published in 2005, the most recent published in 2012 and covering the five-year period ending in 2017. Management plans supplement information contained in earlier publications

Over the years, Reserve staff have also shared research and data in numerous scientific journals and other publications. Many of these reflect KBNERR's ongoing research partnerships. Key KBNERR publications are listed online (found at https://accs.uaa.alaska.edu/publications/).

2.4 Social attributes and population demographics

The population of the entire state of Alaska (737,625) is comparable to the population of a large city in the Lower 48 such as Tucson, AZ or Nashville, TN. KBNERR is located within the KPB which was incorporated in 1964 as a second-class borough under the authority of the State of Alaska Borough Act of 1961. The KPB's governmental responsibilities are comparable to those of a county in other parts of the United States. The KPB lies directly south of Anchorage, the state's principal population center, and is bordered by the Gulf of Alaska and Prince William Sound to the south and east, respectively. As of July 2020, the KPB has one of the state's highest estimated populations at 58,934 (ADLWD, 2021). This population is predominantly white (83.3%) with the next largest represented group being Native Alaskan (8%) (Census Bureau, 2010). The KPB is divided by Cook Inlet into two land masses, and encompass a total of 24,752 square miles, of which 15,700 square miles are land, with 2,146 miles of coastline. The southern Kenai Peninsula, which includes the KBNERR core and buffer regions, has a population of 13,969. As of July 2020, the estimated median age of 41.8 for the area is higher than the rest of Alaska at 35.7 (ADLWD, 2021). The median household income for the region is $48,787 with an unemployment rate of 8.3%. and 10.5% of the individuals living below the federal poverty level (Census Bureau, 2010). Communities around Kachemak Bay include the Native villages of Port Graham (Paluwik), Nanwalek and Seldovia (Angagkitaqnuuq) on the south side of the Bay; Russian Old Believer villages of Voznesenka, Razdolna and Kachemak Selo at the head of the Bay, the towns of Anchor Point and Ninilchik along the coast to the north of the Bay's mouth, and the City of Homer, at the base of the Homer Spit, on the north shore of the Bay. The Reserve primarily works within the Reserve boundaries and in the Kenai Lowlands and lower Cook Inlet area, and transfers knowledge to other parts of Alaska (Figure 2).

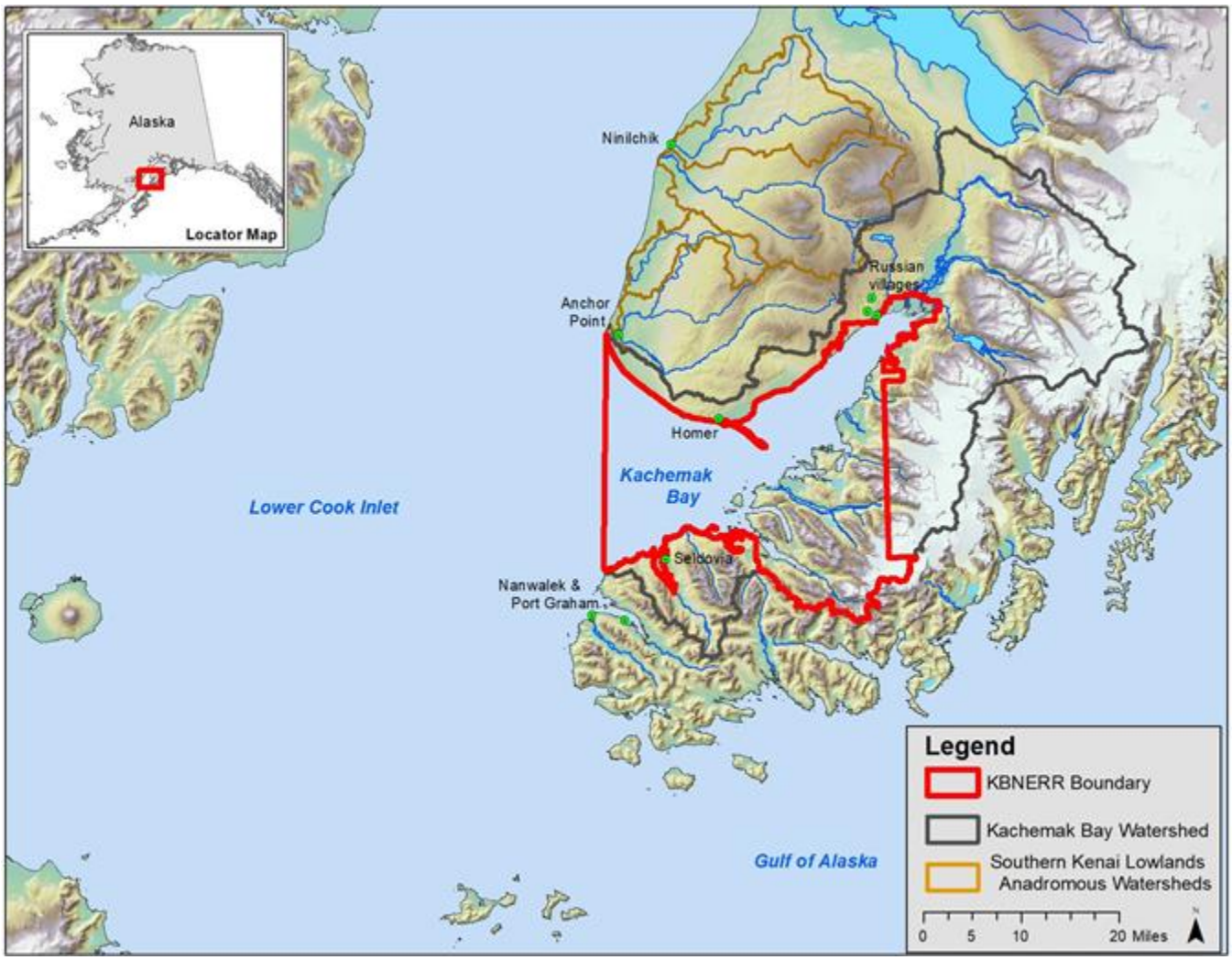

Figure 2: Location of KBNERR on the southwest Kenai Peninsula, also showing main focus areas of our research: lower Cook Inlet and the anadromous rivers north of the reserve boundary

As a regional hub, Homer offers many public services such as schools, public library, hospital and port facilities. It is also the focal point of a thriving tourism industry due to the beautiful setting and access to fishing. According to the Alaska Department of Labor and Workforce Development, 26% of Homer's employment is in the sectors of retail trade, education and health services, arts and entertainment, leisure and hospitality.

Updated demographic, economic and other information on the KPB and the Homer area can be found on these websites:

- Kenai Peninsula Economic Development District: specific data for key communities on the Peninsula including employment, income, house sales, etc. (found at https://kpedd.org/city-of-homer/)
- Mobilizing for Action through Planning and Partnerships: live data portals for demographic and health-related data as well as reports from community health needs assessments that have been conducted since 2010 (found at https://mappofskp.net/).

On the 2.3 million acres of state land within the KPB, use varies from intensely developed gas fields, timber sales, and proposed coal mining projects, to developed recreation sites, protected game refuges, CHAs, and wilderness parks. In communities surrounding KBNERR, traditional resource extraction industries (timber, fisheries, and agriculture) have been in decline, with a corresponding rise in tourism and real estate speculation.

A 2019 ecosystem services assessment completed by researchers in the School for Environment and Sustainability (SEAS) at the University of Michigan (UM), *Human and Environmental Well-being in Alaska's Kachemak Bay Watershed*, identified the value that Kachemak Bay residents place on the local ecosystem

services (Table 1). The research team conducted 31 semi-structured interviews with residents in public and private sectors and three focus groups with KBNERR's Community Council. The results from these surveys outline and identify the specific aspects of the region that participants value (found at https://deepblue.lib.umich.edu/handle/2027.42/148820).

Table 1. Kachemak Bay community values
(% of Interviews = total percentage of interviews that contained the associated value) (n = 31).

What is Valued	% of Interviews	What is Valued	% of Interviews
Fish (salmon, halibut)	93	Ecological Processes	71
Wildlife	99	Research and Education	61
Recreation	87	Agriculture	42
Aesthetics	87	Forests	26

The social value typology identified for Kachemak Bay ranked various categories of values according to the number of participants that referenced those values during the interview (Table 2). Values that ranked highest mirror results from other assessments conducted in the community by a local coalition focused on community health issues, Mobilizing for Action through Planning and Partnerships (MAPP). The ecosystem services assessment added several values to the list that were unique to Kachemak Bay and not included in the framework they were using sharing the theme of *connection.* These unique values have also become identified as particular strengths of the Kachemak Bay area through years of MAPP community health needs assessments.

Table 2. Social value typology for Kachemak Bay
(% of Interviews = total percentage of interviews that contained the associated typology) (n = 31).

Values	Description	% of Interviews
Pristine/Natural	Minimal human impact and/or intrusion into the natural environment	97%
Economic	The provision of fisheries (commercial/recreational), minerals, ecotourism, agriculture, and research and education that support livelihoods	97%
Access	A place to enjoy recreational activities and natural beauty while maintaining sustainable management of human activity	94%
Cultural	Defining community characteristics of Homer and the Kachemak Bay area that are tied to the natural environment	94%
Recreation	A place for favorite/enjoyable outdoor recreation activities	90%
Future	The ability for future generations to enjoy and benefit services	90%
Aesthetic	Appreciation of "sights and sounds," and the overall striking beauty of the Kachemak Bay area.	87%
Learning	Opportunities to learn or share scientific information, values, and traditions as they relate to the Kachemak Bay ecosystem	87%
Connection to Community	The "sense of place, community, belonging…and distinctive 'culture of the sea'" associated with the Kachemak Bay region. Additionally, the sense of pride of place tied to living and/or working in the area	77%
Subsistence	The provision of basic human needs, emphasis on reliable food sources from nature	74%

Connection to Self/Personal Identity	Individual experiences/beliefs that a place is essential identity	71%
Connection to Nature	Experiences of being completely present in nature; recognition that humans are a part of the ecosystem/natural environment	71%
Connection to Family	Familial connections or closeness fostered by shared time spent outdoors; cherished family memories of outdoor activities; or other experiences/opportunities in which the ecosystem has provided a sense of place or identity within a family or household	65%
Therapeutic	A place that enhances feelings of well-being (e.g., 'an escape', 'stress relief', 'comfort and calm')	65%
Spiritual	Places of sacred, religious, unique, deep and/or profound experience where reverence/respect for nature is felt	45%
Biodiversity	A high variety of fish and wildlife species, as well as genetic diversity within populations	45%

2.5 Threats and stressors

2.5.1 Natural and anthropogenic stressors

Environmental stressors within the Reserve reflect natural events and processes characteristic of Southcentral Alaska's dynamic coastal environments. These include extreme storms, earthquakes, volcanic eruptions, droughts, floods, and native defoliating species. Understanding these stressors is complicated by the fact that they may be altered or amplified by anthropogenic stressors such as climate change and habitat destruction. Human activities causing negative environmental impacts include recreational overuse, residential and commercial land development, water usage and diversions, commercial fish and wildlife harvesting, and extraction of resources such as oil, groundwater, gravel, and peat, and the introduction of non-native species. Differing value systems and long-term visions for the area, along with population growth and turnover among resource experts and political decision-makers, create diverse and complex perspectives on resource management and stewardship. Changes in landscapes and the plant and animal communities they support have long-range effects that are difficult to anticipate and may be unknown or very poorly understood by decision-makers. Understanding human impacts and future conditions in changing climate scenarios is a critical concern for the Reserve. Communicating knowledge about ecosystem conditions and processes to a wide variety of decision-makers to promote coherent, cohesive, and informed decisions has become a key Reserve priority. The results of the 2019 ecosystem services assessment documents some local perceptions of threats to the region's ecosystems (Table 3).

Table 3: Perceived threats to ecosystem health
(% of Interviews = total percentage of interviews that contained the associated threat) (n = 31).

Perceived Threat	% of Interviews	Perceived Threat	% of Interviews
Population Growth	94	Aquaculture	35
Climate Change	61	Demographic Change	35
Social Division/Conflict	58	Pollution	23
Extractive Industries	45	Public Awareness & Attitudes	19
Overharvesting	39	Cruise Tourism	13

2.5.2 Climate phenomena and impacts

Climate change in Alaska is reflected in warming temperatures, changing precipitation patterns, drying wetlands, variable stream base flows, floods, altered fire regimes, thawing permafrost, changing ocean salinity, and eroding coastlines. KBNERR—the only subarctic reserve in the NERRS—is on the front lines of climate change. Locally, climate change is also evidenced by glacial retreat and associated isostatic rebound, accelerated coastal bluff erosion, and increasing ocean acidification in waters that pulse seasonally into Kachemak Bay. The bay and surrounding region are undergoing rapid changes to ocean chemistry, water temperatures, and hydrologic inputs, which are now impacting key harvestable species, contributing to harmful algal blooms (HABs), and causing dramatic declines in bivalve populations among other impacts. These changes are compounded by human-related stressors such as those mentioned above.

2.6 Reserve boundaries

The Reserve's geographic boundaries extend from the Fox River Flats—at the head of Kachemak Bay in the northeast—to the mouth of the bay on the west, marked by a line between Anchor Point on the north and Point Pogibshi on the south (Figure 3). KBNERR boundaries encompass the entirety of two legislatively designated state CHAs—Kachemak Bay and Fox River Flats—as well as large portions of two state parks—KBSP and KBSWP. Legislatively designated areas (LDAs) are described in detail in section 6 Resource protection plan.

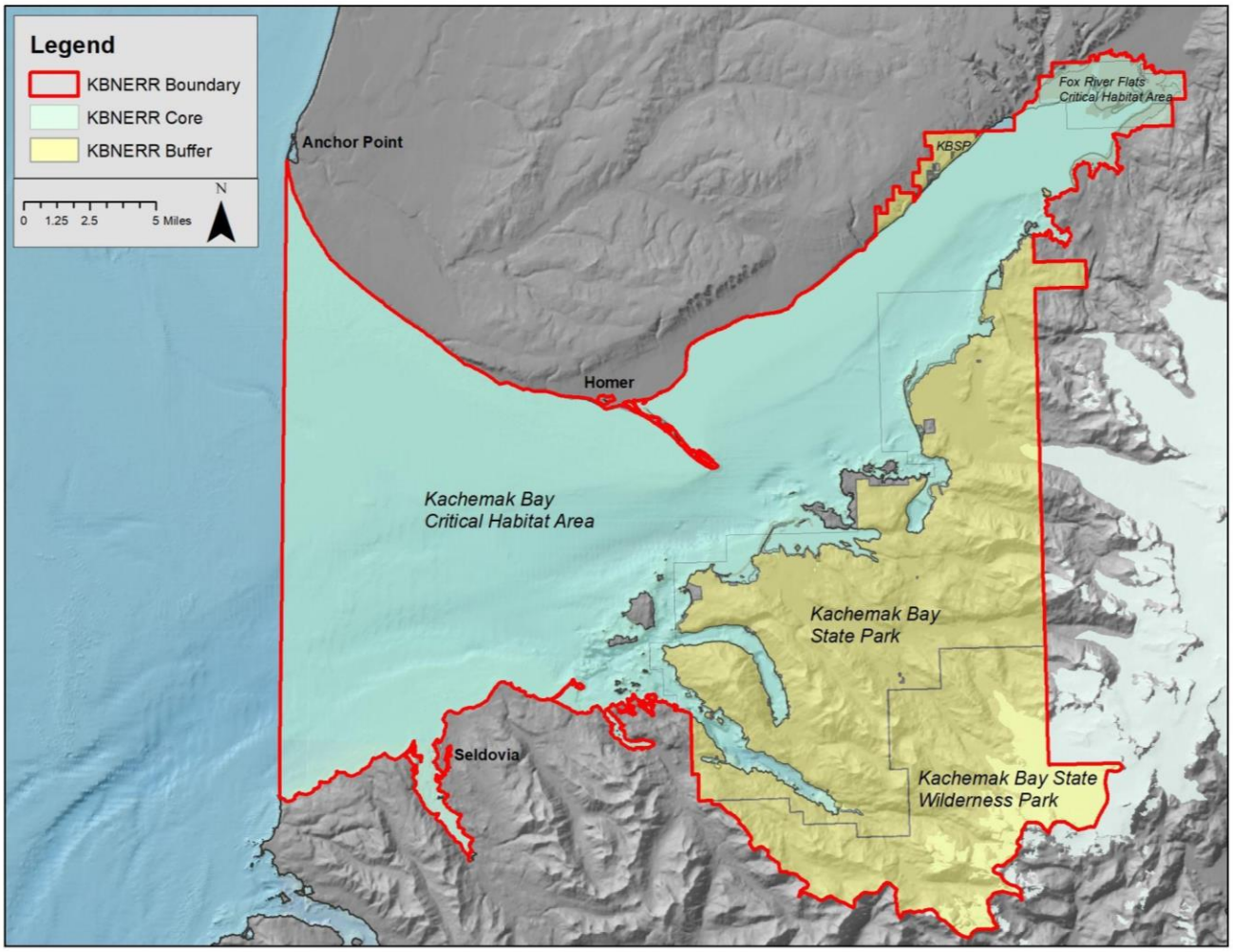

Figure 3. KBNERR Boundary with general buffer and core areas

KBNERR's region of scientific interest—including research and monitoring efforts—extends beyond Reserve boundaries to encompass areas that affect, and are affected by, Kachemak Bay, including the northern Gulf of Alaska and Cook Inlet, and the watersheds of the southern Kenai Peninsula (Figure 2). KBNERR has become a leading research entity for the region and is well positioned to study broad-scale ecological patterns and to monitor long-term trends in Kachemak Bay that have relevance to Cook Inlet and the Gulf of Alaska. As a sentinel site[2] for the region, KBNERR can provide scientific and management entities with vital baseline and long-term datasets that facilitate understanding of regional ecological shifts over time and serve as a magnet for emerging research and technological approaches. Understanding such shifts is critical in managing coastal and marine ecosystems in ways that promote their resilience and sustainability.

[2] Sentinel site defined: Areas in coastal and marine environments that have the operational capacity for intensive study and sustained observations to detect and understand changes in the ecosystems they represent. Observational data are collected at discrete instruments and measurement stations (platforms and sensors) within each site, providing information and data that can be synthesized to provide an understanding of the ecological status and trends in physical and biological variables of interest. (2011, NERRS Sentinel Sites Program: A guidance document.)

2.6.1 KBNERR core and buffer areas

2.6.1.1 *Core* and *buffer* rationale

NERRs encompass two categories of lands and waters: core and buffer areas. **Core** areas are vital to the functioning of NERR estuarine ecosystems. These areas require a level of control sufficient to ensure their long-term viability for research on natural processes. **Buffer** lands and waters protect core areas and provide additional protection for estuarine-dependent species, including those that are rare or endangered. When determined appropriate by the state and approved by NOAA, buffers may also include areas necessary for research and interpretation facilities.

2.6.1.2 KBNERR core areas

KBNERR core areas consist of public lands and waters within Fox River Flats and Kachemak Bay CHAs. Legislatively designated lands and waters such as CHAs and state parks receive the strongest resource conservation protection afforded by state legislative action.

Figure 3 shows the two CHAs constituting KBNERR core areas. The areas of both the entire Fox River Flats CHA (29 km^2) and the Kachemak Bay CHA (916 km^2) are included in the core Reserve area for a total of 945 km^2 . Figures 4 and 5, below, show these two core areas in more detail.

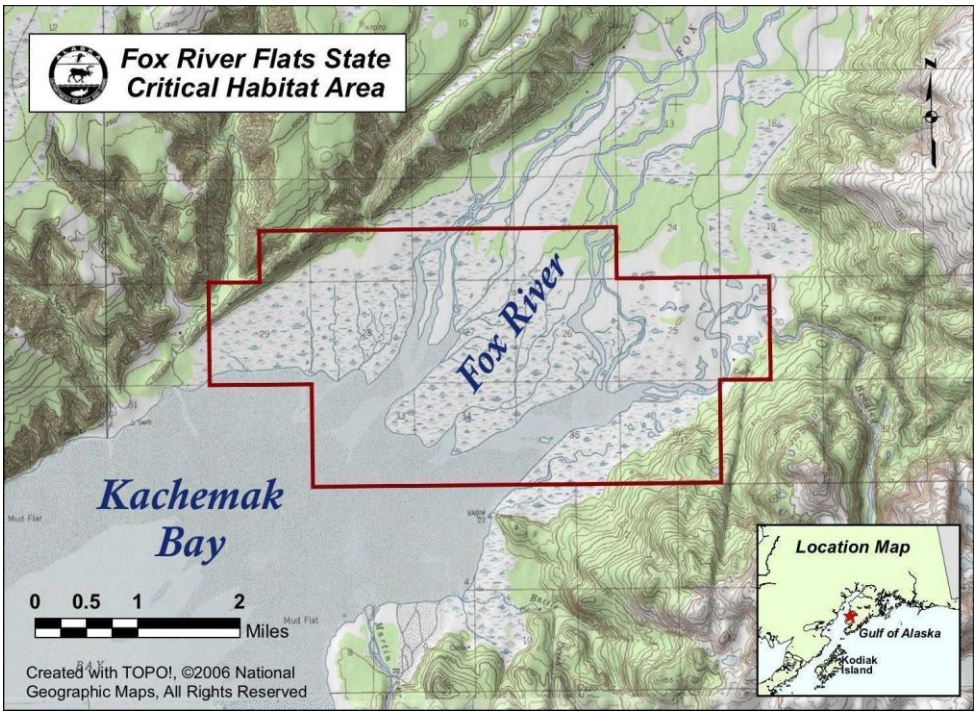

Figure 4. Fox River Flats CHA, which constitutes a core area of KBNERR

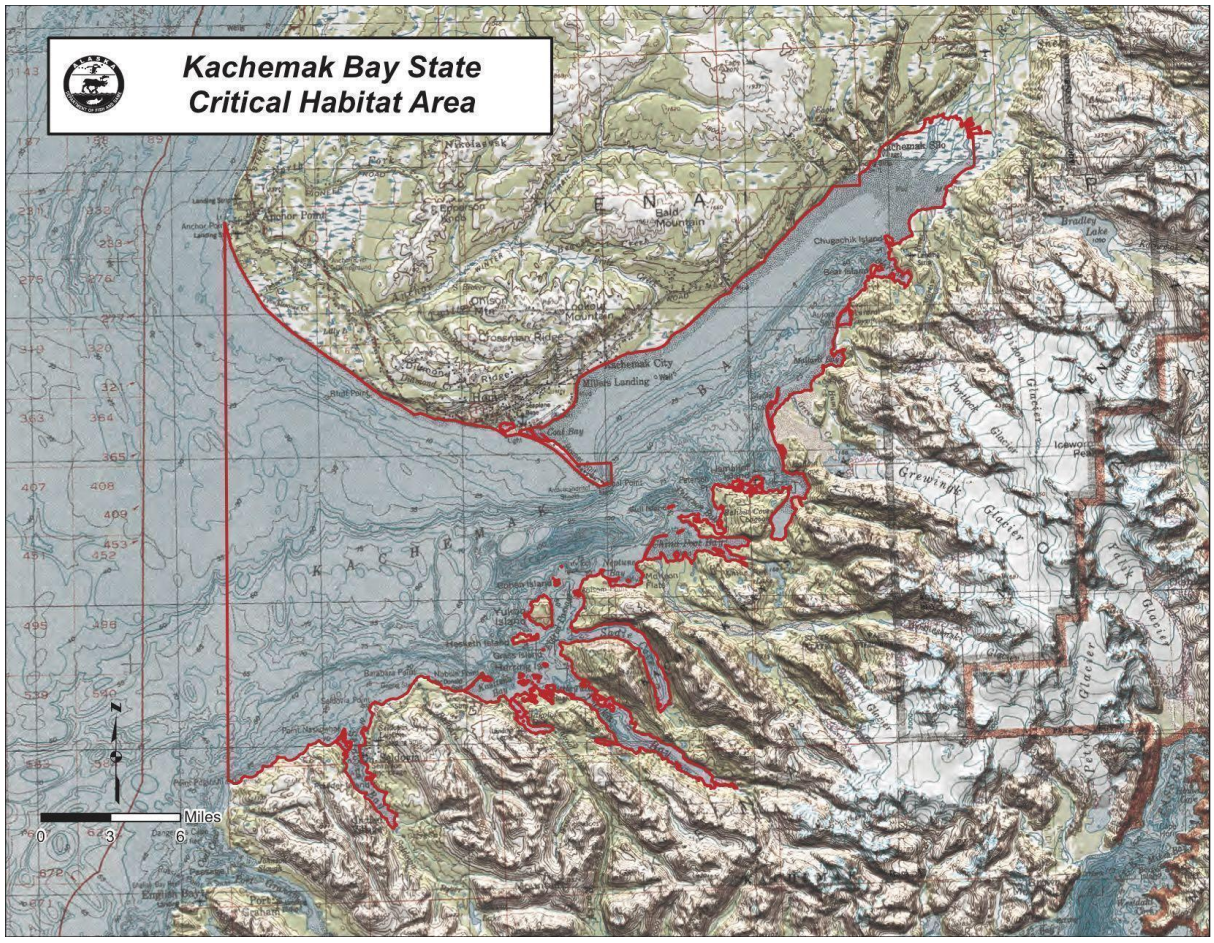

Figure 5. Kachemak Bay CHAs, which constitutes a core area of KBNERR

2.6.1.3 KBNERR buffer areas

KBNERR buffer areas consist of public lands and waters within those portions of KBSP and KBSWP that drain into Kachemak Bay, as well as publicly owned lands in Beluga Slough and on the Homer Spit. Like areas legislatively designated as CHAs, state parks receive the strongest resource conservation protection afforded by state legislative action. Of the total 1,610 km^2 that comprises the KBSP and KBSWP an estimated 554 km^2 of park uplands drain into Kachemak Bay from surrounding watersheds and are contained within Reserve boundaries.

Additional buffer areas are provided by state-owned lands that drain into KBNERR but that are both (a) outside legislatively designated CHA and state park boundaries AND (b) have been designated in the state's Kenai Area Plan for uses compatible with protection of KBNERR resources. Compatible state land use designations include recreation, habitat, and water resources. These lands addressed within the Kenai Area Plan are discussed in section 6 Resource protection plan.

2.6.2 Land ownership and land use types

As noted in Section 2.2, nearly all public lands within the Reserve are owned and managed by the State of Alaska (Figure 6). Within the ADF&G Habitat Division has principal management authority in CHAs. Within ADNR, DPOR (or 'State Parks') has principal management authority on State Park lands. ADNR Division of Mining, Land and Water (DML&W) manages easements within CHAs. Some state lands within KBNERR boundaries are owned by DNR's Trust Land Office (TLO), whose sole responsibility is administering lands for beneficiaries of the Alaska Mental Health Trust (AMHT), managed by the AHMT Authority. Management of adjacent lands and waters can significantly affect conditions and processes within the Reserve. Section 6 Resource protection plan discusses management authorities relevant to the Reserve in more detail.

Terrestrial areas within KBNERR are all part of Kachemak Bay State Park & Wilderness Park, and are used for a variety of recreation purposes, including hiking, backpacking, hunting and fishing. There is an extensive trail system within KBSP. Fox River Flats CHA is used recreationally and as a transport corridor for people, cattle and horses. Cattle frequently graze within the CHA. Kachemak Bay CHA is used for many recreational purposes, as well as commercial fishing and transportation services.

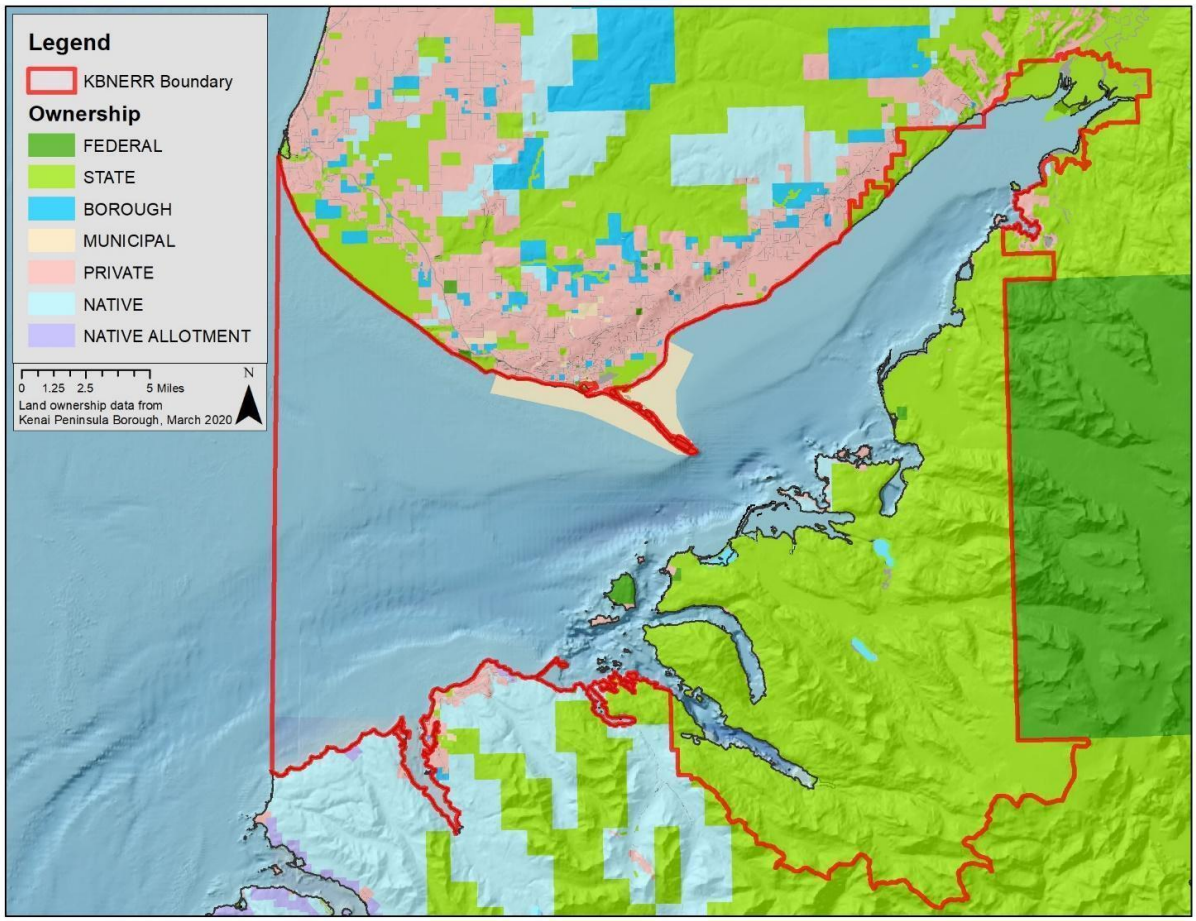

Figure 6. Land ownership in the Southern Kenai Peninsula

2.6.3 Habitat types

The majority of ecosystems of interest for KBNERR lie within the Gulf of Alaska Coast and Cook Inlet Basin Ecoregions defined by the ADF&G Wildlife Action Plan Section IIIB: Alaska's 32 Ecoregions. The most recent map of habitat types within the reserve was produced by the US Forest Service in 2019 using supervised automated classification of remote sensing images (Figure 7). Elevations within KBNERR range from 4311 feet (1314 m) to sea level, and the maximum depth within Kachemak Bay is 558 feet (170 m). Terrestrial habitats within the reserve include perennial snow, ice fields, and glaciers at the highest elevations. In order of decreasing elevation from these snow and ice fields are barren lands recently deglaciated, alpine tundra, alder, and spruce forest. Because of a dieback caused by spruce bark beetles in the late 1990's, much of the spruce forest in the reserve has been converted to alder and/or grasslands. Due to the relatively steep terrain within the terrestrial portions of the reserve, there are relatively few wetlands, other than scattered lakes and ponds and salt marshes. However, the lowlands just outside the reserve to the north have large areas of wetlands, including many peat wetlands.

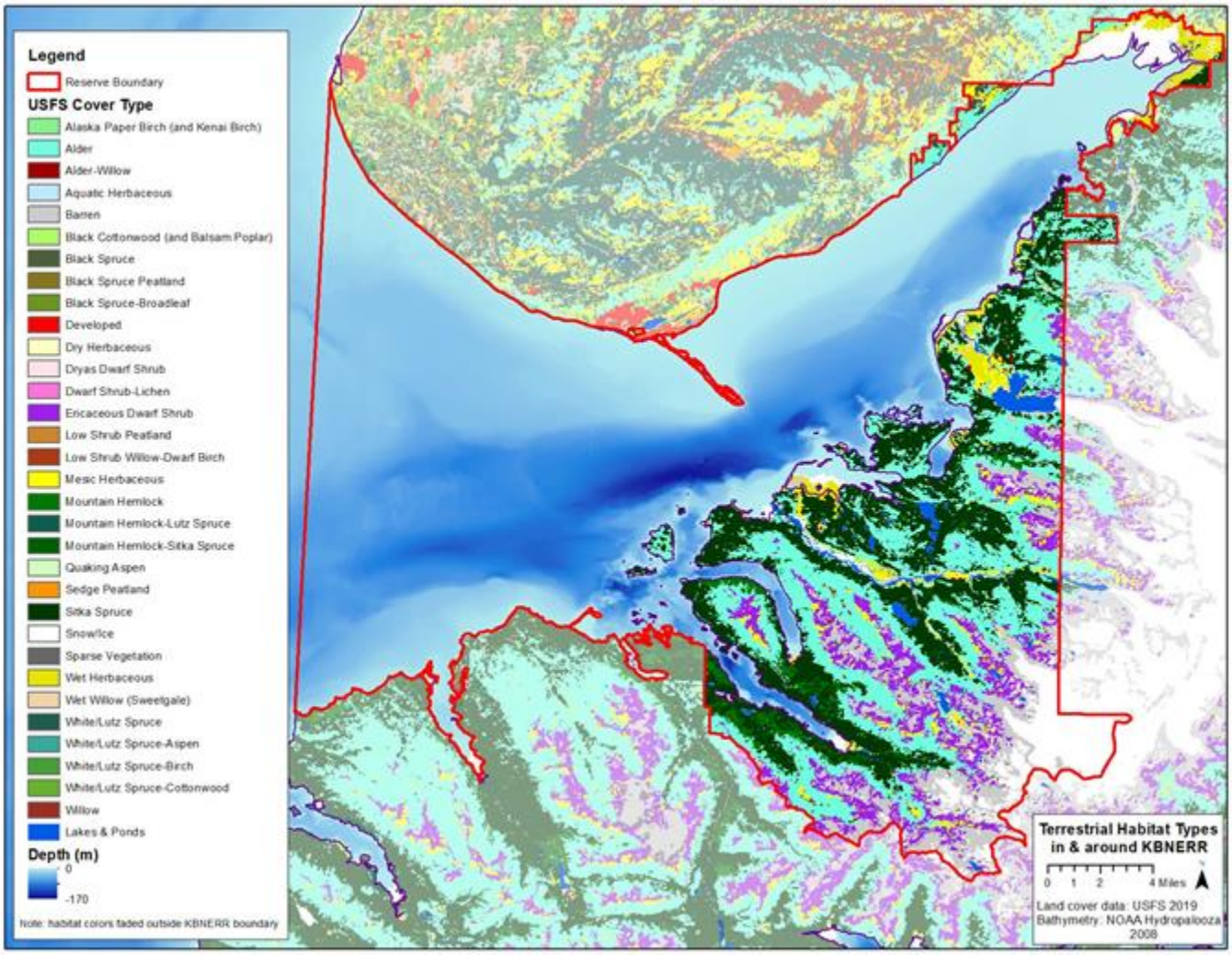

Figure 7. Terrestrial habitats within KBNERR and the surrounding area. Habitat classifications by USFS 2019

There are very few developed areas within the reserve, although there are many cabins and houses in inholdings along the shoreline. Development within the reserve includes a small number of State Park buildings and public-use cabins.

KBNERR has mapped all of the intertidal habitats within the reserve at a higher resolution (Figure 8). This was accomplished as two separate projects: physical intertidal habitat mapping outside of salt marshes, and plant community mapping within salt marshes. These two products included all of the intertidal habitat within Kachemak Bay, although in some areas the intertidal zone is too narrow to be seen at the scale of the map in Figure 8.

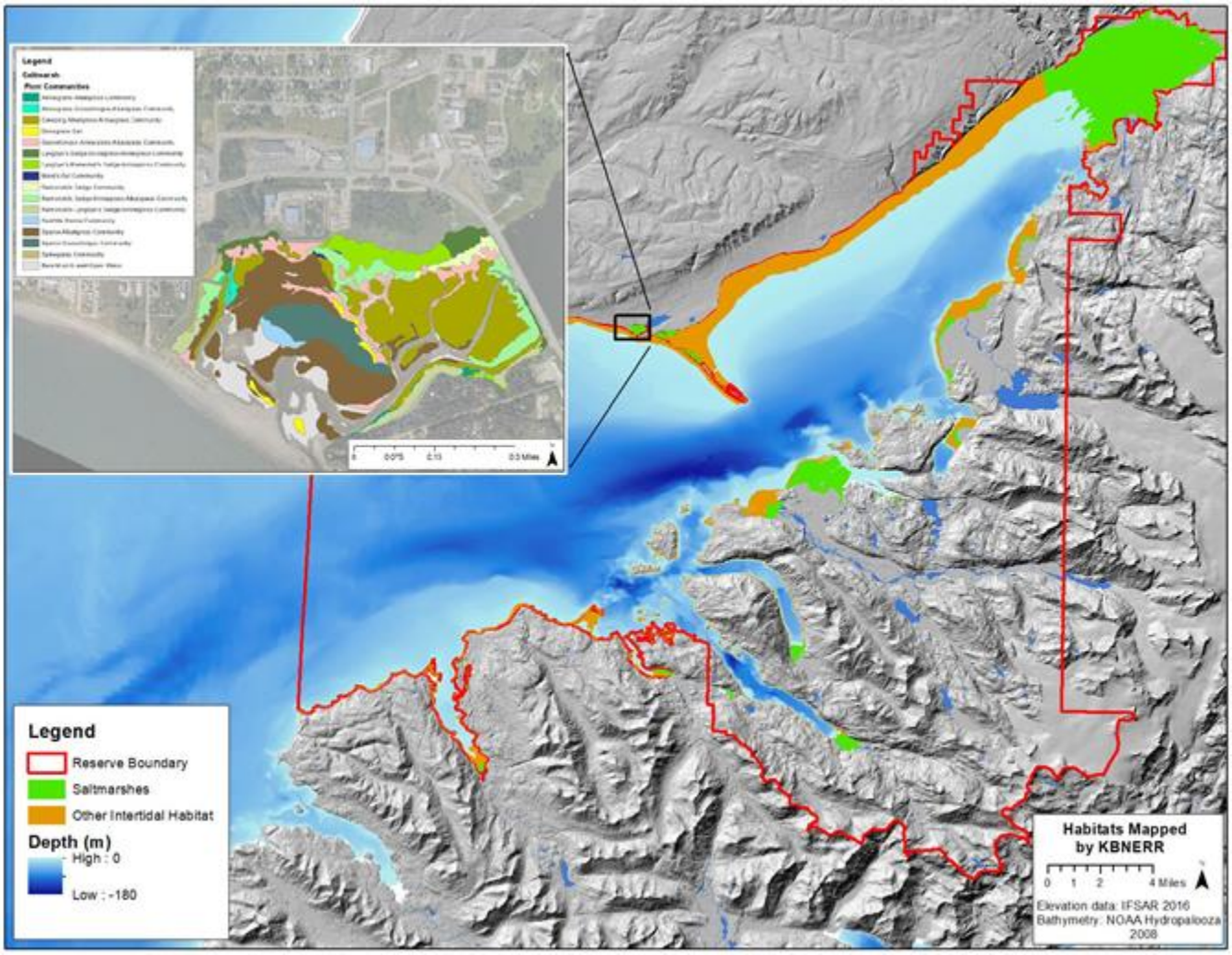

Figure 8. High-resolution habitat maps produced by KBNERR. Areas mapped are shown on the main figure, with details of one mapped marsh shown in the inset

A large portion of the benthic habitat within Kachemak Bay was surveyed during NOAA's Hydropalooza project in 2008. This produced high-resolution bathymetry and sonar data for most of the bay, and NOAA's National Center for Coastal and Ocean Sciences (NCCOS) has recently combined these data sources with drop-camera surveys to map benthic habitats within Kachemak Bay (Figure 9). The majority of the benthic habitat in the bay is mud and silt, with smaller areas of rock, shell litter, and sand. This project can be viewed on NCCOS's BIOMapper website.

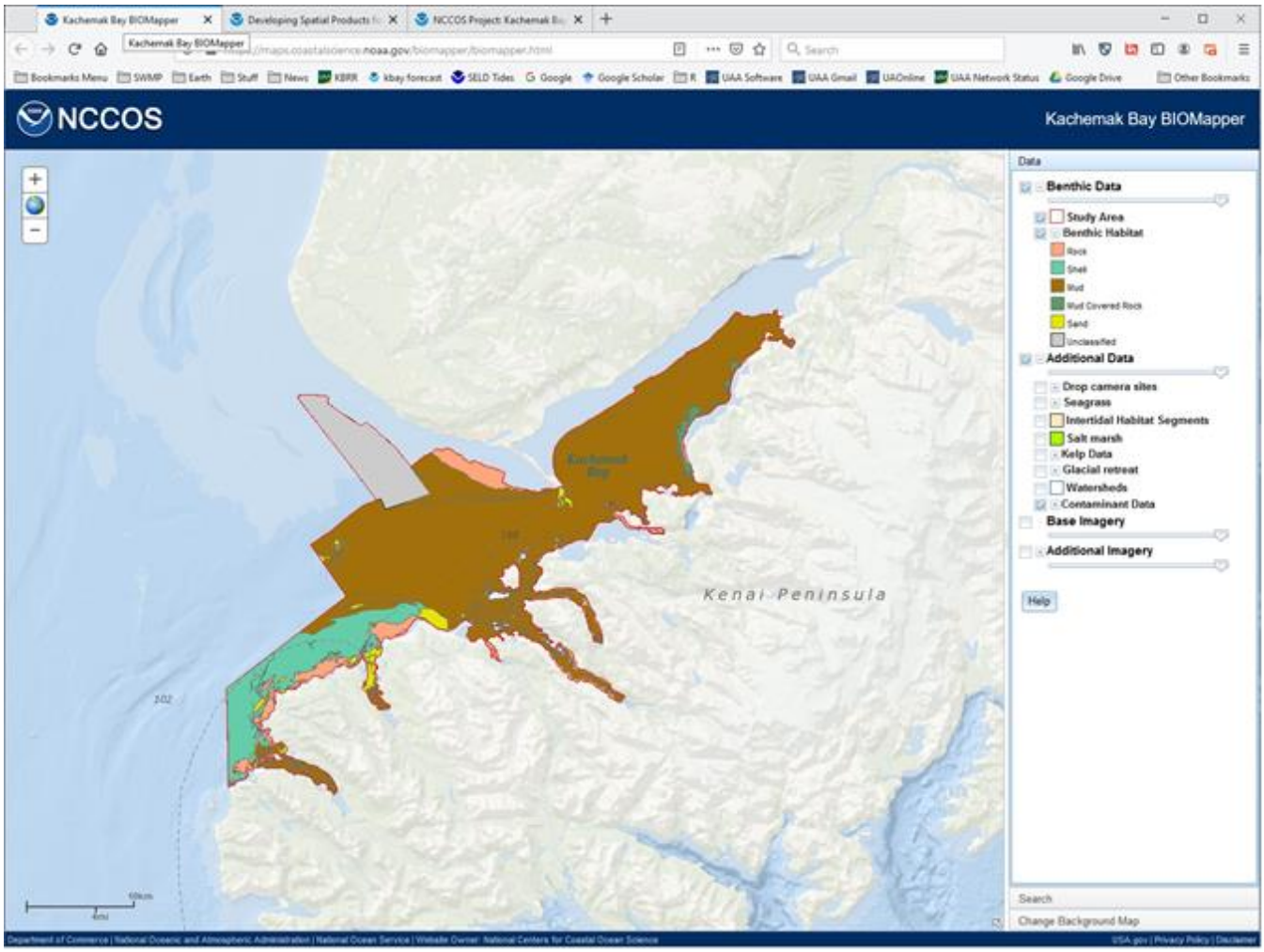

Figure 9. Benthic habitats within Kachemak Bay, shown on the NCCOS BIOMapper site

2.6.4 Watershed map for Kachemak Bay

The watersheds draining into Kachemak Bay include 80 mapped watersheds (Figure 10), encompassing about 656,640 acres. Watersheds at the head of the bay, and most watersheds on the bay's south side are fed by glaciers lying on the north and west slopes of the Kenai Mountains. Watersheds on the north side of the bay are fed primarily by snowmelt and rainwater.

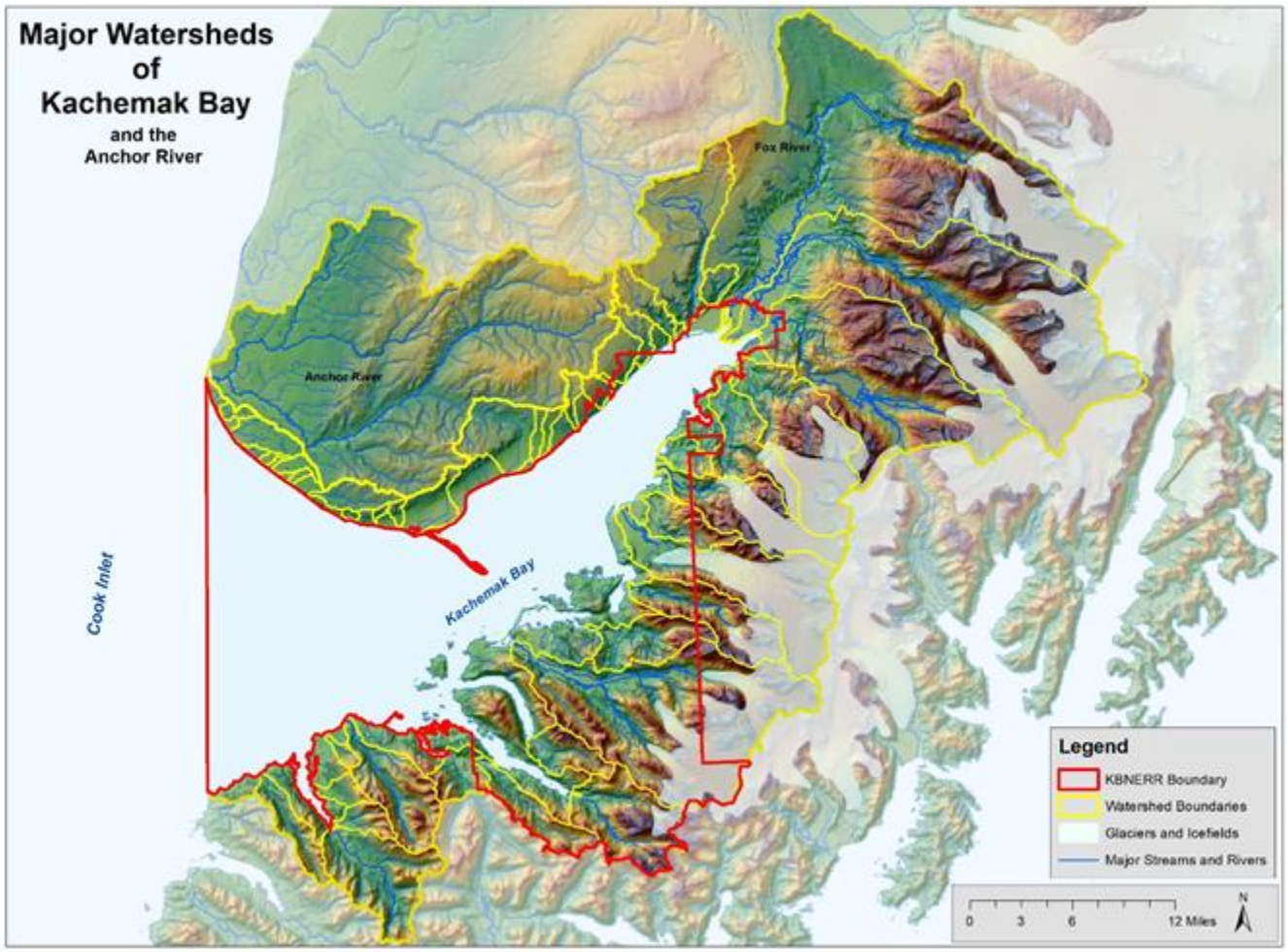

Figure 10. Watersheds draining into Kachemak Bay. The watershed of the Anchor River, which enters salt water just outside the reserve, is also shown

3 Reserve strategic plan

3.1 Introduction

This management plan updates the previous plan (covering June 2012 to June 2017) and will guide KBNERR programs from July 2021 to June 2026. The plan supports the Reserve's vision and mission and has been informed by a 2018 CZMA evaluation process, as well as input from the KBNERR Community Council and routine needs assessments. KBNERR planning reflects an adaptive management strategy—reviews occur regularly, and plan elements can be updated as new information becomes available. Adaptive strategies reflect the dynamic, changing nature of coastal and marine environments and promote resilience and sustainability of these ecosystems and the benefits available to stakeholders. KBNERR staffing, funding, and other administrative support are also likely to be dynamic and changing over the next five years. While implementing this plan, KBNERR will work with its state, federal, and local partners to adjust to changes beyond Reserve control and to adapt the plan as needed to maintain robust programming.

This section outlines the strategic elements underlying the rest of the plan. These elements consist of KBNERR's vision, mission, goals, objectives, and planned actions (strategies). KBNERR's niche, strengths and assets are also relevant to strategic planning and are outlined at the end of section 3.

3.2 KBNERR vision and mission

KBNERR's vision and mission are shown below (Table 4), along with those of its principal federal and state partners: the NERRS and UAA ACCS. KBNERR and its partners share complementary and mutually supportive visions and missions.

Table 4: KBNERR vision and mission

	National Estuarine Research Reserve System (NOAA, NERRS)	**Kachemak Bay National Estuarine Research Reserve (KBNERR)**	**University of Alaska, Anchorage Alaska Center for Conservation Science (UAA, ACCS)**
Vision:	Resilient estuaries and coastal watersheds where human and natural communities thrive.	Kachemak Bay ecosystems and people are robust and resilient.	Fostering research, education, and collaboration on biological conservation and natural resource management in Alaska and the Arctic.
Mission:	Practice and promote stewardship of coasts and estuaries through innovative research, education, and training using a place-based system of protected areas.	Enhance understanding and appreciation of Alaskan coastal ecosystems to ensure that they remain healthy and productive.	The University of Alaska Anchorage (UAA) transforms lives through teaching, research, community engagement and creative expression in a diverse and inclusive environment.

3.3 Priority coastal management issues

The Reserve has the opportunity and responsibility to understand and outreach information about the Kachemak Bay area. Priorities that drive these actions are the need for:

- Understanding Environmental Change
- Understanding Land Use and Human Impacts
- Community Relevant Engagement
- Long-Term Ecosystem Monitoring

3.4 Management plan goals

Three overarching goals will guide KBNERR programs over the next five years. These are shown in the table below along with a concise 'shorthand' statement of each (Table 5).

Table 5. Management plan goals

Goal 1. Through monitoring and research, develop knowledge relevant to coastal communities. **"Develop Coastal Knowledge"**	Doing the science. Creating monitoring and research programs that collect data that is useful and relevant to surrounding communities, landowners, and decision-makers.
Goal 2. Provide opportunities for all learners to improve coastal science literacy. **"Provide Learning Opportunities"**	Developing materials, curricula, and programs for local citizens, schools, students and interns, tourists, other scientists, and diverse groups and organizations.
Goal 3. Build capacity for coastal stewardship through information exchange, skills-building, and partnerships. **"Promote Stewardship"**	Networking, connecting, sharing, training, creating a shared vision for the area based on local science.

KBNERR goals are complementary to those of its state and federal partners, summarized below (Table 6).

- https://www.uaa.alaska.edu/academics/college-of-arts-and-sciences/strategic-plan.cshtml
- https://coast.noaa.gov/data/docs/nerrs/StrategicPlan.pdf

Table 6. How KBNERR management goals complement state and federal partners

NOAA NERR goals Federal Partner	• Applying Science • Educating Communities • Protecting Places • Partnerships
KBNERR goals	• Develop Coastal Knowledge • Provide Learning Opportunities • Promote Stewardship
UAA ACCS goals State Partner	• Student Success • Workforce Development • Community Partnerships • Creative Activity

In addition, KBNERR goals provide a framework for guiding collaboration with other partners—federal, academic, state, regional, and local. Active partnering is a KBNERR priority and strength; the Reserve maintains and encourages a strong network of research, education, and training partners (see Appendix A). One way that KBNERR partners contribute to strategic planning is through the KBNERR Community Council. Numerous partners are represented on the council (see section 2.2). Community Council meetings are open to the public and provide opportunities for input from all those attending.

3.5 Objectives and strategies

Each KBNERR programmatic sector has identified specific actions (strategies) to pursue over the next five years to meet shared goals and objectives. Research, Monitoring, Education and Training programs are described in detail in section 4 Program foundations. Objectives are designed to be specific and measurable, realistic and ambitious, and directed towards particular issues and audiences. The tables below show actions specific to each programmatic sector under each goal and objective.

Goal 1: Develop knowledge relevant to coastal communities through monitoring and research

Objective 1: By 2026 the Reserve will maintain current and produce 5 new, unique data products.

Research	Actively seek grants and develop new studies (projects and/or models) to understand environmental change and function, as well as change from human impacts.
Monitoring	Produce quarterly, annual, and decadal SWMP summaries Biomonitoring synthesis/summaries
Education	Outline Next Gen Science Standards to inform incorporation of new and existing data in curriculum
Training	Assess stakeholder preferences for product format, mediums through routine needs assessments
Administrative	Professional development in new data delivery methodologies

Objective 2: By 2026, the Reserve will produce 5 or more undergraduate and graduate student projects per year

Research	Provide opportunities and mentorship for graduate fellows and undergraduate interns Engage UAA and other research universities as advisor partners for student projects
Monitoring	Provide local data and opportunities to students for communicating science Guest lecture at college courses and mentor undergraduate students who will use monitoring data
Education	Provide student orientation and facilitate onboarding, mentor guidance, learning outcomes, and evaluation Mentor students in science communication and provide opportunities to engage and design education programs
Training	Identify coastal management needs for student projects, connect them with partners for career opportunities Provide stakeholder engagement training and project design guidance to students
Administrative	Advertise and attract students locally and from around the country (including other University-based NERRs Provide facilities for site-based projects Support NERR Graduate Student Fellowship

Objective 3: By 2026, the Reserve will maintain or increase the number of community scientists and volunteer monitors each year from 2020 levels.

Research	Identify research needs and gaps that can be filled by citizen science
Monitoring	Develop new community monitoring programs Expand on existing monitoring programs to include new community scientist and volunteer monitors
Education	Collaborate with other programs and partners to increase participation Develop age appropriate protocols/trainings
Training	Assess geographic gaps, information and engagement needs from training and workshop evaluations Provide training for new scientists and monitors
Administrative	Recruit, maintain and support an active volunteer program Outreach citizen science projects and document protocols to increase participation by additional southcentral region communities

Objective 4: By 2026, the Reserve will partner with other ACCS and UA system scientists and staff on 5 new projects.

Research	Update research catalog to identify synergistic activities Collaborate within ACCS and other UA departments on grants Identify expertise needs and hire seasonally
Monitoring	Conservation data serving and thematic integration Expand on tunicate and european green crab invasive species initiatives, including monitoring and response plans
Education	Outreach products and information from ACCS projects locally in KBAY
Training	Train ACCS staff and other department researchers on coastal management issues Host forums for professional sharing among scientists
Administrative	Connect with staff to other campuses to increase understanding of their capacity and expertise Encourage knowledge sharing during regularly scheduled travel Attend ACCS and UA events and team lead meetings to develop relationships

Objective 5: By 2026, the Reserve will continue to identify current and emergent locally relevant needs and report quarterly.

Research	Keep current on trends in science (state and broader) and share with other staff Participate in local, regional and national meetings, workgroups, networks and task forces
Monitoring	Connect with local management agencies, organizations and government about current issues and needs Participate in local, regional and national meetings, workgroups, networks and task forces
Education	Be responsive to issues in the news to inform lecture and other informal education themes Report on education needs identified through evaluation and informal assessment
Training	Use real-time feedback from evaluations to inform training delivery topics Document emergent issues at local workgroups Co-develop rapid response plans for ecological threats with KBNERR manager and local partners Work with local, regional state and national task force groups to identify common issues
Administrative	Advertise opportunities for public input Maintain web contact form and monitor social media Participate in Local Environmental Observer Network and other public interfaces Seek input from the Community Council and report back to them

Goal 2: Provide opportunities for all learners to improve coastal science literacy

Objective 1. By 2026, every initiative has a communication plan with messages, mediums, and venues for target audiences.

Research	Work with outreach team to provide materials and implement plans once developed Identify key messages
Monitoring	Update and develop SWMP and biomonitoring communication and response plans Address communication preferences and needs of partners during routine engagement
Education	Education will continue to collaborate with partners for venues Develop age appropriate content for preK-16 and public audiences
Training	Training will assist with stakeholder analysis and identify target audiences Provide staff/ACCS professional development in communication techniques Standardize cross-discipline collaboration
Administrative	Dedicated funds for communications planning and implementation Develop and implement an overarching reserve-wide communication plan

Objective 2. By 2026, the Reserve will have a portfolio of site-based learning opportunities.

Research	Develop site profiles for specific research field locations with vulnerabilities and uses Develop information/content/equipment for onsite and pre/post materials
Monitoring	Develop site profiles for specific monitoring field locations with vulnerabilities and uses Identify datasets relevant to different sites
Education	Work with University summer programs for undergraduate workforce development Develop field based informal programs Work with other sectors to plan community biomonitoring
Training	Develop target audiences and decision-maker relevant site-based learning Identify sites appropriate for field-based learning
Administrative	Create partner and landowner engagement profiles (since we don't own land)

Objective 3. By 2026, the Reserve will have regular and timely engagement with every target audience in our region.

Research	Give presentations in mediums as guided by communication plan Respond to information requests Notify audiences of planned research for on-site engagement
Monitoring	Leverage monitoring trips and time to include partner engagement and community presentations Notify target audiences of monitoring schedules and partnership opportunities
Education	Assess target audience engagement methods and frequency Deliver to diverse audiences
Training	Identify existing routine opportunities to engage coastal decision makers Provide trainings to coastal decision makers Provide technical assistance to local partners engaging coastal decision makers
Administrative	Routine outreach efforts with events notices Identify sources of funding for travel Ensure that project/program communication plans and products are produced and followed

Objective 4. By 2026, technology will be used effectively to reach diverse audiences.

Research	Create data views and portals for end user access Participate in NERR wide technology initiatives Respond to new technology opportunities for information format/delivery
Monitoring	Create data views and portals for end user access Develop content for distance delivery and virtual engagement Maintain live feed of accessible long term monitoring data on KBNERR website
Education	Enable partners to share Reserve info through technology, Livestream public events Schedule Reserve staff as guests on others' webinars Coordinate radio and other media opportunities
Training	Produce distance delivered topical training, collaborative workspaces Align with UA information technology on technology use and practice Build capacity for staff and partner virtual engagement
Administrative	Ensure that a technology replacement plan is in place Incorporate emerging communication technologies in outreach Develop social media plan including templates Establish a mechanism for maintenance and regularly scheduled updates of the KBNERR website

Objective 5. By 2026, the Reserve has implemented a data delivery and management plan.

Research	Establish protocols for data acquisition and metadata organization (followed by everyone) Document current data locations/serving for management plan Use technology to improve efficiency and reduce error
Monitoring	Ensure consistent version control and data storage Track whether observing and data delivery platforms/portals are continually able to access real time/updatable monitoring information
Education	Assess educator needs for curated data delivery, preferred delivery methods and frequency
Training	Assess decision maker needs for curated data Cross train staff on data management and delivery protocols Facilitate KBNERR data exchange with partners
Administrative	Obtain dedicated funding for data management and serving

Objective 6. By 2026, the Reserve will have an established role in providing resources and training to educators for curriculum or workforce development.

Research	Serve as guest lecturers/speakers and provide expertise at teacher trainings/field trips Provide data and summaries for curriculum
Monitoring	Work with education staff and teachers to incorporate data collection protocols into curriculum Provide monitoring data and in-person support for Teachers on the Estuary training
Education	Annual workshops for TOTE Work with UAA to recruit undergraduate and graduate students for training programs (pre-service) Develop a short Master Naturalist Training for local ecotourism guides and operators
Training	Mentor local educators for workforce development Develop teacher needs assessment
Administrative	Expand use of bunkhouse for housing visiting teachers, establish a cost center for paying Work to recruit pre-service educators for programs

Goal 3: Build capacity for coastal stewardship through information exchange, skills-building, and partnerships

Objective 1. By 2026, 100% of local elected and appointed officials and coastal decision-maker audiences will be informed of Reserve projects and information.

Research	Partner with municipalities on research projects Participate in public meetings and provide audience appropriate content
Monitoring	Partner with tribes on environmental monitoring projects Provide monitoring summaries and updates for government public processes/presentations
Education	Provide public programs that spotlight information exchange Invite officials to open events or present based on their roles Periodic updates to the Kachemak Bay EE Alliance matrix and KBEEA collaboration
Training	Identify elected, appointed officials and coastal decision-makers in CTP needs assessment Identify opportunities for bringing projects to public process meetings
Administrative	Add specific strategies for elected, appointed officials and coastal decision-makers in communication plan

Objective 2. By 2026, 10 coastal resource users and decision makers report that their actions are informed by Reserve science.

Research	Document and share success stories from research projects and partnerships
Monitoring	Report community data requests, information usage and participation in monitoring results with regulatory agencies
Education	Encourage teaching from kids to parents, engage youth as entry points to communities Educate resource users, industry representatives, and NGOs using science to advocate 6 Month follow up evaluation with teacher trainings
Training	Train staff in writing success stories, program evaluation and follow through Serve on other boards and participate in agency planning meetings Evaluate trainings, document testimonials, intent to use and follow up
Administrative	Outreach success stories locally Conduct long-term evaluation of initiatives Serve on other boards and participate in agency planning meetings Collect reports of use of Reserve science at Community Council Meetings

Objective 3. By 2026, staff from all sectors will present or provide leadership annually at professional knowledge-sharing or skill-building events.

Research	Practice presentations with staff to build skills Identify topical workshops and conferences Present research papers and publications and lead trainings
Monitoring	Practice presentations with staff to build skills Identify topical workshops and conferences Lead trainings, develop monitoring protocols for sharing
Education	Co-Lead educator and education professional trainings Professional sharing session at local-regional science conferences and symposia

Training	Train staff in science communication and facilitation Design trainings with staff that are good for professional skill building Provide opportunities for leadership at local-regional science conferences and symposia Annual meeting planning and professional development at national meetings
Administrative	Develop funding strategy, write travel into grants Allocate travel funding to attend professional events Recruit professionals to trainings (event management)

Objective 4. By 2026, the Reserve will engage in collaborative forums to maintain and grow partnerships.

Research	Participate and present at annual/seasonal forums including conferences, workgroups, meetings
Monitoring	Participate and present at annual/seasonal forums including conferences, workgroups, meetings
Education	Participate and present at annual/seasonal forums including conferences, workgroups, meetings
Training	Participate and present at annual/seasonal forums including conferences, workgroups, meetings Provide technical assistance in coordination of informal and formal workgroup and networking opportunities
Administrative	Allocate funding and support for staff and partner time and travel Identify forums that overlap with ACCS staff Sponsor/Convene Kachemak Bay Science Conference and/or Alaska Conservation Science meetings

Objective 5: By 2026, the Reserve will connect to more partners locally, across the state, and around the country to show Reserve relevance.

Research	Support partner projects with in-kind services and assets Identify KBNERR niche in global initiatives and NERR system for science transfers and topical research projects Publish and present papers and identify communities of practice
Monitoring	Participate in topical workgroups Share curated data Participate in national and international monitoring initiatives
Education	UA platform to expand reach, connecting with remote campuses
Training	Update training market analysis, attend state and national meetings, Intentional partnership with complementary training organizations Facilitate opportunities for information exchange between researcher and decision-makers Work with task force groups to work synergistically toward data collection and problem resolution
Administrative	Foster and participate in community, statewide and national collaborations that support KBNERR programs Success stories of transfers from KBAY to bioregion/state/other NERRS Empower partners to share reserves stories/relevance by creating communication products and materials Market the Reserve to more partners Closer matching with ACCS partners Identify and facilitate article submissions to current and new media outlets Work with the KBNERR Community Council to identify how it actively participates in Reserve activities

3.6 Prioritizing

Prioritizing is key in strategic planning—limited resources may prevent meeting all objectives and require choosing among them. For this plan, KBNERR solicited input on priorities from its Community Council (Figure 11), which represents KBNERR partners and 'clients' (e.g., key users of KBNERR programs and data, such as schools, governments, landowners, and other decision-makers). At a meeting on February 19, 2019, council members and others attending were each given colored dots and asked to vote for one 'top priority' objective under each goal and a single 'special emphasis' objective (yellow dots) among all goals. Results will be used to guide prioritization of Reserve efforts (Figure 11).

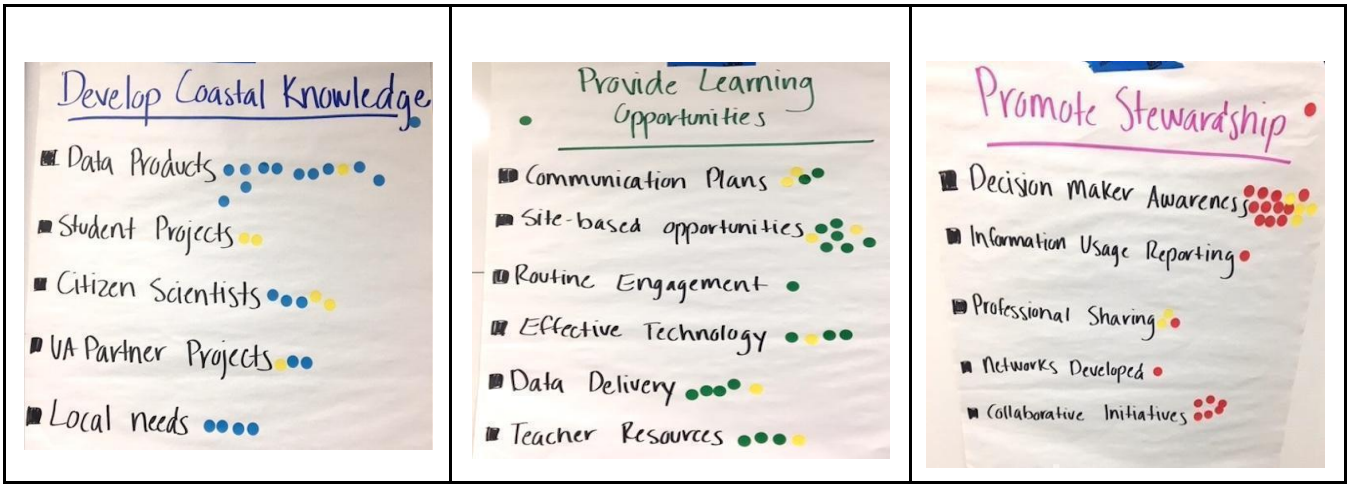

Figure 11: Strategy prioritization exercise results from KBNERR Community Council

4 Program foundations

4.1 Research and Monitoring Program

4.1.1 National Research and Monitoring Program

Reserves are created to provide a stable platform for long-term research on estuarine conditions and relevant coastal management issues. The System-Wide Monitoring Program (SWMP) delivers standardized measurements of short-term variability and long-term changes in water quality and biological systems, and maps land use and land cover characteristics across all reserves. The effort is focused on three ecosystem characteristics: abiotic characteristics (water temperature, salinity and quality, and weather); biotic characteristics (habitat types and species); and watershed and land use characteristics (land cover and elevation changes). Reserve-generated data meet federal geographical data standards and are available via the Reserve System's Centralized Data Management Office. Reserves also serve as sentinel sites for observing how coastal habitats respond to changing water levels. This program is guided by the reserves' System-wide Monitoring Program Plan, the Reserve Habitat Mapping and Change Plan, and Sentinel Sites Guidance.

The Reserve System also supports applied research through its Science Collaborative program and the Margaret A. Davidson Graduate Fellowship program. The Science Collaborative funds competitive research projects that engage end-users in the project design and address system-wide NERRS research and management needs. The goal of the Davidson Fellowship is to build the next generation of leaders in estuarine science and coastal management. The fellowship provides opportunities for graduate students to conduct research within a reserve under the guidance of a mentor who also supports their professional development. The Reserve System Strategic Plan outlines research objectives to maintain and expand biophysical and socioeconomic monitoring to track environmental change, increase the use of collaborative research to address decision-maker needs, and ensure that scientific, education, and management audiences can use the data, research results, and tools developed by the system.

4.1.2 KBNERR Research and Monitoring Program context

Setting and Context:
The KBNERR Research and Monitoring (R&M) program is place-based and focused on ecosystem aspects of Kachemak Bay and surrounding watersheds. The large size of the Reserve area and its proximity to the Gulf of Alaska make KBNERR an ideal long-term sentinel site for tracking, understanding, and interpreting larger-scale ecological shifts related to climate change in Southcentral Alaska.

Research is conducted both independently and in collaboration with regional, state, and national partners, resulting in numerous baseline and analytic datasets and maps. These provide key information for coastal decision-makers and the public and guide future studies. Research data supports developing effective, innovative solutions to coastal management problems and concerns. The Reserve is recognized as a regional leader of watershed research, in particular for the robust body of work in Kenai Lowlands watersheds-which are a center of human activity adjacent to the Reserve. Key coastal research activities led by the Reserve include detailed intertidal assessments (nutrient fluxes, plant, animal communities, biofilms), regional salt marsh mapping, studies of fish communities in freshwater, estuarine and nearshore habitats, socio-economic studies related to ecosystem services and cultural well-being, for example, regional groundwater models and peatland carbon assessments, and studies on the trophic impacts of harmful species. The Reserve works with diverse stakeholders, focusing on collaborative science with multi-sector engagement.

Emerging research needs are identified through the Reserve's Community Council and other partners. Reserve staff will actively seek grants and develop new studies, including citizen science and student opportunities to meet management plan objectives.

Monitoring initiatives, including the SWMP, salt marsh mapping and monitoring (including SSAM-1), and the Harmful Species Community-based monitoring program support short- and long-term data acquisition. SWMP tracks parameters such as water quality, meteorology, and salt marsh vegetation. The harmful species program focuses on HABs and marine invasive species such as European Green Crab and tunicates. SSAM-1 is the first

sentinel site application module developed for the NERR System SWMP data, and is focused on understanding changes in sea levels, inundation, and the associated responses of marsh, mangrove, and submerged aquatic vegetation. Efforts will be made to maintain our current monitoring, and expand on that monitoring and response preparedness as funding allows. KBNERR staff also partner on monitoring phytoplankton, zooplankton, oceanographic shifts, and continued tracking of relative sea level change.

Priority Issues:
KBNERR R&M efforts focus on three biophysical focal areas: oceanography, coastal ecology, and watershed ecology, all of which are being affected by changing climate. Examples of R&M areas of interest are listed above. Projects often combine environmental and biological research, monitoring, and analysis with spatial mapping techniques to provide useful Geographic Information System (GIS) products promoting holistic understanding of terrestrial, marine, and/or estuarine environments. Since the last management plan, discrete, grant-funded research projects continue to contribute to understanding of local and regional long-term trends and key ecological functions, including landscape connections supporting headwaters stream habitats for juvenile salmonids, and the downstream export of nutrients fueling lower river reaches, fish movements in estuaries, nearshore fish communities, HABs, marine ecosystem responses, groundwater aquifers, ocean circulation patterns and acidification (OA), salt marsh dynamics, peatland carbon studies, ecosystem services, coastal erosion, coastal habitat dynamics, and estuarine food webs.

Priority Audiences:
The program works to remain responsive to local needs so that it can contribute to the resiliency of coastal communities. Input from the KBNERR Community Council and periodic coastal decision-maker needs assessments help the R&M program identify local concerns and priorities. Reserve staff engage with coastal and regional resource managers, planners, research colleagues, and others to jointly identify R&M needs. Reserve staff also track national trends and topics relevant to the subarctic region. By sharing this information with decision-makers and local communities, KBNERR assists stakeholders in developing effective ways to help their communities adapt to change while promoting optimal, sustainable ecosystem functions. Important resource management decisions often occur at the local level, thus emphasizing the importance of local tribal and municipal organizations as end-users of our work.

4.1.3 KBNERR Research and Monitoring Program capacity

R&M program capacity depends primarily on a dedicated Research Coordinator, full time or part-time research technicians, facilities, and transportation (on-road and off-road vehicles and boats) funded through the Reserve operating award for continuation of the Reserve's monitoring programs. Capacity is enhanced through additional project-based grant funding which allows hire of additional staff (Research professionals and technicians) as well as creative partnerships involving a wide variety of entities. KBNERR historically involves other universities; state, federal, borough, and local agencies and governments; nonprofit organizations; and local schools in research and monitoring projects. Collaborative partners are identified in Appendix A. KBNERR capacity is also expanded by support available through the UA and the NERRS for professional training and technical support. The Science Collaborative offers competitive opportunities for funding of collaborative research, information and technology transfer, graduate education, and adaptive management to the development and application of science-based tools to detect, prevent, and reverse impacts of coastal pollution and habitat degradation in a time of climate change. The R&M program has a strong history of funding through the NERR Science Collaborative program, Kachemak Bay was designated as a NOAA Habitat Focus Area in 2016, which provided project support for bivalve studies. In 2019, the Reserve was designated as a Smithsonian Working Lands and Seascapes site, for Salmon and People studies and engagement.

4.1.4 KBNERR Research and Monitoring Program delivery

Program delivery is built upon system-wide monitoring requirements, engaging a variety of R&M partnerships and mechanisms for stakeholder involvement, which lead to the identification of key questions and concerns. This platform provides a base for developing proposals and designing projects to meet identified needs. Needs not readily addressed through KBNERR programs can be redirected to partners who have the appropriate expertise and programmatic resources.

R&M program delivery, as well as capacity, is enhanced by integrating R&M activities with KBNERR's outreach activities. This in turn promotes dissemination of R&M data. All Reserve staff (permanent, temporary, volunteer, intern, and visiting) work together to promote cross-training among programs, resulting in the ability of all personnel to help acquire and deliver R&M information. This creates efficient integration of programs, effective information sharing, and cross-fertilization of ideas.

NOAA performance measures are reported by R&M each fiscal year, including number of monitoring initiatives, students involved, grant proposals written, and grant proposals funded.

4.1.5 KBNERR Research and Monitoring Program future needs and opportunities

To identify and prioritize R&M needs, Reserve staff meet regularly to discuss activities and findings and to generate new ideas through cross-sectoral input and coordination. R&M capacity is constrained by limits on funding, time, and expertise and related limits on staff, facilities, and equipment. Funding uncertainty limits staff ability to aggressively pursue and take advantage of R&M opportunities as they arise. One of the biggest limitations in serving existing and additional research and monitoring needs are challenges with the Reserve's lab. The lab has not changed building ownership since the Reserve transferred from the Alaska Department of Fish and Game to the University. It is a priority to complete the building transfer so that the Reserve can pursue options for much needed upgrades and improvements to the existing facility.

Due to the rapidly changing climate, coastal environments face new challenges—among them sea level change, ocean acidification, changes in fresh and marine water temperatures, frequency and intensity of storm events, alterations in precipitation patterns, long-term drying trends in surrounding watersheds, rapid loss of coastal glaciers, ongoing coastal uplift, and spread of harmful species. KBNERR is on the forefront in initiating and implementing R&M efforts to collect information essential for recognizing and understanding such local and regional environmental change. The R&M staff work closely with the training program to incorporate feedback from local decision-makers and needs assessments.

4.1.6 KBNERR Research and Monitoring goals, objectives, and strategies

R&M staff take a leading role in the KBNERR overarching Goal 1: Through monitoring and research, they develop knowledge relevant to coastal communities, and have significant parts to play in all KBNERR goals and strategies to meet collective objectives.

4.2 Education Program

4.2.1 National Education Program

The NERRS seeks to enhance public awareness and understanding of estuarine areas and provide suitable opportunities for public education and interpretation. The NERRS increases estuary literacy among students, teachers, and the public through the KEEP and Conservation Action Education programs.

The KEEP helps educators bring estuarine science into the classroom through hands-on learning, experiments, fieldwork, and data explorations using grade-appropriate lessons, activities, and videos. Reserves also offer teacher development programs that use established coastal and estuarine science curricula aligned with state and national science education standards. TOTE workshops give teachers the opportunity to explore coastal habitats and conduct field investigations, learn how to integrate local and national monitoring data into the classroom, and gain hands-on experience using estuary education resources.

As part of the Conservation Action Education program, reserves conduct education and outreach activities that target culturally diverse audiences whose personal choices and collective actions to conserve, protect, and restore directly benefit the estuaries and their associated watersheds. Conservation Action Education programs foster and model behavioral change to promote resource conservation and support the mission of the NERRS.

The *Reserve System Strategic Plan* outlines education objectives designed to increase the public's awareness of and participation in stewardship activities; improve educators' and students' understanding and use of the NERRS and NOAA resources for place-based and inquiry-based learning; and grow and motivate the next generation of coastal professionals through access to programs and facilities that facilitate research, resource management, and educational opportunities.

4.2.2 KBNERR Education Program context

Setting and Context:
Our goal is to promote appreciation of the coastal environment, support understanding of coastal ecosystems, and foster stewardship. KBNERR prioritizes educational programming for Gulf of Alaska coastal communities, especially those connected to the coasts and watersheds of Kachemak Bay. Alignment with other programs within the University of Alaska system and regional entities enhances KBNERR capacity to connect with audiences state-wide, while collaboration with other reserves and NOAA partners extends programmatic reach through the Pacific region and to the national level. The Education Program operates in a setting consistent with the overall KBNERR context described in the introductory sections 2.3 Ecological characteristics and key species and 2.4 Social attributes and population demographics. The education program serves both local residents and students, as well as visitors, seasonal workers, and local and visiting teachers and student groups. Kachemak Bay resident populations fluctuate seasonally due to tourism and seasonal employment. Year to year, there are approximately 2000 students in the KBNERR service area in the southern Kenai Peninsula Schools (North side of Kachemak Bay/Homer Area=1812, South Side of Kachemak Bay Communities=145 in FY21).

In 2020, a market analysis and needs assessment were conducted in partnership with the Coastal Training Program to better understand the reserve niche. Interviews with learning service providers in the market and a survey of educator needs resulted in key recommendations for KBNERR programs. The results of this assessment were compiled in a stand alone report, and findings are integrated into this plan. Strategies and annual work plans for both sectors will be updated based on results of this market analysis and needs assessment, as well as routine formative assessment of programs. The Education Program 2021-2026 approach is informed by:

- Stakeholder interviews from a 2019 Ecosystem Services Assessment
- Section 315 Evaluation Findings for the Kachemak Bay (published 2020)
- Results of a 2020 Market Analysis and Needs Assessment
- Routine teacher and participant evaluation surveys
- Feedback from Education Subcommittee of the Community Council
- Informal exchanges and unsolicited feedback

Priority Audiences:
With a transition to UAA, raising the next generation of coastal and estuary residents and professionals is an important goal of reserve education programs. Regardless of each learner's path, however, the reserve offers rich education environments in a wide variety of content areas and accommodates a multitude of learning styles. The Reserve Education Program reaches formal educators via professional development opportunities, especially through the TOTE teacher trainings. School students in grades PK–6 participate in educational programming through Naturalist in the Classroom and other formal and informal programming. Middle and High School in school and out of school programs are developed on a case by case basis in response to teacher and student needs and requests, and focus on incorporating career development components. Community and conservation action education programming reaches residents and visitors in the Kachemak Bay region. The education program has identified the following target audiences to focus on for the next five years:

- Students of all levels, with increased attention to students in grades 7-12 and undergraduates
- Teachers and educators, including public and private schools and including university instructors
- Partners providing education about coastal environments (including members of the Kachemak Bay Environmental Education Alliance)
- Informal audiences, primarily adult residents and visitors who do not fall within the Coastal Training Program audience

Priority Issues:
Through a Market Analysis/Needs Assessment of educators in 2020, Reserve staff determined that the priority issues identified in the Needs Assessment, most were in alignment with the top issues that the Learning Service Providers focus on in their programs. Environmental Change, Community Engagement (noted as Stewardship Opportunities in the Needs Assessment survey), and Harmful Species are all top priority topics for the community and are also highlighted as focus issues by the market. Respondents to the Needs Assessment survey also indicated a high interest in learning more about Human Land Use Impacts. Despite less interest in the relevant engagement through the justice, equity, diversity and inclusion (JEDI) lens, this was identified as a gap in the Market Analysis as an area that programs could focus their efforts in. This would also move towards an increased focus on front line communities, non-traditional students and individuals interested in entering professions related to coastal and environmental issues.

4.2.3 KBNERR Education Program capacity

Internal and External Resources: The Education Program is the primary responsibility of the Education Coordinator and Education Specialist(s). The Education Coordinator position and tasks such as TOTE training are funded by the NOAA Operations award; education specialist(s) are dependent on additional extramural funding. Partner programs provide oversight, staff time, field sites and support by collaborating on joint programs, providing feedback on needs assessments and program design, and assisting with supplies and marketing. R&M and Administrative Research Technicians/Professionals assist with program content and delivery. KBNERR's Education Program has shifted in recent years away from providing programs at their facilities (catalyzed by the loss of the education classrooms at the Alaska Islands and Ocean Visitor Center [AIOVC]). Without a designated education venue with a fully equipped lab classroom, adjustments were made in how education was provided—with a new focus on place based learning with on-site or classroom-based approaches with one or two educators and other NERR staff or partners.

The Education Program capacity is determined by the ability to attract new funding sources. Most educational grants are highly competitive, especially larger national grants. National funders look for large outreach numbers, which is difficult to guarantee in rural Alaska. State and local grants are easier to obtain but generally cover 1 or 2 months of staff salary, requiring a patchwork of grants to piece together a year of programming. Additional options to increase capacity are building out a fee structure for payment for programs, although it is preferred to provide services free of charge to ensure access for target audiences.

Strategic Partnerships: Given these challenges, partnerships have played an increasingly significant role in KBNERR's educational capacity. Reserve educators have developed and fostered a growing number of mutually beneficial partnerships, especially through the Kachemak Bay Environmental Education Alliance (KBEEA). Key partners are listed below. Other education partners are identified in Appendix A.

- The Center for Alaskan Coastal Studies (CACS) – CACS and the Reserve coordinate as full partners in conducting long-term visioning, developing programs, and seeking grants
- AMNWR – Refuge education staff act as full partners with KBNERR education staff
- Project GRAD Kenai Peninsula (Project GRAD) – In school and afterschool programs within the Kenai Peninsula Borough School District (KPBSD)
- The Pratt Museum – The Pratt Museum and the Reserve coordinate as full partners in conducting long-term visioning, developing programs, and seeking grants
- ADF&G – youth salmon celebration and salmon in the classroom related programs

4.2.4 KBNERR Education Program alignment and delivery

KBNERR education programs engage students and the public in hands-on learning opportunities while conveying Reserve-based research and scientific findings. Education programs consist of Public Programs, School Programs, and Educator Programs. Education Programming is supported by both the Coastal Training and Research and Monitoring programs.

The following profiles of Education Programming provide details on how the Reserve has enacted the KBNERR Strategic Plan and the NOAA Education Strategic Plan. Future programs will respond to changes in internal capacity and partner and community needs, and are not limited to those described here. Written evaluations are completed by visiting teachers whose students participate in programs, and the Education program works with CTP for web based evaluation and tools which assists participants in rating training, including teacher professional development training and master naturalist training.

Public Programs:

- Estuary Hikes along Beluga Slough. These hour-long walks provide an overview of the natural history of Kachemak Bay. About a half a mile in length, walks originate at the Alaska Islands and Ocean Visitor Center and conclude at Bishop's Beach. Offered from mid-June through mid-August.
- The Making of a Research Reserve. This 30-minute presentation outlines the dramatic events leading up to the founding of the Kachemak Bay National Estuarine Research Reserve in 1999 and the cutting-edge research subsequently undertaken since the Reserve's inception. Conducted from mid-June through mid-August at the Alaska Islands and Ocean Visitor Center.
- Public Discovery Labs. Set in a lab classroom, these two-hour long programs cover a broad range of research topics including: tide-pool invertebrates, juvenile salmon, marine birds, volcanos and earthquakes along the Ring of Fire, Alaska's coastal weather and climate science, and more. Interactive content for all ages. Offered in partnership with the Alaska Islands and Ocean Visitor Center.
- Brown Bag Lunch Lectures. Hour-long talks highlighting coastal research conducted by Reserve staff and a breadth of area partners. Held at the Kachemak Bay Campus in Homer, part of Kenai Peninsula College. These lectures are offered August through April each year.
- Barley & O.A.T.s (Outdoor Adventure Talks) spotlight nature-based recreation throughout Alaska. These short, dynamic talks are held at Grace Ridge Brewing for a more relaxed setting. Offered September through May each year.

School Programs:

- Naturalist in the Classroom. These formal programs for KPBSD schools bring KBNERR educators into K-12 classrooms and out into the school yard. These hour-long programs cover a breadth of topics, and new program topics are offered monthly throughout the year. Teachers register during a call-in day in mid-August each year.
- K-12 Estuary Hikes engage students in an outdoor adventure to explore their local estuary up close and personal. Offered in May. Teachers register during a call-in day in mid-August each year.

Educator Programs:

- Teachers on the Estuary. This National Estuarine Research Reserve (NERR) program is implemented at all NERRs throughout the United States. TOTE is designed for formal and informal educators and includes field-based learning. Offered annually in June, this three-day for-credit workshop offers vetted, classroom-ready activities. Overarching topics will vary.
- Master Naturalist. This collaborative 1-week training prepares seasonal staff and interns at KBEEA member organizations to work in Kachemak Bay.

Internships and Fellowships:

- The NOAA Margaret A. Davidson Graduate Fellowship
- The NOAA Hollings Prep Program, NOAA Hollings Scholar, and NOAA Educational Partnership Programs support students in learning applied research methods at KBNERR.
- The Alaska Native Science and Engineering Program (ANSEP) partners with KBNERR for career explorations, and KBNERR hosts summer interns.
- The Semester by the Bay program at Kachemak Bay Campus, Kenai Peninsula College, UAA works with KBNERR staff who provide guest lectures, identify internship opportunities and mentor students.

4.2.5 KBNERR Education Program future needs and opportunities

There are several environmental education organizations in the greater Homer area that have programs covering overlapping topics. This is a challenge for KBNERR, which needs to create a distinct identity and to offer the community, students and educators valuable programming that isn't duplicative. Additionally, significant staff turnover within partner organizations in recent years has resulted in some confusion about how respective program decisions should be handled. Since the reserve transition to a UAA state partner, there is an opportunity and desire to bridge the historical gap in services KBNERR has experienced with secondary and post-secondary learners to ensure longitudinal student engagement and alignment with UAA student recruitment and success goals.

Recommendations from the 2020 Market Analysis and Needs Assessment for the KBNERR Education Program:

1. Increase Pathways to Post-Secondary Opportunities
2. Develop a Well-Rounded Approach to Student Engagement
3. Diversify Opportunities in Rural/Remote Communities
4. Provide Opportunities for Sustained Professional Development

In order to address unmet needs, the KBNERR Education Program must increase networked capacity and visibility, and partner efficiently and effectively. Partnerships with communities, schools and student supporting organizations (Project GRAD, Alaska Native Science & Engineering Program) will be important to identify potential students and co-create internship experiences. Collaborative grant writing with partners (CACS, Chugach Regional Resources Commission [CRRC]) can also be a means to expand programs and services to additional remote communities in the Gulf of Alaska bioregion. Self-guided and virtual curriculum and resources based on KBNERR and NERRS content would enhance the education program reach while minimizing potential travel costs.

4.2.6 KBNERR Education Program goals, objectives, and strategies

Education staff take a leading role in the KBNERR overarching Goal 2: Provide opportunities for all learners to improve coastal science literacy and have significant parts to play in all KBNERR goals and strategies to meet collective objectives to meet the needs for community relevant engagement.

4.3 Coastal Training Program (CTP)

4.3.1 National Coastal Training Program

The CTP provides up-to-date scientific information and skill-building opportunities to coastal decision-makers on relevant coastal management issues. Target audiences may vary for each reserve, but generally include local elected or appointed officials, managers of both public and private lands, natural resource managers, coastal and community planners, and coastal business owners and operators. They may also include such audiences as farmers, watershed councils, professional associations, recreation enthusiasts, researchers, and more.

The place-based nature of reserves makes them uniquely positioned to deliver pertinent information to these audiences. Each reserve conducts an analysis of the training market and assessment of audience needs to identify how best to deliver relevant training on priority issues to their area.

Partnerships are integral to the program's success. Reserves work closely with a host of local partners, as well as several NOAA programs, to determine key coastal resource issues and the appropriate target audiences and expertise needed to deliver relevant and accessible programs. The *Reserve System Strategic Plan* outlines coastal training objectives designed to ensure that coastal decision-makers and environmental professionals understand and effectively apply science-based tools, information, and planning approaches that support resilient estuaries and coastal communities.

4.3.2 KBNERR Coastal Training Program context

The KBNERR CTP works to enhance understanding, appreciation, stewardship, and management of Alaskan coastal resources and enable sustainable resource management. Since inception in 2002, the program has provided science-based training, technical assistance, and collaborative learning opportunities to coastal decision-makers on a wide range of coastal issues. Here, 'coastal decision-maker' describes any individual who makes regular decisions that impact the coastal or estuarine environments, either directly or indirectly, through their professional or volunteer activities. The approach for CTP has been adjusted from the last management plan to reflect changes in the training market, emerging issues, and state partnerships (now based within a University instead of a regulatory agency). In 2020, a market analysis and needs assessment were conducted in partnership with the Education Program to better understand the reserve niche. Interviews with learning service providers in the market and a survey of decision-maker needs resulted in key recommendations for KBNERR programs. The results of this assessment were compiled in a stand alone report, and findings are integrated into this plan.
The CTP 2021-2026 approach is informed by:

- Stakeholder interviews from a 2019 Ecosystem Services Assessment
- Section 315 Evaluation Findings for the Kachemak Bay (published 2020)
- Internal NOAA analysis of the CTP sector priorities and network dynamics (ERG, 2018)
- Results of a 2020 Market Analysis and Needs Assessment
- Routine workshop/training participant evaluation surveys
- Feedback from CTP advisors
- Informal exchanges and unsolicited feedback

Ecological and Socioeconomic Setting and context:
The CTP operates in a setting consistent with the overall KBNERR context described in the introductory sections 2.3 Ecological characteristics and key species and 2.4 Social attributes and population demographics. The geographic scope and service area of the CTP overlaps with that of the Research, Monitoring and Education sectors and focuses primarily in the Gulf of Alaska bioregion, but can apply more broadly to coastal Alaska. Coastal decision-makers can be located outside the KBNERR geographic area in hub cities (Anchorage, Fairbanks, Juneau) and may have little familiarity with, or even interest in, Kachemak Bay environments and communities even though their actions influence the management of KBNERR.

Priority Issues/Training Needs
The basis of CTP priority issues and decision-maker training needs come from a peninsula-wide coastal decision-maker needs assessment conducted in 2020 and a KBNERR program 315 evaluation conducted by NOAA OCM,

in 2020. Since 2015, when UAA ACCS replaced ADF&G as the Reserve's state partner, CTP has incorporated into program delivery the mission and goals of ACCS along with the NERRS Strategic Plan. ACCS focuses on facilitating conservation and management of natural resources through data synthesis projects and technical assistance with increased access to conservation data. As part of a 2018 analysis of the CTP sector priority training and technical assistance topics and the network dynamics the CTP sector developed the consensus definition of a priority topic as one that:

- Uses the CTP's niche capabilities while advancing the mission of the Reserve; and
- Is considered important to target audiences and/or advisory groups and/or addresses a science-based need identified by the Reserve or its stakeholders

Unique conditions in Alaska make the following issues priorities, particularly on the Kenai Peninsula, where ecological functions are relatively intact, providing a myriad of ecosystem services to residents and visitors. In a low-regulatory environment, conservation and effective resource and land use planning are desired approaches instead of habitat restoration and mitigation. Additionally, climate impacts have been observed in the Gulf of Alaska and statewide, raising concerns and reflecting the immediacy of an adaptive response to these issues. Fish habitat (in the watershed, nearshore and ocean environments) is of particular concern to local audiences as Alaskan commercial, subsistence, and recreational fishing significantly contribute to the economic and cultural resilience of the population. In addition, CTP uses the positive and negative perceptions of natural resource management, policy, and practices from an Ecosystem Services Assessment (Flaherty et al., 2019) to inform CTP training needs in regard to the context of state and local decision-making (Table 7). Perceptions of resource management are useful in understanding opinions and attitudes, as well as in improving communication between organizations and the community.

Table 7. Negative and positive perceptions of natural resource management
(% of Interviews = total percentage of interviews that contained the associated threat) (n = 31).

Negative Perceptions

Natural Resource Management

Management-Related Topic	*% of Interviews*
Science Gaps	51
Fisheries Management	45
Agency Budget Constraints	35
Political Influence	25
Disjointed/Ineffective Management/Policies	19
Insufficient Enforcement	9

Positive Perceptions

Natural Resource Management

Management-Related Topic	*% of Interviews*
Federal & State Policies and Protections	58
Local Policies & Protections	29
Scientific Research	26

The highest request for training and technical assistance by coastal decision-makers has been for coastal science knowledge transfer, specifically on climate change impacts, fish and wildlife management in a changing climate, habitat protection, and cumulative impacts. Additional technical training and skill development topics have been requested that allow people to more effectively use coastal science, such as effective public outreach and engagement, how to communicate science, planning for climate change, sustainable design and development, permitting and planning processes, geospatial mapping, invasive species identification and response, and other ecosystem-based management tool trainings. Results of the 2020 Needs Assessment indicated that climate change, conservation biology, ecosystem-based management, oceanography, and cumulative impacts were topics of high interest for CTP audiences. In recent years CTP has developed trainings that address these topics while integrating up-to-date local research and monitoring data.

To refine the priority issues and training needs highlighted in the Needs Assessment for this management plan, the KBNERR team first met in a strategic planning process. The KBNERR Community Council and Education and Research Subcommittees also met as a part of a program review by NOAA OCM in 2018-2019 to select priority coastal management issues of the KBNERR. While the priority issues are fairly broad in nature, they are all connected and influence the way in which we inhabit this coastal area and support KBNERR efforts and its ability to effectively fulfill its mission. The following topics align with strategic goals and reinforce the priorities from the Needs Assessment:

- **Understanding Environmental Change**: Enhancing community resilience to prepare for or prevent impacts of climate change
    - Training Needs: Water quality, extreme weather, marine toxins and HABs, invasive species, ocean acidification, freshwater resources, coastal erosion and shoreline change, flooding, glacier loss, habitat loss, climate mitigation and adaptation ecosystem services
- **Understanding Land Use and Human Impacts**: Providing science to mitigate anthropogenic stressors and maintain coastal ecosystem services
    - Training Needs: Siting industrial and commercial activities, natural infrastructure solutions, monitoring socio-economic change, managing visitor use, ecological functions and ecosystem connectivity
- **Community Relevant Engagement**: Building capacity to connect with stakeholders and contextualize place-based research in decision-making
    - Training Needs: Effective public outreach and education, sustainable design and development, suitability mapping, planning for climate change
- **Long-Term Ecosystem Monitoring**: Understanding drivers of habitat quality, biodiversity and ecology of species of local importance
    - Training Needs: Harvestable species: groundfish, anadromous fish, shellfish; utilization species: migratory shorebirds and waterfowl, marine mammals

Emerging skills training needs in the next five years are based in social science, new technology and tools for more effectively understanding and communicating coastal management issues. Examples are ecosystem service valuation, resource economics, land and resource use conflict resolution, effective virtual stakeholder engagement, community based social marketing, and risk communication skills. Emerging topical issues or training needs that are anticipated in the next five years will potentially be cross-linked to more than one priority topic such as resource use and development pressure in a changing climate. Example topics:

- Increasing HAB risk with growing mariculture industry or wild shellfish harvest
- Drought in tandem with increasing agriculture and material extraction activity in watersheds

The KBNERR CTP has already offered workshops, trainings and/or technical assistance opportunities on most of the topics listed, and the program will continue to offer, develop, and expand its training opportunities to address the key issues outlined in current and future needs assessments based on periodic review and as new decision-makers are identified in the region.

Priority Audiences

While the efforts of the KBNERR's education programs make information available to a wide audience of residents and visitors (preK-16 students, families, adults), the primary audiences of the CTP are coastal decision-makers (Table 8). Here, 'coastal decision-maker' describes any individual who makes regular decisions that impact the coastal or estuarine environments, either directly or indirectly, through their professional or volunteer activities. They can be divided into four general categories:

- Coastal **policy decision-makers** at all levels (local, tribal, borough, state, federal), including elected officials, land use and resource planners, and regulatory agencies
- Coastal **resource and land managers** at the local, tribal, borough, state, and federal, levels
- Coastal **resource user groups**, including local business and community stakeholders—this varied group ranges from land developers, tourism businesses, and recreators to environmental and educational non-profits

- **Researchers** from varied backgrounds and disciplines interested in conducting research or developing multidisciplinary partnerships

Table 8: Priority CTP audience categories and example entities

Audience Type	Example Entities
Policy DMs Local-State Government *staff, elected and appointed officials*	City of Homer City of Seldovia Kenai Peninsula Borough Seldovia Village Tribe Port Graham Tribal Council Nanwalek IRA Council Ninilchik Traditional Council
Land Managers Landowners *staff of corporations, land trusts*	KPB Land Management Kachemak Heritage Land Trust SOA Department of Natural Resources Cook Inlet Regional Inc. Tribal Corporation Kenai National Wildlife Refuge Kenai Fjords National Park Alaska Maritime National Wildlife Refuge
Resource Managers *Regulatory Agency Staff*	SOA Department of Fish and Game- Sport, Commercial, Subsistence and Habitat Divisions SOA Department of Environmental Conservation- Division of Environmental Health SOA Department of Natural Resources- State Parks SOA Department of Health and Social Services- Division of Public Health NOAA Fisheries Enforcement Field Office
Resource users *Businesses, staff of nonprofits, advocates, educators*	Fishermen Tourism Businesses Mariculture Operators Chamber of Commerce Homer Soil and Water Conservation District Kenai Watershed Forum
Researchers *academics, conservation*	NOAA NCCOS Kasitsna Bay Lab University of Alaska: University of Alaska Fairbanks' College of Fisheries and Ocean Sciences, UAA ACCS, UAA Kenai Peninsula College Alaska Pacific University Cook Inletkeeper Cook Inlet Regional Citizens Advisory Council United States Geological Survey Smithsonian Institute

In the 2019 Ecosystem Services assessment most interviewees emphasized that responsibility for local resource management largely falls to state and local authorities and felt federal influence over the Kachemak Bay area's resources was fairly removed. The most frequently mentioned management and regulatory authorities include ADF&G, City of Homer Planning Commission, and KPB. ADF&G was most often discussed in the context of fishery and wildlife management, while the Homer Planning Commission and KPB were largely tied to land use and development decision-making. These perceptions of coastal decision makers are important for CTP to target investment for training and technical assistance, and guide partnership efforts to support science-based management communication goals.

Alignment within the Reserve

Like all KBNERR programmatic sectors, CTP leverages KBNERR and NERR system-wide resources to create effective training opportunities for diverse audiences. Specific initiatives and projects are detailed in the strategic partnerships section (4.3.3).

CTP provides expertise in collaborative project design and evaluation, as well as stakeholder engagement and social science tools that enhance capacity to attract extramural funding. Typically, emerging priority training issues parallel new research and monitoring lines of inquiry, as stakeholder needs are identified through CTP engagement and evaluation, and research and monitoring staff discover innovative research and methods and develop new coastal science to connect with decision-makers. CTP training and technical assistance experts work with Research and Monitoring sectors to root stakeholder engagement and training programs in KBNERR science, drawing on research, data and expertise of Research and Monitoring staff. CTP works closely with the Education Program to translate place-based research into place-based learning opportunities for both programs' audiences. CTP and education staff collaboratively plan mutually beneficial holistic engagement, such as offering topical or thematic in-school programs, community leader training, and technical assistance on the same day in remote communities. CTP also works with Education to facilitate intergenerational and place-based learning opportunities, connecting students and coastal decision-makers.

CTP contributes to system-wide sector planning and initiatives through performance monitoring and success stories. CTP also provides unique perspectives in incorporating local knowledge and creative engagement strategies from a rural subarctic setting to the national NERR story.

4.3.3 Coastal Training Program capacity

Capacity
CTP tasks are funded by the NOAA Operations award; the CTP Coordinator position and research technician(s) are dependent on additional extramural funding. Partner programs provide oversight, staff time, and in-kind support by participating on the KBNERR CTP's Advisory Committee, providing feedback on needs assessments and program design, and assisting with supplies and marketing. As a leading sector in engaging social science tools and expertise in the NERR system, there are future opportunities to increase capacity by seeking extramural funds on emerging coastal socio-economic issues. Additional options to increase capacity are building out a fee structure for payment for training, although it is preferred to provide services free of charge to ensure access for target audiences.

Strategic Partnerships
Social networking and participating in cross-sector and community events supports existing relationships and attracts potential partners. CTP also participates in multidisciplinary workgroups focused on local, regional, or state issues. This enables CTP to share current research findings and promote science-informed resource management. Participating in workgroups also familiarizes KBNERR CTP staff with partner informational needs. Specific active partnership activities are listed in Appendix A include:

- With Education and training sectors:
    - Staff work together to design and evaluate Master Naturalist and TOTE training, coordinate topics for youth and community engagement with professional and decision maker training so the whole population is talking about the same thing (unified approach)
    - Accessing decision makers through multi-generational events, co-presenting with youth into governing bodies, or offering joint programming to youth and decision makers when traveling to remote communities
    - Design and evaluate conservation action education collaborative learning processes.
- With R&M sectors:
    - Co-producing workshops and training with research and professional partners
    - Identifying end user needs, writing grant proposals

- Within the Reserve System:
    - NERR Science Collaborative Research Projects
    - Topical or Methods Science Transfers
    - Informal NERR exchanges
    - Routine CTP Sector Engagement

- With External Programs. CTP commonly works with external programs and initiatives outside the Reserve system. CTP is involved or takes a leadership role in several collaborative local and regional programs, including:
    - Ad-hoc or routine multi-partner workgroups and coalitions (Kachemak Bay and Lower Cook Inlet Marine Ecosystem Workgroup, Woodard Creek Coalition, MAPP)
    - Issue-driven policy workgroups (Material Site Extraction, Habitat Protection Districts, Climate Resilience and Sustainability)
    - Coordinating Partner of the triennial Kachemak Bay Science Conference (KBSC)

Training Partnerships

Local, state and national partnership opportunities are important for effective training delivery. A statewide market analysis was conducted initially in 2002, and updates were made in Fall 2009 through phone interviews, feedback from the CTP Advisory Committee, and internet searches. The goal of the market analysis is to determine regional training efforts already in existence to avoid duplication by the KBNERR CTP. In addition to helping determine the KBNERR CTP 'niche', the market analysis identifies partnership opportunities for program delivery. The most common types of training that occur on the Kenai Peninsula outside of the CTP are public meetings, agency-specific training/workshops, citizen science training, and training for required certifications. Overall, the market analysis results emphasize the absence of redundant services on the Kenai Peninsula. Most organizations on the Kenai Peninsula that were part of the market analysis do not provide regular training/workshops to coastal decision-maker audiences, all of them, however, could provide or already have provided partnerships for coordinated training events.

This finding was reconfirmed through a 2018 NOAA internal analysis of the CTP sector priority training and technical assistance topics and the network dynamics (Figures 12 and 13). The KBNERR CTP provided data on key partners that included:

- Any organization that touches the funding for the reserve (provide, pass-through or manage funds)
- The responsible entities for the program (state and federal partners, local council)
- Entities that are responsible for the operation and success of the program (administrative partners)
- Entities that send staff to training sessions (including entities that provide grants) on a regular basis
- Entities that are responsible for helping the CTP meet its management goals. This includes other entities that are providing training in the area, as well as entities that provide "in-kind" services such as entities that work with or assist you in planning/implementing training or technical assistance that provide training space/materials

Training partnerships span the spectrum of networking (weakest collaboration), cooperation, coordination, coalition to collaboration (strongest collaboration). The nature and level of collaboration varies among CTP partners, depending on the 'type' of partner (e.g., federal, state), whether they engage through training, technical assistance or both, and the potential for partners to extend the reach or leverage the CTP impact. Below are key local, regional, state and national training partners, for additional information about these and other CTP partners, see Appendix A.

- National key partners for CTP are the NOAA Digital Coast Academy, NOAA Office for Coastal Management Learning Services Division, the NERR Science Collaborative, and individual and groups of other NERRs in the national system.
- Statewide organizations and agencies that KBNERR regularly partners with include the Alaska Sea Grant & Marine Advisory Program, ADF&G, Alaska Ocean Observing System (AOOS), and the UA system.
- Regional partners on the Kenai Peninsula include the Kenai River Center agencies (KPB, ADF&G, U.S. Fish and Wildlife Service [USFWS], Environmental Protection Agency [EPA], and State Parks), the Kenai Watershed Forum, and regional non-profit organizations.
- Local partnerships within Kachemak Bay include CACS, City of Homer, Cook Inletkeeper, HSWCD, Kachemak Heritage Land Trust, Seldovia Village Tribe, NOAA NCCOS Kasitsna Bay Lab, and local non-profit organizations.

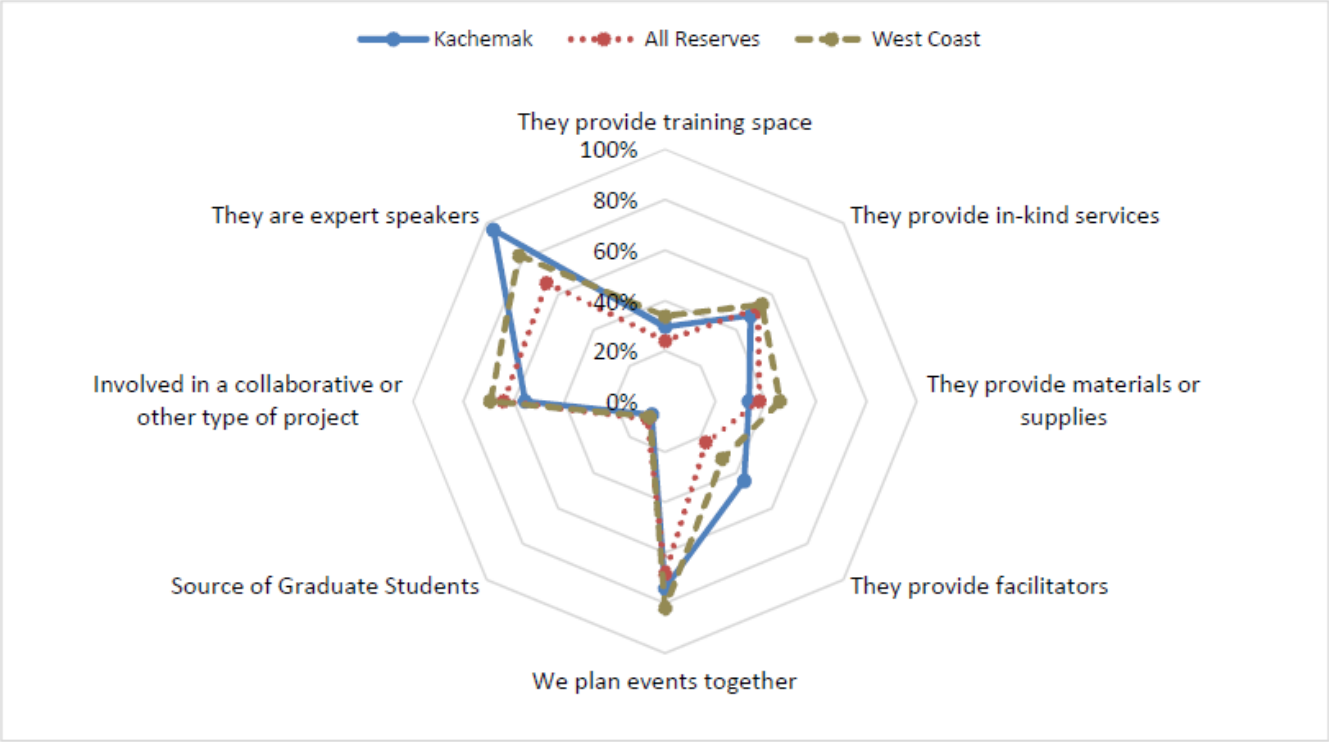

Figure 12. Analysis of the KBNERR CTP, regional CTP and NERRS CTP partner network dynamics (ERG, 2018)

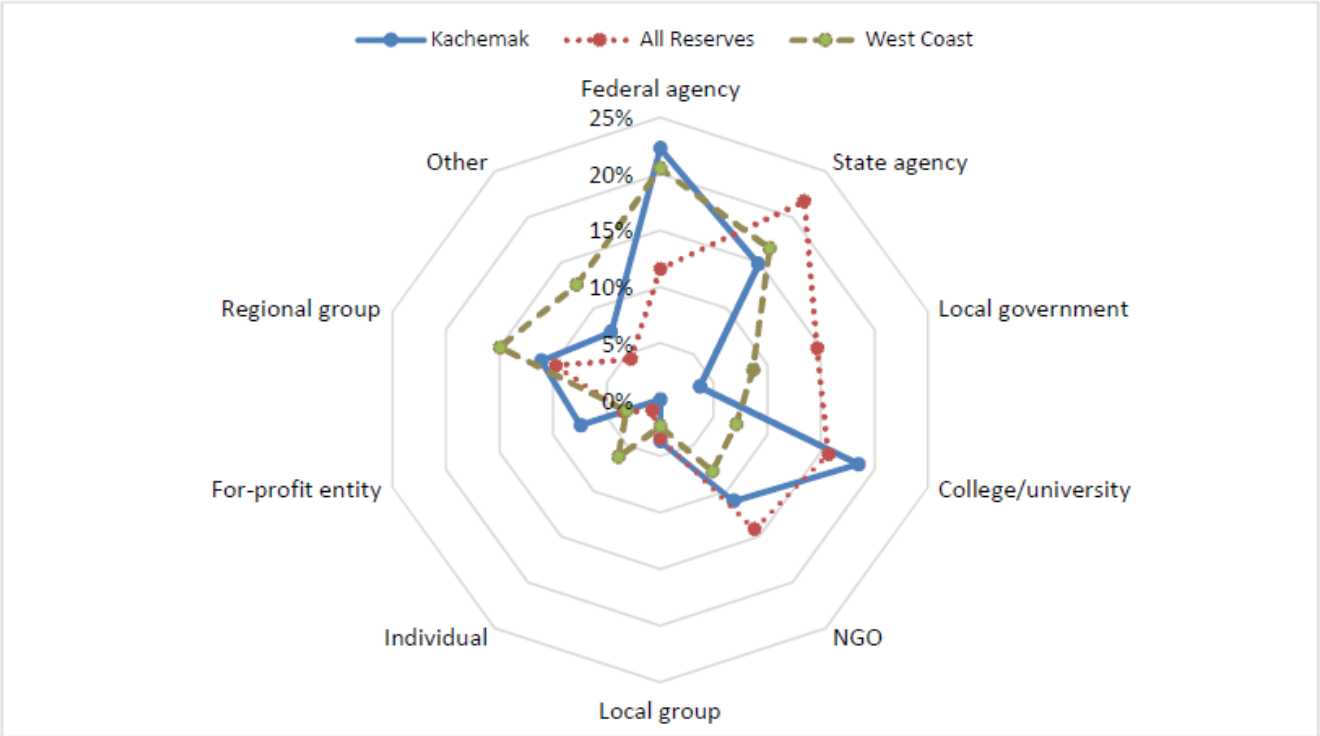

Figure 13. Analysis of the KBNERR CTP, regional CTP and NERRS CTP partners (ERG, 2018)

KBNERR is fairly aligned with both the national system and west coast reserves in the way it works with partners, and partner dynamics (Figure 12). KBNERR partners less frequently with local government entities than other reserves (Figure 13). Future opportunities include working more with:

- Professionals and local government departments who interact with larger audiences for other reasons- stakeholder liaisons or nodes like planners and permitters, economic development and commerce groups.
- Advocacy organizations that enhance stewardship outcomes and community based social marketing

4.3.4 Coastal Training Program delivery

Target audiences for CTP offerings are described in detail in section 4.3.2 KBNERR Coastal Training Program context. To serve these diverse audiences, CTP develops offerings in a variety of formats tailored to the needs and backgrounds of different groups. Formats include seminars, hands-on skills training, lectures and demonstrations, collaborative roundtable workshops, presentations to specific decision-making bodies, and guided educational field trips and field-based training. CTP also develops products such as graphics, GIS-based story maps, and publications to deliver information useful and relevant to specific audiences. Training events and educational products that are organized for one audience, like a policy maker, can additionally benefit and serve other coastal decision-makers, such as industry representatives.

The majority of training events occur at UAA's Kachemak Bay Campus (KBC) of the Kenai Peninsula College or the AIOVC in Homer due to the concentration of coastal decision-makers in the area, and the excellent training venues. The Kenai River Center in Kenai-Soldotna, located equidistantly between Seward and Homer, is also a primary location for training delivery, particularly for trainings of peninsula-wide interest. Due to capacity and need, focus for training delivery has remained on the Kenai Peninsula. An exception is when CTP can fill statewide needs and recruitment of larger audiences is necessary. The statewide training approach relates to coastal management topics and skills-based training in the absence of a state Coastal Zone Management Program, and to serve additional training needs for UA. Statewide training venues include the Gorsuch Commons at UAA in Anchorage, and conference centers when training is delivered as part of regional or state workshops, conferences and symposia.

The KBNERR CTP continues to foster external partnerships with government agencies, non-profit organizations, and academic institutions to leverage resources for program design, marketing, and delivery. Results from workshop evaluations and decision-maker preferences drive selection of format and delivery methods. Generally, workshop lengths of 2 hours to 2 days are preferred, and considerations for supervisory approval, low-cost, and close proximity of workshop delivery increase participation. Annual activities for CTP depend upon current interest and need to address locally relevant issues (including coastal erosion, flooding, HABs, groundwater resources, and risk communication) and decision-maker needs. One or more topics or audiences may be targeted annually in a comprehensive initiative to provide training and supporting technical assistance to address priority management issues. These initiatives can be designed within the CTP annual work plan or be supported by external grant funding.

Training and technical assistance approaches and activities:

- Deliver coastal science and technological training topics based on recent needs assessments, KBNERR priorities, CTP Advisory feedback & partnerships, and opportunistic events
- Continually identify barriers and gaps through informal conversations and formal evaluations after the completion of workshops and/or training
- Coordinate issue or topically driven workgroups to increase the opportunities of coastal scientists to network, coordinate, and share their plans/results to support ecosystem-based management. Coordinate additional outreach of these scientists' efforts and results
- Participate in directed collaborative efforts such as Science Collaborative projects, and coordinate science outreach through workshops, conferences, colloquiums, and/or distributed written materials
- Coordinate science communication workshops to facilitate better exchange between scientists, the media, and the public
- Continue to use informal requests and unsolicited feedback on evaluations to identify needs and shape training events
- Meet consistently with and provide updates to CTP Advisors, KBNERR management team and partners to discuss CTP and KBNERR priorities and upcoming events
- Request evaluations for each effort and report these in the NERR performance measures. Use additional details to inform the local KBNERR CTP efforts
- Maintain the KBNERR website and utilize local and statewide partners, radio, newspaper, and electronic listservs to outreach each CTP events (where appropriate)

- Contribute to the overarching reserve communication and marketing plan. This will include the creation of an outreach 'how to' that provides templates and checklists for delivering an effective outreach and marketing effort

4.3.5 Coastal Training Program future needs and opportunities

CTP monitors local decision-making frameworks and processes such as elected and appointed bodies, long term collaborative planning processes, and agency initiatives to address training needs on an ongoing basis. CTP detects emerging issues at the local, regional and statewide level and incorporates system-wide priorities and NOAA OCM resources to deliver to priority audiences. Recommendations from the 2020 Market Analysis and Needs Assessment for the KBNERR CTP:

1. Engage Communities in Building Capacity and Resiliency to Combat Climate Change
2. Streamline Partnerships with Decision Makers and Leadership
3. Increase Participation and Availability of Distance Delivery Training
4. Develop a Framework for Teaching Science Communication through the Lens of JEDI

Opportunities exist for the Reserve to increase its outreach to and involvement with Kachemak Bay communities beyond Homer. KBNERR collects information relevant to residents of all communities surrounding Kachemak Bay, including the three Native villages on the south side of the bay—Seldovia, Port Graham, and Nanwalek—and the four Russian 'Old Believer' villages on the north side, three near the head of the bay—Razdolna, Kachemak Selo, and Voznesenka—and Nikolaevsk in the Anchor River watershed. Opportunities exist to geographically expand training and technical assistance based on KBNERR research and monitoring relevant to Gulf of Alaska Coast and Cook Inlet Basin ecoregions, particularly in partnership with organizations that serve the seven tribes of the CRRC, and regional citizens advisory councils (Prince William Sound Regional Citizen Advisory Council [PWSRCAC] and Cook Inlet Regional Citizen Advisory Council [CIRCAC]). Statewide expansion could leverage UA community campuses and distance delivery capacity to reach more rural Alaskan communities that could benefit from KBNERR training and technical assistance. Moving forward, the Reserve, while leveraging its vast network of partnership organizations in the greater market, should continue to work towards closing the gap on topics, issues, and skill development identified as needs of the community.

4.3.6 Strategies for CTP monitoring and evaluation

The CTP requires a systematic approach to clarify the Reserve's niche in the training market and to develop appropriate offerings. Needs assessments of particular audiences are used to determine issues and topics of greatest interest, which then guide development of CTP workshops. Achievement of short-term outcomes are measured through workshop/training participant evaluation surveys, informal exchanges, and unsolicited feedback, and is recorded quarterly for the NERR performance measures. Mid- and long-term outcomes will be determined from a combination of success stories, reflection and analysis of progress or change over time, and formal evaluation techniques, such as external program evaluation.

To enhance the training and technical assistance of the Kenai Peninsula and Coastal Alaska decision-makers, the KBNERR CTP is guided by the KBNERR Community Council with special oversight by the Education Subcommittee and targeted advice from core statewide partners who cannot attend regularly scheduled meetings in Homer. Statewide advisors to the CTP include UAA ACCS, NOAA regional, Alaska Sea Grant, AOOS, CRRC, and Prince William Sound Science Center staff who provide guidance, program reviews, and additional perspectives on program development. The KBNERR Community Council Education Subcommittee meets quarterly to discuss upcoming goals, activities, and possible partnership efforts between the KBNERR CTP and other organizations within and outside the committee membership. The statewide advisors help to ensure effective statewide communication and efforts of coastal science outreach. The KBNERR CTP also collaborates and coordinates with a wide range of additional government, university, and non-profit partners (see Appendix B for description of KBNERR Community Council and Subcommittees and Appendix C for CTP advisory partners list).

4.3.7 KBNERR CTP goals, objectives, and strategies

CTP Mission: Enhance understanding, appreciation, stewardship, and ecosystem management of Alaskan coastal ecosystems by providing science-based training, technical assistance, and collaborative learning opportunities to decision-makers.

CTP Goal: To inform and enhance collaborative decision-making for the sustainability of Alaskan coastal ecosystems, particularly in Kachemak Bay and the Kenai Peninsula in the Gulf of Alaska.

Training staff take a leading role in the KBNERR overarching Goal 3. Build capacity for coastal stewardship through information exchange, skills-building, and partnerships and have significant parts to play in all KBNERR goals and strategies to meet collective objectives. Desired program outcomes for the next five years are reflected in the CTP Logic Model (Figure 14).

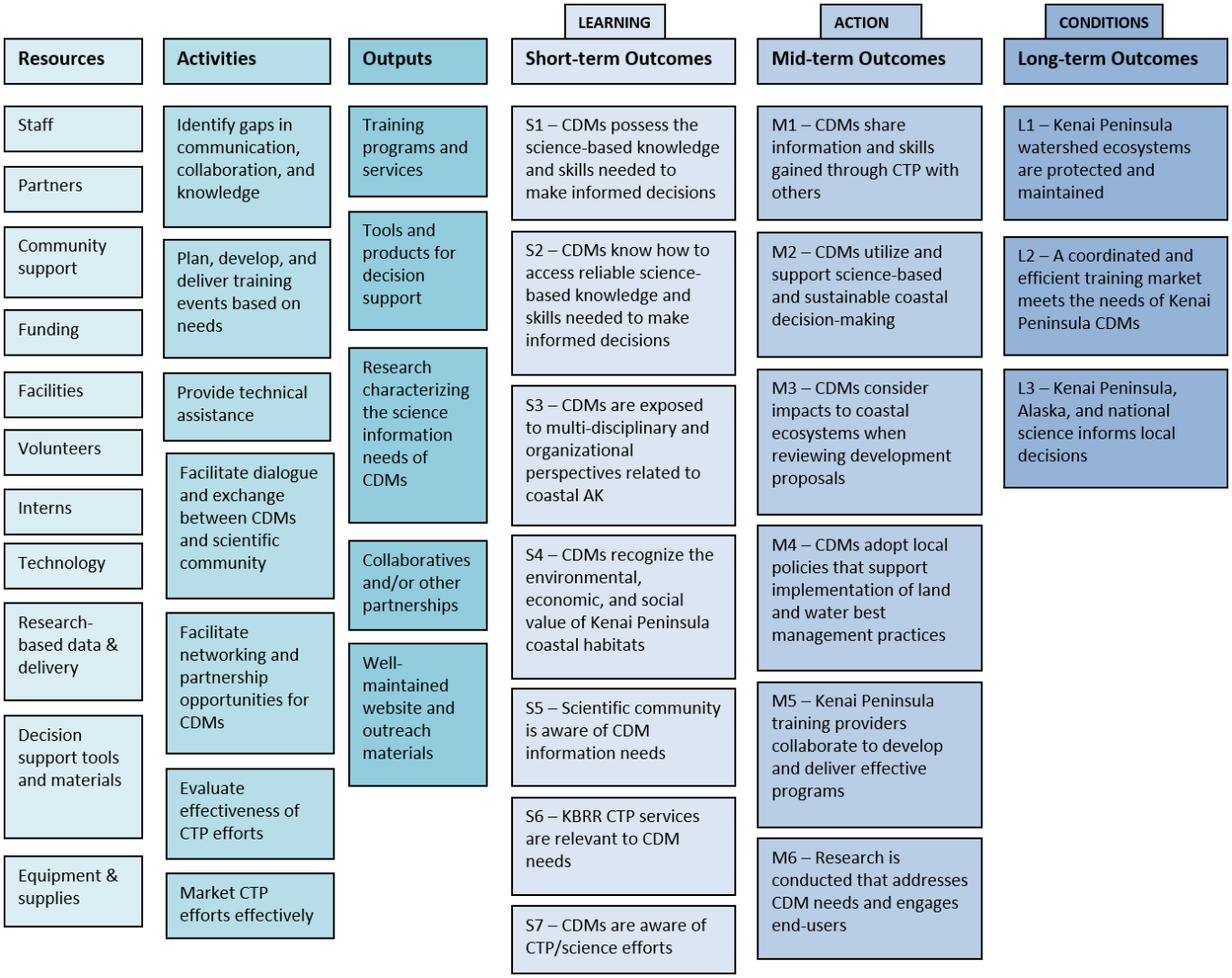

Figure 14. KBNERR CTP logic model

5 Administration and staffing

5.1 Background

KBNERR is characterized by a small, close-knit staff focused on key NERR programmatic sectors. Reserve staff regularly collaborate on grant writing, field research, monitoring, outreach, and educational programs. All staff members have the responsibility to deliver coastal knowledge to community audiences and decision-makers, who benefit from direct communication with researchers. Staff benefit from opportunities for professional development and cross training to hone science communication skills and a deeper understanding of the range of research methods and data-collection processes. Seasoned staff make special efforts to bring new staff (as well as interns and students) into the field to assist with data collection at different sites and for different projects. Time spent in the field translates to a more articulate explanation of research and results when informing decision-makers and presenting to local audiences.

KBNERR administration and staffing have undergone a significant transition since the previous management plan. In 2014, the state decided that the ADF&G was no longer able to serve as the lead agency for the Reserve. During FY2014 (July 2014–June 2015), Reserve staff developed a six-page prospectus and approached both the University of Alaska Fairbanks' (UAF's) College of Fisheries and Ocean Sciences, and ACCS to evaluate their interest in and ability to become the state administrative partner. After several meetings between KBNERR, NOAA, ACCS staff, and UAA's Dean of the College of Arts and Science, a Memorandum of Agreement was drafted and UAA became the state administrative partner effective July 1, 2015. Five existing staff made the transition and became university employees, moving offices to the Field Station modular office and bunkhouse on Kachemak Dr. Although this transition occurred recently, the Reserve is already networking more broadly within the region and state and successfully attracting new funding sources. A significant advantage to transitioning from ADF&G oversight to oversight by an academic partner is an increased ability to apply for funding outside the mission of ADF&G's Sport Fish Division to meet the community needs more holistically. The UAA ACCS program fosters research, education, and collaboration on biological conservation and natural resource management in Alaska and the Arctic, including supporting data catalogs, data portals, and other conservation services for decision-making. Additionally, as part of the state university system, the program encourages student engagement and research from across the state (Figure 15).

Another benefit is a change in staff structure. Rather than the steeply hierarchical structure characteristic of ADF&G, staff structure has flattened, allowing a more collaborative approach to decision-making, grant writing, and program delivery (Figure 16).

5.2 Organizational framework and charts

5.2.1 Organizational chart, Alaska Center for Conservation Science, University of Alaska, Anchorage

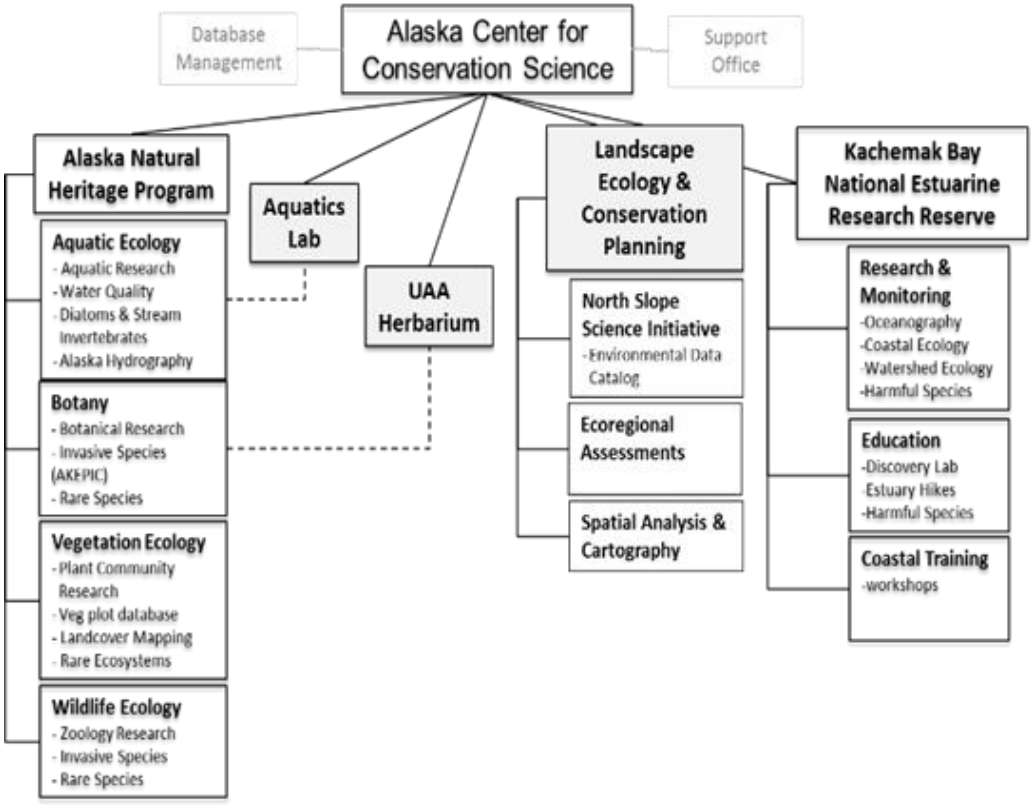

Figure 15. Organizational chart of ACCS at the time of the KBNERR transfer.

5.2.2 Organizational chart, Kachemak Bay National Estuarine Research Reserve

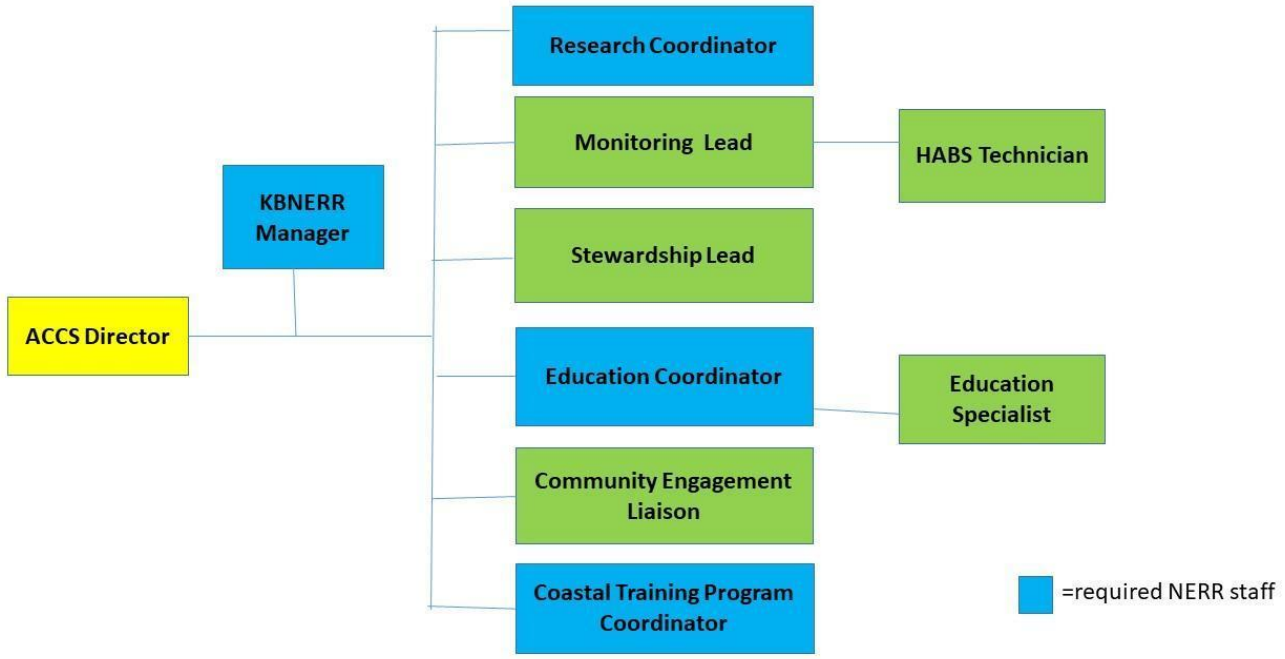

Figure 16. Organizational chart of KBNERR

5.3 Staffing needs and plan

The Reserve has experienced significant staffing gaps over many years. Between 2014 to 2018, the Education Coordinator served as Acting Manager. The Manager hired in 2018 also serves as the coordinator for the watershed research program. There have been three CTP Coordinators and six administrative support staff since the last management plan. In July 2017, the Research Coordinator position was vacated, and has now been filled. For the Reserve to maintain the level of productive research, education and engagement with the creative zeal that has become a hallmark, staffing will need to be stabilized, and include opportunities for advancement. However, the staffing plan has to be balanced with the very real financial limitations that the Reserve faces. For long term stability, we have outlined a plan that includes three coordinators who will be responsible for leadership of the Reserve's Research, Education, and Coastal Training Programs. Each of these positions will also be responsible for grant writing. These positions, in addition to the Reserve Manager are required positions for each Reserve. Additional permanent Reserve staff include a Monitoring Lead who handles the Reserves long term monitoring efforts, a Stewardship Lead, who handles the Reserve's GIS efforts, and a Community Engagement Liaison, who will handle the Reserve's outreach and communications, and assist with volunteers and student programs. Additional temporary technicians and interns will be taken on a project need basis. All Reserve positions will be overseen by the Reserve Manager at KBNERR, and the Director of ACCS. For this staff to be efficient in delivery of the Reserve's mission, the Manager and Coordinators will need to work collaboratively across sectors. This cross-sector way of working is reflected throughout the objectives and strategies outlined in this management plan.

5.4 KBNERR Partnerships

As noted in section 2 Local management of the Reserve, KBNERR's key federal and state partners are, respectively, NOAA's OCM, NERRS, and UAA ACCS. KBNERR's vision and mission complement those of its state and federal partners and its Strategic Plan (section 3) provides a framework for guiding key partnerships.

Developing other active and effective partnerships is a priority and strength of KBNERR. As Goal 3, Objective 4 specifies in section 3, "By 2026, the Reserve will engage in collaborative forums to maintain and grow

partnerships." As is clear from discussions of KBNERR programmatic sectors in section 4 Program foundations, many partnerships significantly leverage, strengthen and expand KBNERR programs and operations. Partnerships also dramatically expand the resources and expertise the Reserve can bring to bear in its information gathering, educational outreach, coastal training, and problem-solving efforts. The striking diversity of KBNERR partners—federal and state agencies, local governments, academic and non-profit organizations, community groups, etc.—and the types of partnerships maintained are summarized in Appendix A. These partnerships reflect five general levels of engagement (Table 9).

Table 9. Levels of engagement of KBNERR partnerships

Members belong to one system, consensus is reached for all decisions Frequent communication is characterized by shared trust	**Collaboration (strongest collaboration)**
Share ideas, share resources, Frequent and prioritized communications, All members have a vote in decision-making	**Coalition**
Share information and resources, defined roles Frequent communications, some shared decision-making	**Coordination**
Provide information to each other, somewhat defined roles Formal communications, all decisions made independently	**Cooperation**
Aware of organization, loosely defined roles All decisions are made independently	**Networking (weakest collaboration)**

5.4.1 Partnership Matrix

In addition to its key federal and state partners referenced throughout this plan, a wide variety of other entities work with KBNERR and, in countless ways, support its activities and operations. The variety of these partnerships is suggested in the Partnership Matrix. The Partnership Matrix identifies KBNERR's types of ongoing partners, along with their level of engagement, as defined above, with KBNERR programs and operations—ranging from co-decision makers to partners that are simply kept informed on a regular basis. The Partnership Matrix also suggests in what ways partner efforts support and/or overlap with KBNERR's four programmatic sectors. Information in the Partnership Matrix provides a straightforward way for KBNERR staff to identify which partners should be actively involved in specific KBNERR efforts and which to approach for various kinds of advice, feedback, cooperation, information, or support. The table below outlines these relationships in general (Table 10), for the full Partnership Matrix see Appendix A.

Table 10. General outline of KBNERR partnership relationships

Type of entity	Partnership type
Local NGOs, regional collaborations, federal agencies, schools and universities, advisory council	**Collaboration**
Federal agency/university partnership	**Coalition**
Advocacy groups, Tribal coalitions, NGOs, federal agencies, schools and universities, regional land managers	**Coordination**
State and federal agencies, local and regional governments, Tribal entities, NGOs and universities	**Cooperation**
State and federal agencies, for-profit consultants	**Networking**

5.5 Advisory committees and purpose

KBNERR benefits significantly from a Community Council that serves as an advisory board and lends a comprehensive perspective to KBNERR activities and programs. The Council facilitates input from local

government, Tribes, state and federal agencies, and other key stakeholders interested in Reserve activities and directions. Nine community members and two alternates are selected for three-year terms through an application process, with final selection and appointment made by the UAA ACCS Director. Additionally, agency members represent KBNERR's key borough, state and federal partners and are selected as outlined in the Community Council charter, which provides direction for community involvement with the Reserve. The Community Council has established standing committees for research, education, and legislative affairs. Other subcommittees may be formed to assist in implementation of Reserve programs on an as needed basis. The Council meets quarterly in March, June, September, and December. Most meetings are three hours, but occasionally the staff organize all-day events with site visits to other communities such as Seldovia or Soldotna. Quarterly Community Council meetings provide an important forum for identifying coastal management needs. Committees provide a sounding board for program ideas and collaborations.

Other forums for gaining input include the tri-annual KBSC (2012, 2015, 2018, 2021), annual Alaska Marine Science Symposia (annually), and topic-driven workshops and workgroups. Since the dissolution of Alaska's Coastal Management Program in 2011, KBNERR has continued to work closely with the regional (KPB) coastal management program, as well as with other coastal management entities (state, federal, and non-governmental) to evaluate and respond to local community concerns.

5.6 Budget considerations

Over the next five years, funding at the state level is anticipated to remain unstable. Future funding plans will need to continue to advocate for stable state support. To continue to thrive, KBNERR—like the NERRS—must innovate to keep programs healthy and relevant. KBNERR staff in all sectors must be ready to pursue new opportunities that can meet the Reserve's vision and mission and anticipate staff expansion or attrition based on grant funded initiatives.

The KBNERR Manager will continue to work closely with other NERR Managers and with the non-profit National Estuarine Research Reserve Association (NERRA) to provide timely information to Congress on system-wide successes as well as program and facility needs to inform annual budget requests. Time for junior staff to build proficiency at grant writing and pursue grant opportunities will need to be incorporated into annual work plans to continue the Reserve's vibrant programs.

5.7 Communication plan

The goal for this communication plan is outlined in Goal 2, Objective 1 of the Strategic Plan: "By 2026, every initiative has a communication plan with messages, mediums, and venues for target audiences." As a reserve wide communication plan and guidelines develop over the next five years, it will involve internal as well as external communications, and provide guidance for routine and initiative-based strategies. Internally, the goal is to increase clarity and information transfer between program sectors with consistent and defined expectations for all staff, students, volunteers and interns. Externally, the goal of outreach and communication is to be consistent, thoughtful, and well-branded to ensure that messages find their target audiences with regularity and clarity. This will help the Reserve develop a reputation as:

- A responsible partner with consistent communication for coordination of cooperative efforts
- A resource for information that is timely and pertinent to local constituents

To this end, KBNERR has identified the need to create a specific communication strategy whenever a new project is initiated. To maintain consistency between projects and create a culture of inclusion among staff, when a new project is initiated, the tasks listed below will be accomplished to identify communication expectations:

- Create project team that includes representation from necessary programs
- Identify communication roles within team
- Identify audiences for targeted outreach
- Identify communication needs/objectives for the project
- Identify schedule/methods/responsible parties for outreach
- Develop an evaluation plan

5.7.1 Audiences

KBNERR audiences include all coastal decision makers, from policy makers to local property owners. Since KBNERR does not own land nor have authorities to enforce best management practices, building strong collaborations with agencies and educating the public are important to ensure stewardship of lands within the Reserve boundary. With such a broad reach, KBNERR needs to link their niche in the community strongly to their outreach potential. This means identifying different levels of expectations for communication with different audiences, as well as identifying key players who can most successfully outreach Reserve efforts to different audiences. For starters, KBNERR staff have identified audiences such as:

- The Community Council
- Stakeholders pertinent to each project
- Partners on each project
- Funders for each project
- Teachers and Environmental Educators
- Pre-K to post-secondary students
- Community monitors and volunteers
- Residents and visitors interested in issue addressed by project
- Media sources
- Political officials and policy makers

5.7.2 Message development and delivery

Due to its great variety of projects and audiences, KBNERR has identified the need to learn more about message development through professional training for staff and administration. Part of this learning will also come from evaluating the outreach that the Reserve does with different audiences on different projects.
For all messaging coming from the Reserve, it will be necessary to identify:

- The key objectives of the communication
- What message will be most effective for the different audiences identified
- What method of delivery will be most effective to reach that audience
- Who will be best at this delivery (KBNERR staff, partner organization, or media person)
- The best timing and frequency for message delivery

5.7.3 Branding

The Reserve team will be able to use these next five years to develop a pattern for consistent communication to build recognition of KBNERR's products. This will include style guidelines for outreach materials such as pamphlets or presentations, business communications such as letterhead and business cards, and the Reserve's social media presence such as on Facebook. Since the website used by the Reserve is part of the UAA system, certain decisions about design and content are out of Reserve staff control. With those parameters in mind, branding is to be as clear and repeatable as possible.

6 Resource protection plan

As outlined in section 2.6, the Reserve does not own land within Reserve boundaries. Reserve lands are LDAs in state ownership, but other ownerships are represented and discussed below. Landowners and their interests play a significant role in how resources are managed. For maps of Reserve boundaries and land ownership, refer to section 2.6.

6.1 Management of legislatively designated areas

Lands and waters encompassed by KBNERR are protected through state legislative designations (see below). In addition, Alaska's fish protection statutes mandate the ADF&G Habitat Division to protect freshwater habitat for salmon and other anadromous fish and to ensure free passage for all fish in rivers, lakes, and streams anywhere in the state. Protected rivers, lakes, and streams are identified in ADF&G's Anadromous Waters Catalog online interactive mapper and include many waterways within the Reserve boundaries, and in the watersheds that support the Reserve.

6.1.1 Legislatively designated areas

State LDAs[3] are managed in accordance with enabling legislation, applicable regulations, and specific management plans. As discussed in section 2.6, Reserve core areas consist of two LDAs: Fox River Flats CHA and Kachemak Bay CHA. Additional Reserve core and buffer areas are within KBSP and KBSWP, see below.

Enabling legislation and LDA acreage are listed below (Table 11). Anchor River-Fritz Creek CHA is included because the Anchor River mouth is the northern coastal boundary of KBNERR. Lower Anchor River and its estuary are within Anchor River State Recreation Area, which is managed by State Parks staff who manage Kachemak Bay State Park units. Anchor River watersheds provide ideal locations for studying salmon habitats and comparing these to habitats in Kachemak Bay watersheds. Permit decisions for LDA's are based on the management plans, links are shown below.

Table 11. Summary of Legislatively Designated Areas with links to associated management plans

Name of LDA	Alaska Statute (AS) Established Year	Current Year	acres[4]	link to management plan
Anchor River-Fritz Creek CHA	AS 16.20.605, 1985	1989	18,581	www.adfg.alaska.gov/index.cfm?adfg=anchorriver.managementplan
Fox River Flats CHA	AS 16.20.580, 1972	1993, update in progress	7,197	www.adfg.alaska.gov/index.cfm?adfg=foxriverflats.managementplan – plan being updated
Kachemak Bay CHA	AS 16.20.590, 1974		229,620	www.adfg.alaska.gov/index.cfm?adfg=kachemakbay.managementplan – plan being updated
Kachemak Bay State Park	AS 41.21.131, 1970, amended	update in progress	371,000	http://dnr.alaska.gov/parks/plans/kbay/kbayplan.htm and Kachemak Bay State Park And Kachemak Bay State Wilderness Park Management Plan
Kachemak Bay State Wilderness Park	AS 41.21.140, 1972, amended			

6.1.2 Critical Habitat Areas (CHAs) allowable uses and permit requirements

Legislatively designated CHAs support essential life functions of fish and wildlife (e.g., nesting, staging, spawning) or large concentrations of one or more fish and wildlife populations. ADF&G Habitat Division

[3] LDAs include state refuges, sanctuaries, critical habitat areas, ranges, special management areas, forests, parks, recreation areas, preserves, public use areas, recreation rivers, recreational mining areas, and mental health trust lands.

[4] Acreage figures are approximations of acreage of all lands, regardless of ownership, within exterior boundaries of legislatively designated areas. Consult referenced Alaska Statutes to determine legal description and management intent.

develops management plans for and oversees activities within these areas. Habitat Division also implements a statewide special areas permitting program to manage land and water uses within Special Areas such as CHAs. Activities that may impact fish, wildlife, habitats, or existing public uses require a Special Area Permit; common, minimal impact activities are permitted under General Permits. All uses or activities must be conditioned to (1) be consistent with protection of fish and wildlife and their use, protection of fish and wildlife habitats and the purpose for which the special area was established; (2) not unduly restrict or interfere with public use and enjoyment of resource values for which the special area was established; and (3) ensure that any adverse effect on fish and wildlife and their habitats, and any restriction or interference with public uses, will be mitigated in accordance with 5 Alaska Administrative Code (AAC) 95.900. KBNERR complies with these regulations and obtains all necessary permits, and provides research, education and training to meet needs identified in the management plans.

6.1.3 Kachemak Bay State Park and Kachemak Bay State Wilderness Area allowable uses and permit requirements

The largest areas of Reserve lands and waters that are managed by State Parks are within KBSP—Alaska's first state park—and Kachemak Bay State Wilderness Park—the state's only wilderness park (Figure 17). The two essentially roadless parks encompass roughly 371,000 acres of diverse lowlands, mountains, glaciers, forests, tundra, and marine waters. Acreages within park watersheds that drain into Kachemak Bay are included within Reserve buffer areas. KBSP units encompass numerous inholdings. These include 201 privately owned parcels (approximately 845 acres) and 7 other parcels (189 acres), which are owned by UA, Seldovia Native Association (SNA), U.S. Bureau of Indian Affairs, or U.S. Bureau of Land Management (BLM). The State Park and Wilderness Area are managed by the Alaska State Department of Natural Resources to facilitate use, to inform through interpretation, and be conserved for future generations, which has a new management plan (see Table 11 in KBSP Management Plan). In general, non-motorized uses are allowed throughout the State Park and Wilderness Area. Fixed wing aircraft and boat access are allowed on salt water, beaches and gravel bars. Authorization is generally required for fixed wing aircraft landings on lakes within the park and wilderness areas. Helicopter landings are not allowed without authorization/permits in the state park, but are allowed on wilderness area beaches. Drones and unmanned underwater vehicles are not allowed in most areas of the park and wilderness area. Hunting, fishing, gathering and trapping are generally allowed throughout the area without permit, providing the user has a license from ADFG if required. Bicycles are allowed on existing trails and roads. All other methods of human powered transport (hiking, skiing, snowboarding, snowshoeing,mountaineering, paddling, rowing) are allowed without permit. For more detailed information on allowable uses, see Chapter 5 of the new management plan (see Table 11 in KBSP Management Plan).

Figure 17. Kachemak Bay State Park and Kachemak Bay State Wilderness Park, map available at [Alaska DNR website.]

6.2 Management authorities and land uses on other public lands in and adjacent to KBNERR

Extensive areas of non-legislatively designated state-owned public lands are adjacent to, upslope, and inland of KBNERR core and buffer areas. Some of these represent lands whose management and use are likely to affect KBNERR lands in the long-term.

6.2.1 State lands managed under the Kenai Area Plan and other state lands

In addition to State Parks, three other ADNR divisions have significant roles in managing state lands within and adjacent to KBNERR. These are the DML&W, Division of Agriculture (DOA), and the Trust Land Office, which serves the AMHT Authority.

The bulk of non-legislatively designated state lands within and adjacent to KBNERR are managed in accordance with the state's Kenai Area Plan (KAP), which was adopted by ADNR in 2001[5] and is available at http://dnr.alaska.gov /mlw/planning/areaplans/kenai/. The plan gives each state parcel a number and then designates primary and secondary land uses for that 'unit' (which may consist of one or many parcels). Land use designations are defined in Chapter 3 of the KAP. Designations trigger applicable state regulations that define how particular land uses can be conducted. Other uses may be allowed if compatible with primary uses or with resources for which a unit is designated. Three of the twelve regions distinguished in the KAP encompass watersheds draining into Kachemak Bay and uses of lands in these regions can affect conditions in KBNERR.

Within KAP Region 8, Unit 271 consists of grazing lands leased by the Fox River Cattlemen's Association. This lease overlaps about 4,100 acres of the Fox River Flats CHA—a Reserve core area. The grazing lease is an allowed use mentioned in the CHA Management Plan, overseen by two DNR divisions: DMLW and DOA. The grazing lease includes acreage within Fox Creek, Fox River, Sheep Creek, and Bradley River watersheds. An overview of the lease area, its relevant regulations, and a grazing management plan are provided in the *Fox River Flats Grazing Lease Area Coordinated Resource Management Plan*, available at http://www.homerswcd.org/publications.htm #landuse). That plan is currently being updated with input from stakeholders, including KBNERR.

Other large state land units at the head of Kachemak Bay include units 261 and 271D, both designated for settlement (e.g., transfer to private owners for residential or commercial use); 271B, designated for resource management; and 271D and 271E, designated for general use (primary uses are not specified). KBNERR has an important and significant role to play in informing and educating decision-makers involved in planning and managing uses on these state lands.

Nine large blocks of state land are within KAP Region 9A south of Seldovia. These parcels are designated for public recreation and tourism (units 183, 184, and 184A) or for water resources and uses (unit 184B). These uses are compatible with KBNERR aims and activities and can be informed and improved by integration with KBNERR programs. The SNA owns and manages lands that border KBSP and KBSWP and Kachemak Bay CHA. KBNERR coordinates with SNA.

6.2.2 Alaska Mental Health Trust Authority, Trust Land Office

ADNR's TLO whose sole responsibility is administering lands for beneficiaries of the AMHT, manages approximately 4,568 coastal acres in Kachemak Bay through the AMHT Authority. Beneficiaries AMHT include individuals experiencing mental illness, developmental disabilities, chronic alcohol or drug addiction, Alzheimer's disease and related dementia, and traumatic brain injuries.

[5] State "Area Plans" are developed by ADNR DML&W in concert with other ADNR divisions, state departments, local governments, and area stakeholders, including the public.

6.2.3 Bradley Lake Hydroelectric Project

The Alaska Energy Authority leases about 6040 acres (ADL 222656) of state land south of the Fox River Flats CHA for operation of the Bradley Lake Hydroelectric Project. The lease expires in 2049. Activities at the site can impact adjacent KBNERR resources.

6.2.4 Alaska Maritime National Wildlife Refuge and Bureau of Land Management

Scattered parcels of federal lands are also encompassed within KBNERR boundaries, including roughly 1,195 acres in 19 BLM parcels (including NOAA's Kasitsna Bay Lab) and numerous small units of the AMNWR. The map at right (Figure 18) shows Maritime Refuge lands within Kachemak Bay (as well as a part of Kenai National Wildlife Refuge located east of the bay). The Maritime Refuge is headquartered in Homer at the AIOVC.

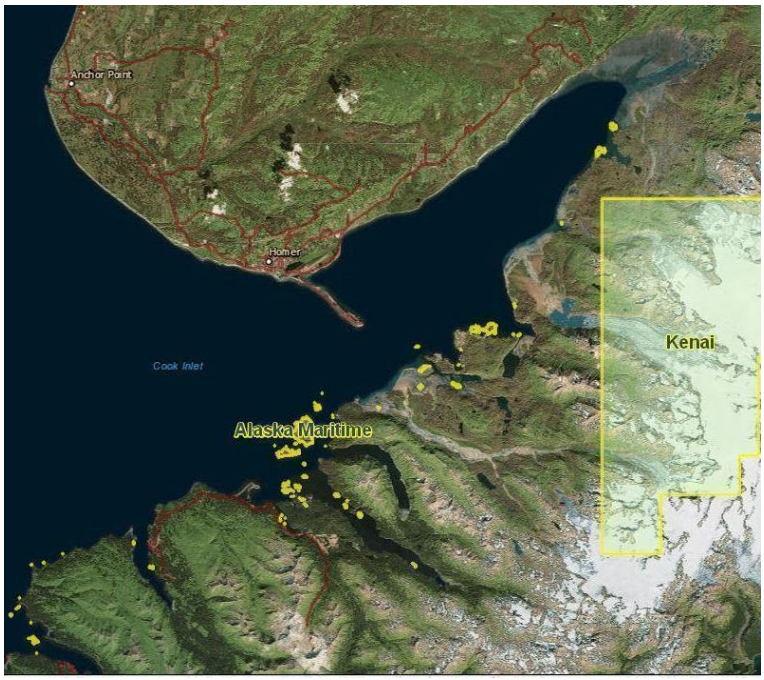

Figure 18. Alaska Maritime and Kenai National Wildlife Refuge Lands

6.3 Other ownership, management, and regulatory entities

6.3.1 Tribal entities

Large areas of lands adjacent to Reserve core and buffer areas, including lands in Anchor River watershed, are owned by Alaska Native entities. Among these owners and managers are Cook Inlet Region, Inc., Ninilchik Native Association, SNA, Nanwalek Village, English Bay Corporation, Port Graham Village Council, and Port Graham Corporation.

6.3.2 Kenai Peninsula Borough

The Kenai Peninsula Borough Coastal Management Plan has both enforceable and recommended policies. Based on this plan, the borough can comment on projects within coastal zone boundaries, which are defined as follows:

- Landward Limit: The landward limit of the interim coastal zone boundary is the 1,000-foot elevation contour in the Kenai Peninsula Borough.
- Seaward Limit: The seaward boundary of this zone includes the offshore waters to the three-mile limit of state jurisdiction.

The Kenai Peninsula Borough Comprehensive Plan provides general planning guidance for borough lands in Kachemak Bay watersheds (and other watersheds throughout the borough). The most recent borough comprehensive plan was approved by the borough assembly in July 2018 (http://kpbcompplan.com/). The Kenai Peninsula Borough has worked with peninsula cities to develop a multi-jurisdictional mitigation plan, *Kenai Peninsula Borough All Hazards Mitigation Plan*. This document provides guidance for planning and development relative to hazards, such as earthquakes, floods, wildfires, tsunamis, seiches, and severe weather events. (http://www2.borough.kenai.ak.us/emergency/hazmit/plan.htm).

6.3.3 Alaska Department of Environmental Conservation

Alaska Department of Environmental Conservation (ADEC) has delegated responsibility from the EPA for air and water quality standards and nonpoint source pollution control activities. Water quality standards address physical and chemical properties and are enforced through permitting, field evaluations, and voluntary monitoring activities by public organizations. ADEC comments on permits administered by the U.S. Army Corp of Engineers

and, with EPA, provides regulatory oversight of oil and gas exploration, municipal wastewater, and seafood processing discharge through the National Pollutant Discharge Elimination System. Air emissions are regulated by ADEC under delegated permitting responsibility from EPA. Oil pollution prevention planning for facilities and vessels is regulated by ADEC under 18 AAC 75, which requires a plan review every 3 years. Cook Inlet Spill Prevention and Response, Inc. and Alaska Chadux Corporation currently hold member contingency plans for Cook Inlet and Kachemak Bay. ADEC also certifies water quality statewide for aquatic farming sites and commercially harvested shellfish beaches.

6.3.4 U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (USACE) evaluates applications for discharge of dredge and fill material into waters of the U.S., including wetlands. Federal and state agencies (including the USFWS, National Marine Fisheries Service, and EPA), along with local governments (e.g., KPB and City of Homer), review applications for USACE permits pursuant to the Fish and Wildlife Coordination Act (16 USC 661-666 et. seq.).

6.3.5 U.S. Environmental Protection Agency

Activities associated with the Clean Water Act (CWA) are regulated by the EPA. The CWA (33 USC § 1251, et seq.) prohibits discharge of sediments, fill material, and other pollutants into waters of the United States, except as authorized by a permit issued pursuant to Section 402 or 404 of the CWA (33 USC § 1342 or 1344). Section 308(a) of the CWA (33 USC § 1318(a)) authorizes EPA to require the submission of information regarding such discharges.

6.3.6 U.S. Coast Guard

Approval from the U.S. Coast Guard is required for certain kinds of work in navigable waters.

6.4 Surveillance and enforcement

The primary mechanism for enforcing state laws and regulations within the Reserve is through permit review. ADF&G and ADNR conduct some surveillance and enforcement within these areas with assistance from the Alaska Department of Public Safety (State Troopers and Fish and Wildlife Protection). Public Safety officers are currently based in Anchor Point, approximately 15 miles north of Homer. Some ADF&G and ADNR employees are deputized and authorized to enforce their department's regulations and issue notices of violation and citations. Officials with the Alaska Department of Public Safety have the authority to make arrests or take other appropriate action for violation of state laws and regulations.

Some of the biggest challenges for enforcement are at the head of the Bay, in the Fox River Flats Critical Habitat Area, where motorized vehicles use is widespread in areas that are closed to vehicle use. The lack of enforcement personnel and relative ease of access for motorized vehicles has been an ongoing issue that is growing worse with time. Human bear interactions are a potential enforcement problem on some of the most popular trails. The ADFG approved the use of personal watercraft in Kachemak Bay CHA although this decision is being challenged locally. If personal watercraft are allowed in the Kachemak Bay CHA, this could pose potential enforcement challenges for the State Park and Wilderness Area which do not allow personal watercraft.

7 Public access

7.1 Public access context

Public access is the ability of community members and visitors to pass physically and visually to, within, from, and along the ocean shoreline, other waterfronts, and over public lands. Opportunities to explore, experience, study, and enjoy Reserve lands and waters are directly related to public access. Challenges to access include the remote nature, difficult terrain, extreme weather conditions and a very large tidal range. KBNERR itself does not own or directly manage lands or waters within Reserve boundaries and, as a result, does not manage access to and through the Reserve. As outlined in Section 6, most Reserve public lands and waters are managed by state agencies, primarily ADF&G Habitat Division, which manages CHAs, and ADNR, which manages State Park units. DML&W has responsibilities related to easements. Access to and within Reserve state lands and waters is managed in accordance with relevant state management plans, enabling legislation, and applicable state laws.

The current management plan for Fox River Flats and Kachemak Bay CHAs states: "Maintain existing public access into Kachemak Bay and Fox River Flats CHAs. Improve public access within Kachemak Bay CHA consistent with the goals of the management plan. Fox River Flats Trail should continue to be used as an all-weather trail with appropriate terms and conditions, including weight restrictions placed on use of motorized vehicles." Maintaining public access is also part of the mission of State Parks: "The DPOR provides outdoor recreation opportunities and conserves and interprets natural, cultural, and historic resources for the use, enjoyment, and welfare of the people." As management plans for the two CHAs and for KBSP are updated, and access issues are among the topics considered. KBNERR is routinely a key participant in these planning processes.

DML&W has the lead role in managing access on state lands adjacent to and upland of KBNERR; DML&W also manages submerged lands in the bay. These state lands are managed in accordance with the Kenai Area Plan—discussed in section 6.2.1—and applicable state regulations. The KAP allows access to state lands for recreation, study, and other activities compatible with specific state land use designations.

The key role that the Reserve plays in regard to access is to educate decision makers and public users about information available to help identify sites best suited for different kinds of access and how that access can be accommodated in sustainable, resilient ways. In particular, the Reserve's long term monitoring of salt marshes, and relative land level change, as well as studies of bluff erosion, invasive species, and nearshore fish communities provides important reference information for consideration of new, as well as existing access points. Information collected and shared by the Reserve is also used to help address and ameliorate access issues that arise (see below).

The Reserve does not foresee major expansions in public access from land management agencies over the next five years. Existing access sites will be improved by land managers as resources permit and conditions warrant. As appropriate, KBNERR staff will continue to assist landowners and managers in planning access improvements.
Resources for the bay that have more information on public access include:

- Kachemak Bay Water Trail
- KPSB Map (2016)

7.2 Current public access and map of access points

Currently, public access has many points of access (Figure 19). Most visitors to Kachemak Bay arrive in the Homer area by motor vehicle or plane. Fewer arrive via the Alaska Marine Highway System (state ferry) or cruise ships; the number of cruise ships has been increasing in recent years. Public ferries operated by SNA (from spring to fall) and the Alaska Marine Highway System connect Seldovia to the Homer harbor. The state ferry also connects Seldovia and Homer to Kodiak and the Aleutian Islands). Individuals access the bay and its beaches in numerous ways, including via motorized and non-motorized watercraft, on foot, on all terrain vehicles (ATVs) and other off-road vehicles, and on horseback. There are approximately ten public boat ramps and docks located

around Kachemak Bay, with the city-operated public boat launch in Homer Harbor serving as the primary access point. Bay access can also be gained through Seldovia Harbor, Halibut Cove, and Jakolof Bay on the south side, and via Mud Bay, Mariner Park, Bishop's Beach, and Diamond Creek Trail on the north side. Fox River Flats can be accessed from the bay, via the beach on the north side of the bay, and via the Switchback Trail at the terminus of East End Road. Other public access can be found along Homer Spit, Homer Airport beach, and Sterling Highway.

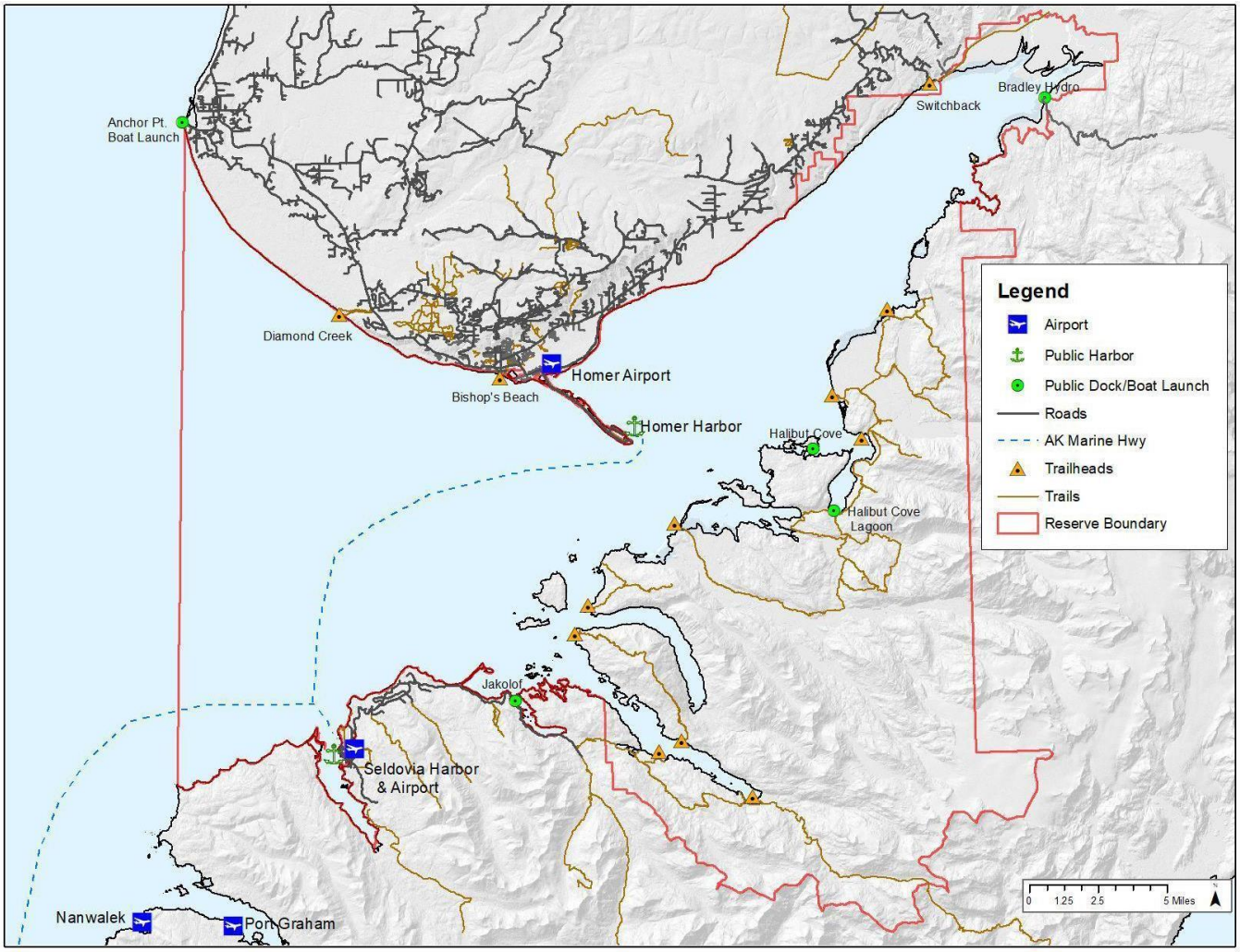

Figure 19. KBNERR access

On the north side of the bay, beach access is available by road from the Sterling Highway at the Anchor River State Recreation Area in Anchor Point and at Bishop's Beach near Beluga Slough in Homer. Beluga Slough and Bishop's Beach can be reached by a short walk on an improved trail from the AIOVC. Mud Bay in Homer is accessible from Kachemak Drive to non-motorized use. Several pull-outs along the Homer Spit Road allow for motorized and pedestrian beach access. On the whole, however, access to the north side of the bay is limited due to high bluffs to the east and west of Homer's central business district. The few available access points along the north shore are heavily used. Conflicts between users was recently addressed by the Homer City Council, with a ruling that vehicle traffic on Homer beaches be limited to tidal lands to the west of Bishop's Beach throughout the year and Mariner Park during winter months.

The south side of Kachemak Bay, where the KBSP and KBSWP are located is not accessible by road and has sustained less human impact than the north side. Travel to the south side from Homer requires a boat or small plane, and each summer, hundreds of private boats, water taxis, and public and private ferries cross the bay in support of recreational, educational, and research activities. The state park map in section 6.1.3 identifies many of these access points. KBSP provides 15 named trailheads on the south side of the bay, with state park cabins and

campsites available at a variety of locations. Owners of private land inholdings on the south side of the bay access the park via their properties and along the shore.

The Switchback Trail at the terminus of East End Road connects via the beach to the Fox River Flats Trail, which runs from the head of the bay up the valley on the north and west side of Fox River Flats. The Switchback Trail has been improved by local users and now provides vehicle access to the Russian 'Old Believer' village of Kachemak Selo. KBNERR is involved in exploring ways to address issues related to increased levels of travel and use of larger vehicles across the Fox River Flats.

7.3 KBNERR activities related to public access

As indicated above, while KBNERR is non-regulatory and does not own land or manage access, Reserve staff work to encourage public enjoyment of, and access to, lands within KBNERR boundaries. The Reserve also assists in developing ways to ameliorate damage caused by access. For example, the Reserve routinely brings together primary coastal land managers and stakeholders in collaborative workshops to solve issues. Reserve staff are involved in public planning efforts, including management plan renewals and municipal comprehensive, transportation and land use plans. The Education Program collaborates with KBSP on public access enhancements by participating in trail building, providing public KBSP-sponsored naturalist hikes on the south side of the bay. Staff also work closely with Kachemak Bay Water Trail, which strives to increase access and enjoyment of the bay.

8 Facility development and improvement plan

8.1 Overview of current facilities, uses, and challenges

Reserve facilities include the Field Station modular building at 2181 Kachemak Drive, which is located on land that is leased through the Alaska Department of Transportation (ADOT). One wing of the Field Station has 10 offices, a large conference room (capacity 32 without tables), and a small conference room (capacity 10), plus a reception area. The second wing has a three-bedroom bunkhouse (capacity 10), a large kitchen, two bathrooms, and a laundry room. This space is used by UAA students at the local Kachemak Bay Campus who are enrolled in the Semester by the Bay program in the fall, by NOAA Holling Scholars, NOAA Davidson Fellows, and other interns and students working directly with KBNERR throughout the year, and by visiting researchers and their students engaged in complementary research on an as-needed basis when space is available. Two of the offices in the Field Station are rented out to ADF&G to accommodate two of their staff, which contributes to operational funding and provides support for a building maintenance fund.

The Bay Avenue Laboratory (BAL) at 1432 Bay Avenue provides for Reserve research and storage needs. The building has a large carport overhang that shelters Reserve boats in winter. Transfer of the BAL from ADF&G to UAA is still pending.

The Field Station headquarters, and BAL are primarily supported with dedicated funding in the annual NOAA Operations award for land lease, heating, phone and internet service, water and sewer, janitorial, waste removal, lawn care, and maintenance and repair, as the UAA has very limited financial resources capacity. These facility costs constitute a significant expense for the Reserve, and conversations are ongoing for finding ways for the university to assist with KBNERR facility costs.

8.2 Partner facilities

8.2.1 Kasitsna Bay Laboratory

Kasitsna Bay Laboratory (KBL) is located on the south shore of Kachemak Bay within the boundaries of the Reserve (Figure 20). KBL is the Alaska field laboratory of the Center for Coastal Fisheries and Habitat Research (CCFHR), one of five centers within the NCCOS in the National Ocean Service (NOS) line office of NOAA. KBL is the only NCCOS field laboratory on the U.S. Pacific Ocean coast and includes a pier, wet and dry laboratories, SCUBA station, maintenance shop, two dormitories, a warehouse, and water/sewer infrastructure. The lab can host up to 48 visiting researchers onsite for studies lasting from days to months—including in winter—and offers unique opportunities for cost effective collaborations. NCCOS and the UAF College of Fisheries and Ocean Sciences conduct collaborative research and education programs at KBL. KBL also provides an ideal test site for developing and refining applications of emerging technology to subarctic coastal ecosystems, such as multibeam sonar, airborne LiDAR, algal bloom detection kits, satellite remote sensing, autonomous underwater vehicles, etc. KBL research is enhanced by the capacity to conduct experiments under controlled conditions in both flowing sea water and dry laboratories. Coastal field ecology studies are enhanced by ready access to eelgrass, kelp, and salt marsh communities, rocky fjords, mudflats, and glacial rivers and watersheds.

KBL staff collaborate closely with KBNERR on coastal science issues affecting Kachemak Bay. Collaborative efforts to date include projects funded by the Exxon-Valdez Oil Spill (EVOS) Trustee Council and cooperative (unfunded) activities such as Cook Inlet/Kachemak Bay circulation studies, shellfish monitoring for paralytic toxins, Hollings Scholar student support, and the Hydropalooza benthic mapping project. The Reserve's TOTE workshops are often hosted at the KBL.

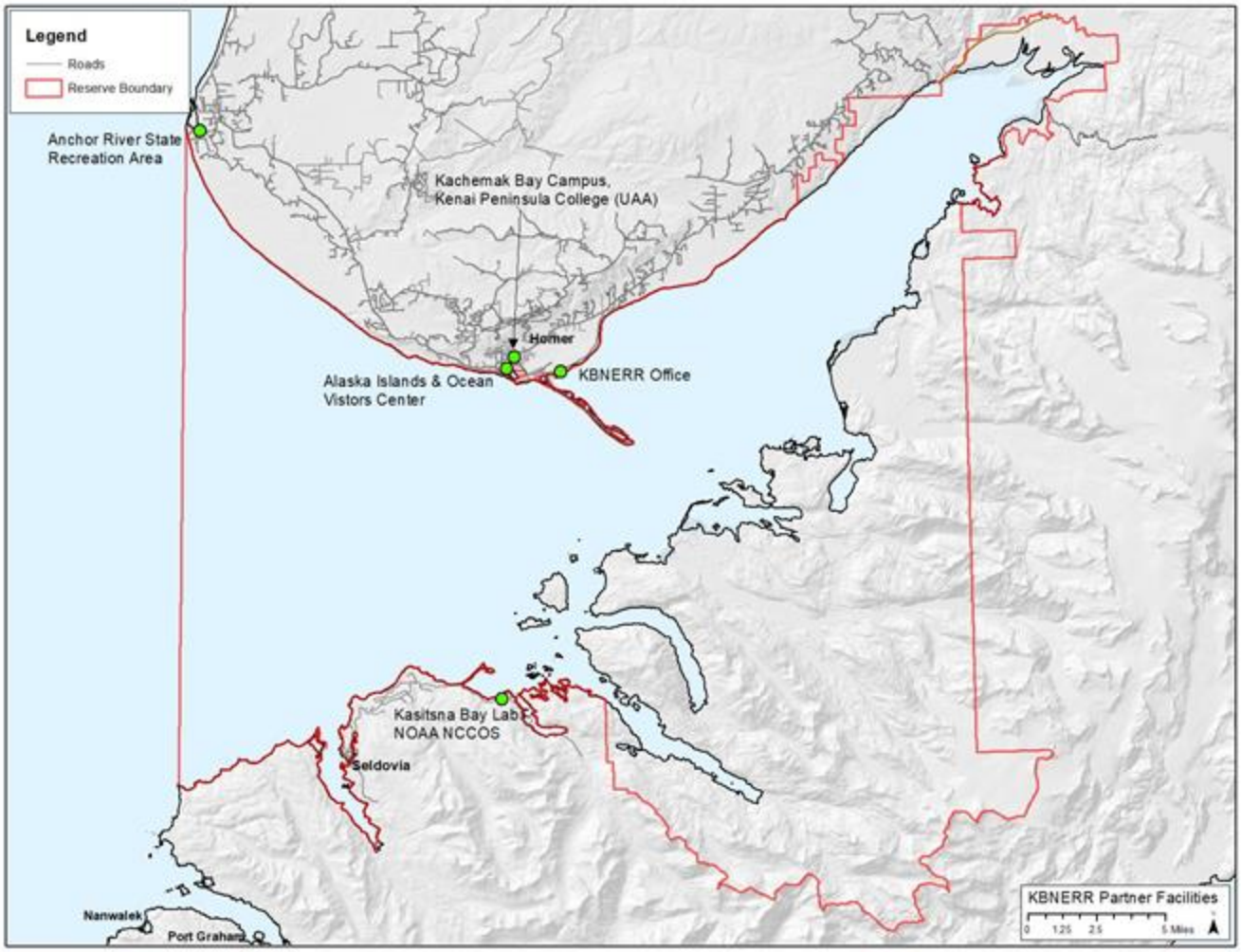

Figure 20. KBNERR partner facilities

8.2.2 Kachemak Bay Campus of Kenai Peninsula College, University of Alaska, Anchorage

The KBC provides a local UA partner facility supporting KBNERR programs, especially its educational offerings (Figure 20). The campus includes numerous classrooms, most supporting digital presentation formats, and a variety of labs. There is also a bookstore and comfortable common area for informal larger gatherings. KBC instructors coordinate closely with KBNERR and KBL to incorporate Reserve information into their classes and serve as content experts for education and training program development.

8.2.3 Distributed educational opportunities

As a world class visitor destination, the Kachemak Bay area offers numerous facilities, trails, and other improvements that KBNERR uses as venues for outreach to the community and educational offerings. These include a variety of outdoor shelters, pavilions, decks, and boardwalks, among them the Boathouse pavilion, Kachemak Bay Water Trail pavilion, Lighthouse Village deck, Beluga Slough boardwalk, Beluga Lake wildlife viewing platform, Calvin and Coyle Trail and wildlife viewing platform, and many sites further afield, including Bradley Lake dock and access road, Anchor River State Recreation Area campgrounds and day use areas, Stariski Creek elevated walkway, and facilities in Seldovia, among others. These are owned and managed by a variety of entities, including the cities of Homer and Seldovia, Alaska state, USFWS, and area nonprofits. KBNERR also takes advantage of opportunities to network and to outreach its activities and accomplishments at conferences held throughout Alaska, particularly in Anchorage, but also in Homer and Fairbanks.

8.2.4 Alaska Islands and Ocean Visitor Center

From 2004 until 2015, KBNERR headquarters were located in the AIOVC (Figure 20), a public facility owned and operated by the USFWS. Reserve educational exhibits at AIOVC (installed in FY2010) remain in place, and KBNERR continues to offer education and training programs at AIOVC, but less frequently.

8.3 Description of facility needs

The Reserve's facilities described above are very modest and in need of repair, renovation and new developments. Since transitioning to the UAA, the Reserve moved out of the AIOVC, a facility it shared with the USFWS from 2003-2014, into the modular office/bunkhouse facility. AIOVC was located on a main road through town, was clearly visible, and received thousands of visitors each year. The Reserve space in AIOVC included offices, a state of the art laboratory, a teaching classroom, seminar room, indoor exhibits, outdoor gathering areas and a system of boardwalks and trails. The Reserve's new location is more sequestered, the facilities are small, and very few visitors are received, other than visiting researchers and students. As a consequence, the Reserve has had to pivot its education and engagement programs to accommodate the reduced capacity of the venue. Greater emphasis has been placed on taking programs to schools, for example through the NITC programs, which has been enthusiastically received by teachers and students. The Reserve is also focusing more on reaching middle school, high school, and college students, which is more in line with its role as part of the university. Additionally, the Reserve hopes to provide some modest visitor services at our new location, including a small teaching space, signage, and indoor exhibits that include tanks for invertebrates and fish.

As programs develop to incorporate older students, the demand for student housing is increasing. To meet these needs, the Reserve is planning for developing new bunkhouse and office spaces. This plan includes remodelling the current modular building to convert offices into bunkhouse rooms, with the front reception area and meeting room becoming exhibit and teaching spaces.

Other facility plans include updating the Reserve's cramped laboratory and storage area, the BAL, and promoting more green energy sources. BAL is currently the only space available to Reserve staff for equipment storage, running the SWMP and HABs programs, processing samples for watershed, nearshore and oceanographic projects. The lab is used by Reserve staff, visiting students and researchers, and for partners, including the KBC and KBL staff. There is high demand for the lab, and it is woefully in need of repair and remodelling to accommodate all the use.

The Reserve has developed a list of facility projects and costs that we are seeking non-funding match sources for that can be used to leverage available federal funding (Table 12). NOAA's NERRS PAC (Procurement, Acquisition, and Construction)– Grants are a potential option. These funds require a 25% non-federal match.

Table 12. List of KBNERR facility projects and costs seeking non-funding match sources

Facility Project	Explanation of Need	Estimated Cost
Retrofit of existing Reserve modular building (current offices) to bunkhouse and meeting rooms	There is very limited inexpensive housing in the Homer area, and graduate students, undergraduate interns and scholars, and college field-based classes coming to the Reserve for programming and projects need housing. The retrofitting includes conversion to natural gas.	$350,000
New office space for Reserve staff (10)	Reserve staff will need to vacate the current modular building in order to make room for the bunkhouse expansion.	$400,000
Laboratory safety features	The Reserve's laboratory space is currently in need of updated safety features, including a working chemical hood and shower facilities onsite. Additional storage is also needed.	$200,00

9. Land Acquisition Plan

The Reserve, in cooperation with its land-holding partners, seeks to protect in-holdings within the Reserve's boundary, and works closely with entities—governmental, private, and nonprofit—that acquire land for conservation purposes or protect land through other legal mechanisms, such as easements that are contiguous with the KBNERR border, or any of the inholdings within the KBNERR State Park. The Reserve works closely with partners to identify priority areas for acquisition. Those partners include the Kachemak Bay State Park Citizen Advisory Board, State Parks, ADF&G (especially through the EVOS restoration program), City of Homer, USFWS, and the Alaska Conservation Foundation. One way that the Reserve can assist partners in acquiring in-holdings is through support from NOAA's NERRS PAC fund, which provides opportunities for funding to state host agencies of reserves to support land acquisition for projects identified in approved reserve management plans.

Information collected by KBNERR can be used by these and other land acquisition and conservation entities to identify lands and waters with high priority for retention. Consistent communication and coordination between these entities and KBNERR will facilitate cooperative efforts on land acquisition, management, and potential restoration projects, as well as collaboration on critical resource issues, research needs, and outreach efforts on affected lands. There has been no change to the Reserve's boundary since the last management plan.

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Appendices

Appendix A. Partnership matrix

Note: this matrix represents a snapshot of currently active partnerships of reserve programs.

adm. = administers or advises programs focused on protecting or managing natural resources within KBNERR boundaries or related areas
ct. = involved with programs educating landowners, resource managers, governments, etc. on Reserve coastal and adjacent ecosystems
ed. = conducts programs to educate schools, students, and communities about ecosystems within KBNERR boundaries or related areas
r&m = collects data about organisms and/or natural systems and/or human impacts within Reserve boundaries or related areas

Partner name and type of entity	Partnership type	adm.	ct.	ed.	r&m
Kachemak Bay Environmental Educators Alliance (KBEEA) -- Regional educational alliance	Collaboration			✓	
Kachemak Bay NERR Community Council -- Regional resource advisory and advocacy group	Collaboration	✓	✓	✓	
Kachemak Heritage Land Trust (KHLT) -- Regional NGO land trust	Collaboration	✓	✓	✓	✓
Kenai Peninsula Fish Habitat Partnership (KPFHP) -- Regional multi-entity collaboration involving agencies and NGOs	Collaboration		✓	✓	✓
National Estuarine Research Reserve System (NERRA) -- National Friends Group of the NERR System	Collaboration	✓	✓	✓	✓
Smithsonian Institution (SERC, WLS, MarineGEO) -- world's largest museum, education, and research complex	Collaboration		✓	✓	
Project Grad -- Regional KPBSD, UAA, and Project Grad partnership	Collaboration			✓	
University of Michigan NERR Science Collaborative -- College/university	Collaboration		✓	✓	✓
Ninilchik Traditional Council-Indigenous tribal organization	Collaboration	✓	✓		
US Fish and Wildlife Service Coastal Program	Collaboration	✓	✓		✓
University of South Florida-College/university	Collaboration		✓	✓	✓
NOAA Kasitsna Bay Lab -- Federal agency/university partnership	Coalition	✓	✓	✓	✓
Alaska Marine Conservation Council (AMCC) -- Statewide resource advisory and advocacy group	Coordination	✓	✓	✓	
Alaska Sea Grant, University of Alaska, Fairbanks -- College/university	Coordination		✓	✓	✓
Center for Alaskan Coastal Studies (CACS) -- Educational NGO, also owns and manages Kachemak Bay coastal lands	Coordination	✓	✓	✓	
Chugach Regional Resource Commission -- Regional Tribal resource advisory and advocacy coalition	Coordination	✓	✓	✓	

Girassol Preschool -- School	**Coordination**			✓	
Kachemak Bay Conservation Society (KBCS) -- Local resource advocacy NGO	**Coordination**		✓	✓	
Kenai National Wildlife Refuge (KNWR) -- Federal agency, manages KNWR	**Coordination**	✓		✓	✓
Kenai Peninsula Borough School District (KPBSD) -- Regional school district	**Coordination**			✓	
Kenai Peninsula Borough Resource Planning Department, Land Management Division -- Regional agency managing borough lands	**Coordination**	✓		✓	
NOAA Office for Coastal Management (OCM) -- Federal agency providing coastal management support and program oversight	**Coordination**	✓	✓	✓	✓
Alaska Department of Environmental Conservation (DEC) -- State agency protecting air and water quality and environmental health	**Cooperation**	✓		✓	
Alaska State Parks (Alaska Department of Natural Resources, Division of Parks and Outdoor Recreation) -- State parks management agency	**Cooperation**	✓		✓	
Alaska Maritime National Wildlife Refuge (AMNWR) -- Federal agency, manages AMNWR	**Cooperation**	✓	✓	✓	✓
City of Homer -- Local city government	**Cooperation**	✓		✓	
Cook Inletkeeper (CIK) -- Regional NGO focused on advocacy, education, and research	**Cooperation**	✓	✓	✓	✓
Homer Soil and Water Conservation District (HSWCD) -- Local quasi-state entity promoting informed use and management of natural resources	**Cooperation**	✓	✓	✓	
Kenai Peninsula Borough Coastal Management Program -- Regional government advising and overseeing coastal management	**Cooperation**	✓	✓	✓	
Seldovia Village Tribe -- Local Tribal entity overseeing natural and community resources	**Cooperation**	✓	✓	✓	✓
University of Alaska Fairbanks -- College/university	**Cooperation**	✓	✓	✓	✓
Alaska Department of Fish and Game -- State agency managing fish and wildlife	**Networking**	✓	✓	✓	✓
Alaska Department of Health and Social Services -- State Agency	**Networking**				✓
NOAA National Centers for Coastal Ocean Science (NCCOS) -- Federal Agency	**Networking**	✓	✓	✓	✓

USDA Natural Resources Conservation Service (NRCS) -- Federal Agency providing technical and financial assistance	**Networking**		✓	✓	✓
US Fish & Wildlife Service (USFWS)-- Federal Agency managing National Wildlife Refuges, Endangered Species, and other federal lands and fish and wildlife	**Networking**	✓	✓	✓	✓

Appendix B. KBNERR Community Council

Current as of June, 2021
(*Indicates KBNERR Education Subcommittee Members)

Appointed Community Members:
James Hornaday
Paul Allen*
George Matz, Chair
Michael Opheim
Donna Aderhold
Linda Robinson*
Curtis Jackson
Francie Roberts*
Tony Burgess
Carol Harding
Jessica Shepherd*
Laurie Daniel

Agency members:
Willie Dunne, KPB Assembly
TBD, KPB River Center
Kris Holderied, NOAA NCCOS Kasitsna Bay Lab
Katrin Iken, UAF CFOS
Jason Okuly, ADNR State Parks
Jan Keiser, City of Homer
Sarah Apsens ADEC
Emily Munter, USFWS
Brian Blossom, ADFG Habitat
Reid Brewer, UAA KPC KBC
Michael Booz, ADFG Sport Fish

Appendix C. CTP Advisors

Core Statewide Advisory Partners:

University of Alaska Anchorage
As the administering partner agency for the KBNERR, the UAA has a mission to discover and disseminate knowledge through teaching, research, engagement and creative expression. Within the College of Arts and Sciences, the largest college in the UA system, the ACCS fosters research, education, and collaboration on biological conservation and natural resource management in Alaska and the Arctic. University representative = Matt Carlson, ACCS Director

Alaska Sea Grant
Alaska Sea Grant's mission is to support wise use and conservation of Alaska's seas and coasts through research, education, and extension. They do this through supporting marine and coastal research, providing education and extension services, and distributing information about Alaska's seas and coasts. Sea Grant's Marine Advisory Program has university faculty located in 10 coastal communities to provide information, technical assistance, and workforce development opportunities. Providing similar services as the KBNERR CTP (although to different audiences), it is important to foster communication and leverage resources between two organizations to enhance the effectiveness of each program. Agency representative = Davin Holen, Coastal Community Resilience Specialist

NOAA Regional
NOAA regional coordinator facilitates the communication of inter-agency efforts to the national, state and local levels, including coastal mapping, weather and climate products and services, ocean acidification, and coastal and marine spatial planning. The regional coordinator plays a large role in supporting collaborative efforts amongst various NOAA offices and partnering organizations. Agency representative = Amy Holman, Alaska Regional Coordinator.

Alaska Ocean Observing System
As the 'eye on Alaska's coasts and oceans,' AOOS represents a network of critical ocean and coastal observations, data and information products that aid our understanding of the status of Alaska's marine ecosystem and allow stakeholders to make better decisions about their use of the marine environment. KBNERR partners with AOOS on collaborative workshops, trainings, and technical assistance related to geospatial and monitoring data in the Gulf of Alaska on topics of OA and HABs. Agency representative = Darcy Dugan, Network Coordinator

Chugach Regional Resources Commission
The goal of CRRC is to "promote Tribal sovereignty and the protection of our subsistence lifestyle through the development and implementation of Tribal natural resource management programs to assure the conservation, sound economic development, and stewardship of the natural resources in the traditional use areas of the Chugach Region." KBNERR partners with CRRC and tribal environmental coordinators on environmental monitoring and provides technical training to staff and stakeholders through formal workshops, listening sessions, and integrated programs with youth. Commission representative = Willow Hetrick, Executive Director

Prince William Sound Science Center
PWSSC is the Outreach and Community Involvement effort coordinator for the Gulf Watch Alaska Program, the long-term ecosystem monitoring program of the EVOS Trustee Council for the marine ecosystem affected by the 1989 oil spill. Center Representative = Donna Aderhold

Appendix D. Public involvement in plan development

Development of the KBNERR management plan occurred over 3 years and included direct input from all Reserve staff members, the University of Alaska Anchorage staff, the reserve Community Council, as well as the National Oceanic and Atmospheric Administration's Office for Coastal Management.

The process began with a contractor assisting with assembly of standard elements of management plan from NERR Guidance in August 2018. In tandem with the Section 315 Evaluation for the Kachemak Bay, KBNERR convened a regional stakeholder meeting to identify priorities in September 2018. The contractor facilitated a strategic planning retreat with all staff in fall, 2018. Strategic and Communication Plans were developed and incorporated into the management plan draft during the winter of 2018-19. The strategies were reviewed by the Education and Research Subcommittees of the Community Council in spring 2019.

A second facilitated staff retreat was held in April 2019 to review the full outline of the plan and identify additional information needs. A pause in the process occurred in summer 2019 to ensure incorporation of recommendations from the NOAA Section 315 Evaluation Findings for the Kachemak Bay, which were published in 2020. KBNERR staff reviewed recommendations and edited plan and provided the plan to the Community Council for review and comment for their summer 2020 meeting. KBNERR submitted the plan to State (UAA) and federal (NOAA) partners and NERR Program Sector leads in July 2020.

NOAA's Office for Coastal Management reviews and approves the plan after ensuring sufficient opportunity for comment by the public, per 15 Code of Federal Regulations 921.33. NOAA published a notice announcing the availability of the draft plan for a 30-day public comment period in the Federal Register on May 27, 2021. The comment period ended on June 28, 2021.

Additionally, the plan was published on the KBNERR Website, and public notices were published in Homer, Alaska in the Homer News and on the KBNERR social media. A virtual public meeting was offered on June 21, 2021 at 5:00 pm with a short presentation of the as part of the renewal of the Management Plan. The purpose of the meeting was to receive public comments regarding the plan. Written comments were encouraged, and directions were given that comments should be submitted through the Federal Register no later than June 30, 2021 or by emailing the KBNERR Manager no later than July 31, 2021.

After the required 30-day public comment period through the Federal Register, and the extended opportunity to comment by contacting the KBNERR Manager Directly until July 31, 2021, no comments were received on the plan. No substantive revisions to the document were made.

Appendix E. Species lists

The Reserve compiled comprehensive species lists during the designation process (1998-2000). The lists were updated in 2002, and can be found in the appendix of the KBNERR site profile https://coast.noaa.gov/data/docs/nerrs/Reserves_KBA_SiteProfile.pdf.

Species lists include:

- Marine Flora
- Terrestrial Flora
- Fish
- Marine Mammals
- Terrestrial Mammals
- Marine Invertebrates
- Birds

Appendix F. KBNERR publications list

Publication	Type
Walker CM, Whigham DF, Bentz IS, Argueta JM, King RS, Rains MC, Simenstad CA, Guo C, Baird SJ, and Field CJ. 2021. Linking landscape attributes to salmon and decision-making in the southern Kenai Lowlands, Alaska, USA. Ecol Soc 26(1):1. doi: 10.5751/ES-11798-260101	Peer-reviewed paper
Vandersea MW, Tester PA, Holderied K, Hondolero DE, Kibler SR, Powell K, Baird SJ, Doroff A, Dugan D, Meredith A, Tomlinson M, and Litaker RW. 2020. An extraordinary *Karenia mikimotoi* "beer tide" in Kachemak Bay, Alaska. Harmful Algae 92. doi: 10.1016/j.hal.2019.101706	Peer-reviewed paper
Robbins CJ, Yeager AD, Cook SC, Doyle RD, Maurer JR, Walker CM, Back JA, Whigham DF, and King RS. 2020. Low-level dissolved organic carbon subsidies drive a trophic upsurge in a boreal stream. Freshw Biol 47(5): 1086-1105. doi: 10.1111/fwb.13478	Peer-reviewed paper
Walker CM, and King R. Headwater stream nutrient export and downstream community response. Final report. Alaska Department of Fish and Game, Sport Fish Division, State Wildlife Grant; 2018 Aug. Report No. T-37-01-P01.	Technical report
Walker CM, and Baird SJ. Extending the anadromous waters catalog in the Kenai Lowlands. Final report. Alaska Sustainable Salmon Fund; 2018 Mar. Report No. 44203.	Technical report
Vandersea MW, Kibler SR, Tester PA, Holderied K, Hondolero DE, Powell K, Baird SJ, Doroff A, Dugan D, and Litaker RW. 2018. Environmental factors influencing the distribution and abundance of *Alexandrium catenella* in Kachemak bay and lower cook inlet, Alaska. Harmful Algae 77: 81-92. doi: 10.1016/j.hal.2018.06.008	Peer-reviewed paper
Bentz S, Johnson M, Gibson G, Baird SJ, and Schloemer J. Ocean circulation mapping to aid monitoring programs for harmful algal blooms and marine invasive transport in south central Alaska. Final report. Alaska Department of Fish and Game, Sport Fish Division, State Wildlife Grant; 2018 Aug. Report No. T-34-03.	Technical report
Whigham DF, Walker CM, Maurer J, King RS, Hauser W, Baird SJ, Keuskamp JA, and Neale PJ. 2017. Watershed influences on the structure and function of riparian wetlands associated with headwater streams – Kenai Peninsula, Alaska. Sci Total Environ 599-600: 124-134. doi: 10.1016/j.scitotenv.2017.03.290	Peer-reviewed paper
Walker CM, and Pierce BD. Habitat models for juvenile salmon rearing in Cook Inlet estuaries. Final report. Alaska Department of Fish and Game, Sport Fish Division, State Wildlife Grant; 2017 Jul. Report No. T-36-01-P01.	Technical report
Walker CM, and King R. Downstream effects of headwater stream productivity on juvenile salmonids and stream macroinvertebrate communities in the Kenai Lowlands. Final report. Alaska Department of Fish and Game, Sport Fish Division, State Wildlife Grant; 2017 Jul. Report No. T-35-01-P01.	Technical report

Robbins CJ, King RS, Yeager AD, Walker CM, Back JA, Doyle RD, and Whigham DF. 2017. Low-level addition of dissolved organic carbon increases basal ecosystem function in a boreal headwater stream. Ecosphere 8(4): 1-15. doi: 10.1002/ecs2.1739	Peer-reviewed paper
Hiatt DL, Robbins CJ, Back JA, Kostka PK, Doyle RD, Walker CM, Rains MC, Whigham DF, and King RS. 2017. Catchment-scale alder cover controls nitrogen fixation in boreal headwater streams. Freshw Sci 36(3). doi: 10.1086/692944	Peer-reviewed paper
Callahan MK, Whigham DF, Rains MC, Rains KC, King RS, Walker CM, Maurer JR, and Baird SJ. 2017. Nitrogen subsidies from hillslope alder stands to streamside wetlands and headwater streams, Kenai Peninsula, Alaska. J Am Water Resour Assoc 53(2): 1-15. doi: 10.1111/1752-1688.12508	Peer-reviewed paper
Walker CM, and Pierce BD. Estuary habitat use by juvenile chinook and coho salmon in a Kenai Lowlands (Anchor) river. Final report. Alaska Department of Fish and Game, Sport Fish Division, State Wildlife Grant; 2016 Sep. Report No. T-31-13-P01.	Technical report
Walker CM, Whigham DF, King R, and Tyler C. Headwater stream rearing habitat– phase two. Final report. Alaska Sustainable Salmon Fund; 2015 Aug. Report No. 44709.	Technical report
Callahan ML, Rains MC, Bellino JC, Walker CM, Baird SJ, Whigham DF, and King RS. 2015. Controls on temperature in salmonid-bearing headwater streams in two common hydrogeologic settings, Kenai Peninsula, Alaska. J Am Water Resour Assoc 51(1): 84-98. doi: 10.1111/jawr.12235	Peer-reviewed paper
Palardy JE, and Witman JD. 2014. Flow, recruitment limitation, and the maintenance of diversity in marine benthic communities. Ecology 95(2): 286-297. doi: 10.1890/12-1612.1	Peer-reviewed paper
Matthaeus WJ, Walker CM, Danley P, and King R. Genetic variation of populations of juvenile coho salmon and dolly varden within and among river basins on the lower Kenai Peninsula. Final report. Alaska Department of Fish and Game, Sport Fish Division, State Wildlife Grant; 2014 Sep. Report No. T-10-06-P22.	Technical report
Descoteaux R. 2014. Effects of ocean acidification on development of Alaskan crab larvae [thesis]. Fairbanks: Univ of Alaska.	Master thesis
Walker CM. Headwater stream rearing habitat– phase one. Final report. Alaska Sustainable Salmon Fund; 2013 Mar. Report No. 44507.	Technical report
Walker CM, Simenstad C, Hoem-Neher TD, Baird SJ, Maurer J, and Sosik E. Identifying key habitats for juvenile salmon in the Fox River flats estuary. Final report. Alaska Department of Fish and Game, Sport Fish Division, State Wildlife Grant; 2013 Sep. Report No. T-10-03-P17.	Technical report
Rinella DJ, Wipfli MS, Walker CM, Stricker CA, and Heintz RA. 2013. Seasonal persistence of marine-derived nutrients in south-central Alaskan salmon streams. Ecosphere 4(10): 122. doi: 10.1890/ ES13-00112.1	Peer-reviewed paper

Murphy M, and Iken K. 2013. Larval Brachyuran crab timing and distribution in relation to water properties and flow in a high-latitude estuary. Estuar Coasts 37: 177-190. doi: 10.1007/s12237-013-9668-2	Peer-reviewed paper
Hoem-Neher TD, Rosenberger AE, Zimmerman CE, Walker CM, and Baird SJ. 2013. Use of glacier river-fed estuary channels by juvenile Coho Salmon: transitional or rearing habitats?. Environ Biol Fish 97: 839-850. doi: 10.1007/s10641-013-0183-x	Peer-reviewed paper
Hoem-Neher TD, Rosenberger AE, Zimmerman CE, Walker CM, and Baird SJ. 2013. Estuarine environments as rearing habitats for juvenile coho salmon in contrasting south-central Alaska watersheds. Trans Am Fish Soc 142(6) 1481-1494. doi: 10.1080/00028487.2013.815660	Peer-reviewed paper
Whigham DF, Walker CM, King RS, and Baird SJ. 2012. Multiple scales of influence on wetland vegetation associated with headwater streams in Alaska, USA. Wetlands 32: 411-422. doi: 10.1007/s13157-012-0274-z	Peer-reviewed paper
Walker CM, King RS, Whigham DF, and Baird SJ. 2012. Landscape and wetland influences on headwater stream chemistry in the Kenai Lowlands, Alaska. Wetlands 32: 301-310. doi: 10.1007/s13157-011-0260-x	Peer-reviewed paper
Rinella DJ, Wipfli MS, Stricker CA, Heintz RA, and Rinella MJ. 2012. Pacific salmon (*Oncorhynchus* spp.) runs and consumer fitness: growth and energy storage in stream-dwelling salmonids increase with salmon spawner density. Can J Fish Aquat Sci 69(1): 73-84. doi: 10.1139/f2011-133	Peer-reviewed paper
King RS, Walker CM, Whigham DF, Baird SJ, and Back JA. 2012. Catchment topography and wetland geomorphology drive macroinvertebrate community structure and juvenile salmonid distributions in south-central Alaska headwater streams. Freshw Sci 31(2): 341-364. doi: 10.1899/11-109.1	Peer-reviewed paper
Hoem-Neher TD. 2012. The influence of estuarine habitats on expression on life history characteristics of coho salmon smolts in south-central Alaska [dissertation]. Fairbanks: Univ of Alaska.	Dissertation
Doroff A, Badjeros O, Corbell K, Jenski D, and Beaver M. 2012. Assessment of sea otter (*Enhydra lutris kenyoni*) diet in Kachemak Bay, Alaska (2008-2010). IUCN Otter Spec Group Bull 29(1): 15-23.	Peer-reviewed paper
Dekar MP, King RS, Back JA, Whigham DF, and Walker CM. 2012. Allochthonous inputs from grass-dominated wetlands support juvenile salmonids in headwater streams: evidence from stable isotopes of carbon, hydrogen, and nitrogen. Freshw Sci 31(1): 121-132. doi: 10.1899/11-016.1	Peer-reviewed paper
Boveng PL, London JM, Montgomery RA, and Ver Hoef JM. Distribution and abundance of harbor seals in Cook Inlet, Alaska. Task I: Aerial surveys of seals ashore, 2003-2007. Final Report. Bureau of Ocean Energy Management, Alaska Outer Continental Shelf Region; 2011. Report No. 2011-063.	Technical report

Boveng PL, London JM, and Badajos O. Distribution and abundance of harbor seals in Cook Inlet, Alaska. Task II: Assessment of Factors Influencing Harbor Seal Haul-out Behavior Using Remote Time-Lapse Cameras, 2003-2005. Final Report. Bureau of Ocean Energy Management, Alaska Outer Continental Shelf Region; 2011. Report No. 2011-064.	Technical report
Palardy JE. 2010. Flow, neutrality, and the control of diversity in marine epifaunal communities [dissertation]. Rhode Island: Brown Univ. doi: 10.7301/Z0319T5X	Dissertation
Markis J. Preliminary biological assessment of the proposed Homer harbor expansion project. Final report. US Army Corps of Engineers, Alaska Division; 2010 Apr. Report No. 103546.	Technical report
Doroff AM, and Badajos O. Monitoring survival and movement patterns of sea otters (*Enhydra lutris kenyoni*) In Kachemak Bay, Alaska August 2007-February 2009. Final report. US Fish and Wildlife, Marine Mammals Management; 2009 Jun. Report No. PRT-041309-3.	Technical report
Daly B, and Konar B. 2010. Temporal trends of two spider crabs (Brachyura, Majoidea) in nearshore kelp habitats in Alaska, USA. Crustaceana 83(6): 659-669. doi: 10.1163/001121610X498773	Peer-reviewed paper
Walker CM, King R, Rains MC, Whigham DF, Baird SJ, Bellino J. Headwater stream wetland settings and shallow ground water influence: relationships to juvenile salmon habitat on the Kenai Peninsula, Alaska. Final report. US Environmental Protection Agency, Region 10, Wetland Program Development Program; 2009 Dec. Report no. CD-96011801-0.	Technical report
Daly B, and Konar B. 2008. Effects of macroalgal structural complexity on nearshore larval and post-larval crab composition. Mar Biol 153:1055-1064. doi: 10.1007/s00227-007-0878-7	Peer-reviewed paper
Baird SJ, and Sigman M. Connecting with CoastWalk: linking shoreline mapping with community-based monitoring. Final report. Exxon Valdez Oil Spill, Gulf Ecosystem Monitoring Program; 2008 Apr. Report No. 050743.	Technical report
Baird SJ, and Field CJ. Salt marsh mapping in Cook Inlet: Iniskin, Oil, and Chinitna Bays. Final report. Cook Inlet Regional Citizens Advisory Council; 2008 Jun.	Technical report
Walker CM, Rinella DJ, Wipfli MS, and Stricker C. Presence and effects of marine derived nutrients (MDN) in stream, riparian and nearshore ecosystems on southern Kenai Peninsula, Alaska: developing monitoring tools for tracking MDN in Alaska watersheds. Final report. Exxon Valdez Oil Spill, Gulf Ecosystem Monitoring Program; 2007 Jul. Report No. 040726.	Technical report
Walker CM, King R, Whigham D, and Baird SJ. Wetland geomorphic linkages to juvenile salmonids and macroinvertebrate communities in headwater streams of the Kenai Lowlands, Alaska. Final report. US Environmental Protection Agency, Region 10, Wetland Program Development Program; 2007 Oct. Report No. CD-96011801-0.	Technical report

Salomon AK, Tanape NM, and Huntington HP. 2007. Serial depletion of marine invertebrates leads to the decline of a strongly interacting grazer. Ecological Applications 17(6): 1752-1770.	Peer-reviewed paper
Ruggiero P, Adams PN, and Warrick JA. 2007. Mixed sediment beach processes: Kachemak Bay, Alaska. In: Sixth International Symposium on Coastal Engineering and Science of Coastal Sediment Processes; May 13-17; New Orleans, Louisiana, USA; p 1-14. doi: 10.1061/40926(239)35	Peer-reviewed paper
Daly B. 2007. Temporal variation and habitat use of nearshore crab populations in Kachemak Bay, Alaska [thesis]. Fairbanks: Univ of Alaska.	Master thesis
Chenelot H, and Konar B. 2007. *Lacuna vincta* (Mollusca, Neotaenioglossa) herbivory on juvenile and adult *Nereocystis luetkeana* (Heterokontophyta, Laminariales). Hydrobiologia 583(1): 107-118. doi: 10.1007/s10750-006-0484-6	Peer-reviewed paper
Baird SJ, Field CJ, and Badajos O. Salt marsh mapping in Cook Inlet: Trading, Redoubt, and Chickaloon Bays. Final report. Cook Inlet Regional Citizens Advisory Council; 2007 Jul.	Technical report
Adams PN, Ruggiero P, Schoch GC, and Gelfenbaum G. 2007. Intertidal sand body migration along a megatidal coast, Kachemak Bay, Alaska. J Geophys Res 112: 1-19. doi: 10.1029/2006JF000487	Peer-reviewed paper
Pegau S. Mapping intertidal habitats: a biological inventory for coastal management, resource assessment, and monitoring. Final report. Alaska Department of Natural Resources, Coastal Impact Assistance Program; 2005 Mar. Report No. 40GA-77.	Technical report
Pegau S. High resolution mapping of intertidal and shallow subtidal shores in Kachemak Bay. Final report. Exxon Valdez Oil Spill, Gulf Ecosystem Monitoring Program; 2005 Jan. Report No. 040556.	Technical report
Adams PN, and Ruggiero P. 2005. Wave energy dissipation by intertidal sand waves on a mixed-sediment beach. In: Fifth International Conference on Coastal Dynamics; Apr 4-8; Barcelona, Spain; p 1-12. doi: 10.1061/40855(214)18	Peer-reviewed paper
Schoch GC, and Chenelot H. 2004. The role of estuarine hydrodynamics in the distribution of kelp forests in Kachemak Bay, Alaska. Journal of Coastal Research SI (45): 179-194. doi: 10.2112/SI45-179.1	Peer-reviewed paper
Pegau S. High resolution mapping of intertidal and shallow subtidal shores in Kachemak Bay. Final report. Exxon Valdez Oil Spill, Gulf Ecosystem Monitoring Program; 2004 Mar. Report No. 030556.	Technical report
Pegau S, and Potter R. Visible remote sensing of the Gulf of Alaska. Final report. Exxon Valdez Oil Spill, Gulf Ecosystem Monitoring Program; 2004 Apr. Report No. 030685.	Technical report

Adams PN. 2004. Assessing coastal wave energy and the geomorphic evolution of rocky coasts [dissertation]. Santa Cruz: Univ of California.	Dissertation
Chenelot H. 2003. Factors affecting estuarine populations of *Nereocystis luetkeana* in Kachemak Bay, Alaska [thesis]. Fairbanks: Univ of Alaska.	Master thesis
Schoch GC. The spatial distribution of bull kelp (*Nereocystis leutkeana*) in the Kachemak Bay Research Reserve. Final report. Alaska Department of Fish and Game, Sport Fish Division, Kachemak Bay National Estuarine Research Reserve; 2001 Dec.	Technical report

Appendix G. Memorandums of Understanding

Memorandum of Agreement
Between the
National Oceanic and Atmospheric Administration
And the
University of Alaska Anchorage
Detailing the state-federal roles in the
Management of the Kachemak Bay
National Estuarine Research Reserve

This Memorandum of Agreement establishes the provisions for the cooperative management of the Kachemak Bay National Estuarine Research Reserve in the State of Alaska, between the University of Alaska Anchorage and the National Oceanic and Atmospheric Administration's Office for Coastal Management (NOAA). This Memorandum of Agreement supersedes the previous Memorandum of Agreement between NOAA and the Alaska Department of Fish and Game (ADF&G) regarding the Kachemak Bay National Estuarine Research Reserve (Kachemak Bay Reserve) made on February 8, 2006.

I. BACKGROUND

A. The State of Alaska has determined that the waters and related coastal habitats of Kachemak Bay provide unique opportunities for study of natural and human processes to contribute to the science of estuarine ecosystem processes, enhance environmental education opportunities, and provide scientific information for effective coastal zone management in the State of Alaska.

B. The State of Alaska has determined that the resources of the Kachemak Bay Reserve and the values they represent to the citizens of Alaska and the United States will benefit from the management of these resources as part of the National Estuarine Research Reserve System.

C. The National Oceanic and Atmospheric Administration has concurred with that finding and, pursuant to its authority under Section 315 of the Coastal Zone Management Act of 1972, as amended (CZMA, 16 U.S.C. § 1461), and in accordance with implementing regulations at 15 C.F.R. § 921.30, has designated the Kachemak Bay Reserve.

D. The University of Alaska Anchorage, as the agency designated by the Governor of Alaska is responsible for maintaining and managing the Kachemak Bay Reserve in accordance with Section 315 of the CZMA and acknowledges the value of state-federal cooperation for the long-term management of the reserve in a manner consistent with the purpose of its designation.

E. The Kachemak Bay Reserve management plan, approved by NOAA, describes the goals, objectives, strategies/actions, administrative structure, and institutional arrangements for the reserve, including this MOA and others. In consideration of the mutual agreements herein, NOAA and University of Alaska Anchorage agree to the following roles indicated in Section II of this agreement.

II. STATE-FEDERAL ROLES IN RESERVE MANAGEMENT

A. University of Alaska Anchorage Role in Reserve Management

The University of Alaska Anchorage shall:

1. be responsible for compliance with all federal laws and regulations, and ensure that the Kachemak Bay Reserve management plan is consistent with the provisions of the CZMA and implementing regulations;

2. ensure protection of the natural and cultural resources of the reserve, and pursue enforcement of the provisions of state law to protect the reserve

3. ensure adequate, long-term protection and management of lands and waters included within the reserve boundary;

4. apply for, budget, allocate, and expend funds in accordance with federal and state laws, the reserve management plan, and annual funding guidance for reserve operations, research and monitoring, education and stewardship, and, as necessary, land acquisition and reserve facility construction;

5. conduct and coordinate research and monitoring programs that encourage scientists from a variety of institutions to work together to understand the ecology of the reserve ecosystem to improve coastal management;

6. conduct and maintain programs that disseminate research results via materials, activities, workshops, and conferences to resource users, state and local agencies, school systems, general public, and other interested parties;

7. provide staff and endeavor to secure state funding for the manager, education coordinator, and research coordinator;

8. secure facilities and equipment required to implement the provisions within the reserve management plan;

9. ensure adequate funding for facilities operation and maintenance;

10. maintain effective liaison with local, regional, state, and federal policy makers, regulators and the general public;

11. serve as principal contact for issues involving proposed boundary changes and/or amendments to the reserve management plan; and

12. respond to NOAA's requests for information made pursuant to Section 312 of the CZMA, particularly cooperative agreement and grant progress reports and evaluation findings, including necessary actions and recommendations;

13. coordinate activities and comply with all terms, conditions, and obligations of the Pacific Northwest Cooperative Ecosystem Studies Unit cooperative and joint venture agreement to facilitate transfer of Section 315 CZMA funds by NOAA for operations of the Kachemak Bay Reserve.

B. Federal Role in Reserve Management

NOAA's Office for Coastal Management shall:

1. administer the provisions of the Sections 315 and 312 of the CZMA to ensure that the reserve operates in accordance with goals of the reserve system and the Kachemak Bay Reserve management plan;

2. review and process applications for financial assistance from the University of Alaska Anchorage, consistent with 15 C.F.R. Part 921, for management and operation of the reserve, and, as appropriate, land acquisition and facility construction;

3. advise the University of Alaska Anchorage of existing and emerging national and regional issues that have bearing on the reserve and reserve system;

4. maintain an information exchange network among reserves, including available research and monitoring data and educational materials developed within the reserve system;

5. to the extent possible, facilitate the allocation of NOAA resources and capabilities in support of reserve goals and programs.

C. General Provisions

1. Nothing in this agreement or subsequent financial assistance awards shall obligate either party in the expenditure of funds, or for future payments of money, in excess of appropriations authorized by law.

2. Upon termination of this agreement or any subsequent financial assistance awards to University of Alaska Anchorage, any equipment purchased for studies to further this agreement will be disposed of in accordance with 2 C.F.R. § 200.313.

3. A free exchange of research and assessment data between the parties is encouraged and is necessary to ensure success of cooperative studies.

D. Other Provisions

1. Nothing in this agreement diminishes the independent authority or coordination responsibility of either party in administering its respective statutory obligations.

Nothing in this agreement is intended to conflict with current written directives or policies of either party. If the terms of this agreement are inconsistent with existing written directives or policies of either party entering this agreement, then those portions of the agreement which are determined to be inconsistent with such written directives and policies shall be invalid; but the remaining terms not affected by the inconsistency shall remain in full force and effect. At the first opportunity for revision of this agreement, all necessary changes shall be made by either an amendment to this agreement or by entering in a new superseding agreement, whichever is deemed expedient to the interested parties. Should disagreement arise on the interpretation of the provisions and/or amendments of this agreement, such disagreement shall be resolved by negotiations at the operating level of each party.

2. Disagreement on the interpretation of the provisions and/or amendments of this agreement shall be resolved by informal negotiations at the operating level of each party's respective organization. If such disputes cannot be resolved, then the area(s) of disagreement shall be stated in writing and presented to the other party for further consideration. If agreement is not reached within thirty (30) days, the parties shall forward the written presentation of the disagreement to respective higher officials for appropriate resolution.

III. REAL PROPERTY ACQUIRED FOR PURPOSE OF THE RESERVE

As well as acknowledging the rest of the requirements set forth at 15 C.F.R. Part 921, University of Alaska Anchorage specifically acknowledges and will fully comply with conditions set forth at 15 C.F.R. § 921.21 (e), which specify the legal documentation requirements concerning the use and disposition of real property acquired for reserve purposes with federal funds under Section 315 of the CZMA.

IV. PROGRAM EVALUATION

The Office for Coastal Management of NOAA will schedule periodic evaluations of University of Alaska Anchorage's performance in meeting the terms of this agreement, financial assistance awards, and the reserve management plan. Where findings of deficiency occur, NOAA may initiate action in accordance with the designation withdrawal or interim sanctions procedures established by the CZMA and applicable regulations at 15 C.F.R. § 921.40-41.

V. EFFECTIVE DATE, REVIEW, AMENDMENT AND TERMINATION

A. This agreement is effective on the date of the last signature on this agreement and shall be in effect until terminated by either party.

B. This agreement will be reviewed periodically by both parties and may only be amended by the mutual written consent of both parties.

C. This agreement may be terminated by mutual consent of both parties or by NOAA if NOAA withdraws designation of the area as a National Estuarine Research Reserve pursuant to applicable provisions of the CZMA and implementing regulations as at 15 C.F.R. Part 921, Subpart E and Part 923 Subpart L. Section 315 of the CZMA provides that NOAA may withdraw designation under only two circumstances: 1) NOAA finds that the criteria for establishing the reserve no longer exist; or 2) a substantial portion of the research conducted within the reserve fails to meet reserve system guidelines. In making any decision to withdraw designation, NOAA will take into consideration factors set forth in 15 C.F.R. § 921.40, they include, among other things, failure of the University of Alaska Anchorage to comply with this MOA, issue timely updates to the MOA, or adequately manage or operate the reserve. The agreement may be terminated by University of Alaska Anchorage with or without cause. Should this agreement be terminated and designation withdrawn, reimbursement of unexpended funds from financial assistance awards shall be determined on a pro rata basis according to the amount of work done by the parties at the time of termination. Additionally, reimbursement for land purchased and facilities constructed with NOAA funds shall be consistent with terms and special award conditions of financial assistance awards.

D. If any clause, sentence or other portion of this MOA shall become illegal, null, or void for any reason, the remaining portions of this MOA shall remain in full force and effect.

E. No waiver of right by either party of any provision of this MOA shall be binding unless expressly confirmed in writing by the party giving the waiver.

IN WITNESS THEREOF, the parties have caused this agreement to be executed.

Jeffrey L. Payne, Ph.D.
Acting Director
Office for Coastal Management
National Ocean Service National
Oceanic and Atmospheric
Administration
U.S. Department of Commerce

April 3, 2015
Date

Thomas R. Case
Chancellor
University of Alaska Anchorage

Apr 7, 2015
Date

THE STATE
of ALASKA
GOVERNOR BILL WALKER

Department of Fish and Game

OFFICE OF THE COMMISSIONER
Headquarters Office

1255 West 8th Street
P.O. Box 115526
Juneau, Alaska 99811-5526
Main: 907.465.4100
Fax: 907.465.2332

March 5, 2015

The Honorable Bill Walker
Office of the Governor
P.O. Box 110001
Juneau, AK 99811-0001

Dear Governor Walker:

The Kachemak Bay National Estuarine Research Reserve (KBRR) is a federal-state partnership between the National Oceanic and Atmospheric Administration (NOAA) Estuarine Reserve Division and the Alaska Department of Fish and Game (ADF&G), Division of Sport Fish. KBRR also has a local Council that fosters dialogue about local coastal issues of concern and provides direct communication to the community. KBRR was designated as a research reserve in 2002 with support from ADF&G, the National Estuarine Research Reserve system, and from members of the Homer community.

KBRR is Alaska's first and only Research Reserve, the only sub-arctic Reserve, and the largest Reserve in the national system. The intention of the Reserve is to enhance understanding of the Kachemak Bay estuary and adjacent waters to ensure these ecosystems remain healthy and productive.

As a result of a long period of sustained budget constraints associated with declining license revenues, decreased federal grant funding and limited general fund allocations relative to increasing annual operational costs, the decision was made to seek a new state partner for KBRR in FY 2014. The University of Alaska Anchorage has expressed interest in filling that role and must execute a Memorandum of Agreement (MOA) with NOAA stating the terms of the partnership.

Your written acknowledgment of agreement for the transfer of responsibility for KBRR from ADF&G to UAA is required before NOAA will sign a new MOA with UAA. A draft letter of approval for your signature has been provided to your office. Upon receipt of your approval, our department will coordinate with NOAA and UAA to move forward with the transition.

Sincerely,

Sam Cotten
Commissioner

cc: Sunny Haight, Director, Division of Administrative Services
Lisa Evans, Assistant Director, Division of Sport Fish
Erica Seiden, Acting Program Manager, NOAA OCRM-CSC
Keith Boggs, Director, UAA Natural Heritage Program

THE STATE
of ALASKA
GOVERNOR BILL WALKER

Department of Fish and Game

OFFICE OF THE COMMISSIONER
Headquarters Office

1255 West 8th Street
P.O. Box 115526
Juneau, Alaska 99811-5526
Main: 907.465.4100
Fax: 907.465.2332

March 5, 2015

Mr. Jeffrey Payne, Acting Director
NOAA Office for Coastal Management
1305 East-West Highway
Silver Spring, MD 20910

Dear Mr. Payne:

Following a long period of sustained budget constraints and decreased federal grant funding, the Alaska Department of Fish and Game (ADF&G) is no longer able to support the Kachemak Bay National Estuarine Research Reserve (KBRR). Current NOAA funding levels do not sufficiently cover the costs associated with our partnership and ADF&G is unable to continue providing financial support for projects that do not contribute directly toward our mission.

The University of Alaska Anchorage has agreed to partner with NOAA to manage and operate KBRR and is pursuing the required Memorandum of Agreement (MOA). The MOA between NOAA and ADF&G entered into on February 8, 2006, regarding management and operation of KBRR will be terminated, effective on the date in which ADF&G receives official written notice from NOAA that:

1) UAA has assumed management of KBRR pursuant to a fully executed agreement with NOAA; and
2) ADF&G has been released of any and all financial obligations to NOAA, associated with the KBRR partnership.

Immediately prior to the termination of the MOA, it is ADF&G's intent to transfer any remaining NOAA grant awards associated with the partnership to UAA.

ADF&G remains committed to a successful transition of KBRR to UAA before June 30, 2015, and appreciates your consideration of this notice to terminate the current MOA. Please do not hesitate to contact Sunny Haight at (907) 465-5999 or Lisa Evans at (907) 267-2330 if you have any questions or require additional information.

Sincerely,

Sam Cotten
Commissioner

cc: Sunny Haight, Director, Division of Administrative Services
Lisa Evans, Assistant Director, Division of Sport Fish
Erica Seiden, Acting Program Manager, NOAA OCRM-CSC

Office of the Chancellor
UNIVERSITY of ALASKA ANCHORAGE

3211 Providence Drive
Anchorage, Alaska 99508-4614
T 907.786.1437 • F 907.786.6123
chancellor@uaa.alaska.edu

March 5, 2015

Office of the Governor
State of Alaska
PO Box 110001
Juneau, AK 99811

Dear Governor Bill Walker,

The University of Alaska Anchorage (UAA) supports the pending transfer of authority over the Kachemak Bay National Estuarine Research Reserve (KBRR) from the Alaska Department of Fish and Game (ADF&G) to UAA. KBRR is a state-federal partnership program and requires a state partner agency to execute National Estuarine Research Reserve System research, monitoring, education, training and stewardship activities. The ADF&G Sport Fish Division has reduced financial capacity to support the KBRR and has been forced to hone its mission as a result of steady declines in revenue; hence, they are choosing to transfer that responsibility to UAA.

In order for UAA to become the state partner, they must execute a Memorandum of Agreement (MOA) with NOAA stating the terms of the partnership. In order for NOAA to sign the MOA, they must receive acknowledgement that the Governor's Office supports the transfer of responsibility of KBRR from ADFG to UAA. Tom Brookover, Acting Director of ADF&G Division of Sport Fish, Charlie Swanton, Deputy Commissioner for ADF&G, and Sam Cotten, Commissioner of ADF&G are in full support of the transfer and have previously notified the Governor's Office of this.

If you support this, we request a written acknowledgement of agreement from the Governor's Office stating your support for the transfer of responsibility of KBRR from ADF&G to UAA.

Thank you for your time.

Sincerely,

Tom Case

Tom Case
Chancellor
University of Alaska Anchorage

Cc: Sam Cotten, Commissioner, ADF&G
Charlie Swanton, Deputy Commissioner, ADF&G
Tom Brookover, Acting Director, ADF&G Division of Sport Fish
Pat Gamble, President, University of Alaska
Chris Christensen, Associate Vice President for State Relations, University of Alaska

STATE CAPITOL
P.O. Box 110001
Juneau, AK 99811-0001
907-465-3500
fax: 907-465-3532

Governor Bill Walker
STATE OF ALASKA

550 West Seventh Avenue, Suite 1700
Anchorage, AK 99501
907-269-7450
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www.Gov.Alaska.Gov
Governor@Alaska.Gov

March 16, 2015

The Honorable Sam Cotton
Commissioner
Alaska Department of Fish and Game
P.O. Box 115526
Juneau, AK 99811-5526

Chancellor Tom Case
University of Alaska Anchorage
3211 Providence Drive, ADM 216
Anchorage, AK 99508

Dear Commissioner Cotten and Chancellor Case:

I am in receipt of your respective letters and commend your efforts to ensure the Kachemak Bay National Estuarine Research Reserve (KBRR) maintains its presence within the Homer community and continues serving the purpose for which it was created. KBRR clearly represents a successful federal-State partnership with the National Oceanic and Atmospheric Association that benefits the Kachemak Bay estuary and adjacent waters.

Please consider this letter as my approval for the transfer of responsibility for KBRR from the Alaska Department of Fish and Game to the University of Alaska Anchorage.

Sincerely,

Bill Walker
Governor

cc: Jeffrey Payne, Ph.D., Acting Director, Office for Coastal Management, National Oceanic and Atmospheric Administration
Kip Knudson, Director of State and Federal Relations, Office of the Governor

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MEMORANDUM OF UNDERSTANDING
between the

UNIVERSITY OF ALASKA ANCHORAGE
Alaska Center for Conservation Science
and the

CITY OF HOMER

concerning portions of the
KACHEMAK BAY NATIONAL ESTUARINE RESEARCH RESERVE

This Memorandum of Understanding (MOU) is designed to assist the governmental agencies in cooperatively managing the areas within the boundaries of the Kachemak Bay National Estuarine Research Reserve (KBNERR). The agreement pertains to the responsibilities of: 1) University of Alaska Anchorage (UAA), College of Arts and Sciences, Alaska Center for Conservation Science, whose address is 3211 Providence Drive, Anchorage, Alaska 99508, and 2) the City of Homer ("City"), whose address is 491 E. Pioneer Ave., Homer, Alaska 99603. In no way does this MOU alter existing authorities and responsibilities either between or within the agencies.

WHEREAS, the State of Alaska has determined that the designation of the KBNERR under the National Estuarine Research Reserve System (NERRS) would provide for beneficial long-term research and improve public understanding of our coastal resources; and

WHEREAS, the National Oceanic and Atmospheric Administration (NOAA), Office of Coastal Management, designated the KBNERR, which includes areas along the Homer Spit and portions of Beluga Slough; and

WHEREAS, UAA is designated by the State of Alaska and in the KBNERR Management Plan, as the agency responsible for managing the Reserve; and

WHEREAS, the City of Homer has passed resolutions (e.g., Res. 98-14, 96-106) supporting the establishment of KBNERR; and

WHEREAS, the City of Homer has title to lands which form important components of the Reserve, including several acres of tidelands and salt marshes alongside the Homer Spit, and marshland and park parcels in the Beluga Slough area; and

WHEREAS, including these areas in the reserve may better facilitate estuarine research and education programs in the Homer area;

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NOW THEREFORE, it is agreed by and between the City and UAA as follows:

1. The purpose of the KBNERR is to provide a natural field laboratory and living classroom which, in addition to current uses, will be used to gather data and educate people of the state and nation on the natural and human processes occurring within coastal watersheds and estuaries. As stated in the NERRS goals, the Reserve will serve to increase public awareness and understanding of the complex nature of estuarine systems, their values and benefits to humans and the natural world, and the problems the confront them.

2. A management plan for the KBNERR was finalized by UAA after public review with critical input from the City of Homer. The management plan provides a framework for conducting research and educational programs in the Reserve. Activities within the City lands will be conducted in a manner which is consistent with the management plans for City lands and the KBNERR, designated as a NERR in 1999. Under terms of this agreement, the City of Homer will continue to manage and administer its lands and programs in these areas.

3. The City shall be fully and regularly consulted by UAA regarding research and education needs, opportunities, and information pertaining to Reserve areas.

4. The Signatories will coordinate and cooperate to ensure that research and educational activities do not adversely affect the lands, waters, fish, wildlife, natural and scenic values in these areas, or each other's management plans.

5. The Signatories acknowledge that the City intends to significantly expand port and harbor facilities on the spit. Nothing in the agreement is to be construed as opposing the City’s projects or impairing the City’s ability to expand port and harbor facilities for purposes which may include, but are not limited to, marine industrial, commercial, and recreational uses.

6. Nothing in this agreement shall obligate any party in the expenditure of funds, or for future payments of money, in excess of appropriations authorized by law.

7. Each party agrees that it will be responsible for its own acts and omissions including those of its officers, agents, and employees, and each party shall indemnify, defend and hold harmless the other, to the maximum extent allowed by law, from any claim of, or liability for error, omission or negligent act of whatever kind, including attorney fees, for damages to property or injury to persons occasioned by each party's own acts or omissions in connection with the terms of this agreement.

8. Nothing herein is intended to conflict with federal, state, or local laws or regulations. If there are conflicts, this agreement will be amended at the first opportunity to bring it into conformance with conflicting laws or regulations.

9. A free exchange of management, research, and assessment data among agencies is

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encouraged and is necessary to insure the success of these cooperative efforts.

This MOU will become effective on the date of signature. The termination date of this agreement shall be indefinite; however, either party may terminate its participation by providing written notice to the other party ninety days before termination. This agreement may be amended by mutual written consent of the Parties.

IN WITNESS THEREOF, the Parties hereto have caused this MOU to be executed

DocuSigned by:
59712FF95AAA497...
March 4, 2021
UAA Interim Chancellor Bruce Schultz Date

DocuSigned by:
AE7EE55F615543D...
March 4, 2021
UAA Provost Denise Runge Date

DocuSigned by:
BB4F2D21712643C...
March 4, 2021
UAA [illegible] John Petraitis Date

DocuSigned by:
4E61F1504C10466...
February 24, 2021
UAA ACCS Director Matthew Carlson Date

DocuSigned by:
2C15BCD30C0D4B7...
March 4, 2021
Rob Dumouchel Date
City Manager City of Homer

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MEMORANDUM OF UNDERSTANDING
between the

UNIVERSITY OF ALASKA ANCHORAGE,
Alaska Center for Conservation Science
and the

ALASKA DEPARTMENT OF NATURAL RESOURCES,

Division of Parks and Outdoor Recreation

concerning the
KACHEMAK BAY NATIONAL ESTUARINE RESEARCH RESERVE

This Memorandum of Understanding (MOU) is designed to assist the agencies in cooperatively managing the areas within the boundaries of the Kachemak Bay National Estuarine Research Reserve (KBNERR). The agreement pertains to the responsibilities of: 1) University of Alaska Anchorage (UAA), College of Arts and Sciences, Alaska Center for Conservation Science, whose address is 3211 Providence Drive, Anchorage, Alaska 99508, and 2) the Alaska Department of Natural Resources (DNR), Division of Parks and Outdoor Recreation (DPOR) hose address is 550 W 7th Ave # 1380, Anchorage, AK. In no way does this agreement alter existing authorities and responsibilities either between or within the agencies.

WHEREAS, the State of Alaska has determined that the designation of the KBNERR under the National Estuarine Research Reserve System (NERRS) would provide for beneficial long-term research and public education to improve coastal management capabilities in the state; and

WHEREAS, the National Oceanic and Atmospheric Administration (NOAA), Office of Ocean and Coastal Resource Management, is in the process of designating the KBNERR, which includes portions of the Kachemak Bay State Park and state tidelands, submerged lands, and waters; and

WHEREAS, UAA has been designated in the KBNERR Management Plan, to which this Agreement is attached, and by the State of Alaska as the agency responsible for managing the Reserve; and

WHEREAS, DPOR has management responsibilities for state waters, tidelands, and submerged lands of Kachemak Bay State Park, which form important components of the Reserve; and

WHEREAS, DPOR recognizes that the more complete information on the region's resources and current uses assembled by the Reserve will provide real benefits to their programs; and

WHEREAS, a coordinated effort between UAA and DPOR to provide and promote research and educational uses of these areas will benefit all parties;

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NOW THEREFORE, it is agreed by and between UAA and DPOR as follows:

1. The purpose of the KBNERR is to provide a natural field laboratory and living classroom which, in addition to current uses, will be used to gather data and educate people of the state and nation on the natural and human processes occurring within coastal watersheds and estuaries. The Reserve will serve to increase public awareness and understanding of the complex nature of estuarine systems, their values and benefits to humans and the natural world, and the problems that confront them, as stated in the NERRS goals.

2. A management plan for the KBNERR was finalized by UAA with input and review from DPOR. The management plan provides a framework for conducting research and educational programs in the Reserve. Activities using DPOR funding and activities that require DPOR's authorizations in the Reserve will be conducted in a manner consistent with the management plans for Kachemak Bay State Park and the Kenai Area Plan. DPOR may use the UAA management plans for the Reserve and the Kachemak Bay and Fox River Flats Critical Habitat Areas for additional guidance in implementing its authorities where the Reserve overlaps the Park.

3. DPOR shall be fully and regularly consulted by UAA regarding research and education needs, opportunities, and information as well as management policies pertaining to the Park. DPOR will also be consulted about proposed research projects that require authorization from DPOR.

4. DPOR and UAA agree to share geographic information system (GIS), research findings and other data for the region, and are interested in developing new uses and applications for such information.

5. The Signatories will coordinate and cooperate to ensure that research and educational activities do not adversely affect the scenic values of the Park nor interfere with the recreational opportunities of the visiting public. Additionally, the Signatories shall minimize any effects to the lands, waters, fish, and wildlife, of the Park.

6. This agreement does not create duties or legally enforceable liabilities or obligations for any party nor establish a standard of care attributable to the activities associated with the subject of this agreement. Nothing in this agreement shall obligate any party in the expenditure of funds, or for future payments of money, in excess of appropriations authorized by law. The only remedy for a breach of this agreement shall be termination.

7. Nothing herein is intended to conflict with federal, state, or local laws or regulations. If there are conflicts, this agreement will be amended at the first opportunity to bring it into conformance with conflicting laws or regulations.

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8. A free exchange of research and assessment data among agencies is encouraged and is necessary to insure the success of these cooperative studies.

This MOU will become effective upon the date of signature. The termination date of this agreement shall be indefinite, however, either party may terminate its participation in this agreement by providing written notice to the other party sixty days before termination. This agreement may be amended by mutual written consent of the parties.

IN WITNESS THEREOF, the Parties hereto have caused this MOU to be executed:

DocuSigned by:
Cathy Sandeen
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January 3, 2020

UAA Chancellor Cathy Sandeen Date

DocuSigned by:
John R. Stalvey
CBBA1B38C358465...

December 20, 2019

UAA Provost John Stalvey Date

DocuSigned by:
John Petraitis
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December 20, 2019

UAA CAS Dean John Petraitis Date

19 Dec 2019

UAA ACCS Director Matthew Carlson Date

DocuSigned by:
Ricky Gease
02F4FE728C904CA...

January 6, 2020

DPOR Director
Ricky Gease Date