



# NOAA FISHERIES

## Accomplishment Report

### Habitat Conservation Division, Fiscal Year 2020

Habitat conservation, protection, and restoration are the foundation for sustaining the nation's fisheries. The Alaska Region (AKR) Habitat Conservation Division (HCD) carries out the National Marine Fisheries Service's (NMFS) statutory responsibilities for habitat conservation in Alaska under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the Fish and Wildlife Coordination Act, the National Environmental Policy Act (NEPA), the Federal Power Act, and other laws.

To prioritize our resources and activities, make decisions in an ecosystem context, and strengthen the science behind our decision-making, we work closely with the Alaska Fisheries Science Center (AFSC), other NOAA line offices, the North Pacific Fishery Management Council (NPFMC/Council), other federal and state agencies, non-governmental organizations, local governments, and a variety of industry and conservation groups. By leveraging these partnerships, we work together to better execute the Alaska Region's mission: *the science-based stewardship of living marine resources and their habitat in the waters of the North Pacific and Arctic Oceans off Alaska*. The Alaska Region's mission responsibilities include supporting sustainable fisheries, recovering and conserving protected species, and promoting healthy ecosystems and resilient coastal communities.

This report highlights our accomplishments for Fiscal Year 2020 (October 1, 2019 to September 30, 2020). The format of this Report reflects our commitment to HCD's six overarching goals.



Figure 1: Linda Shaw - Sea anemone taken in Juneau, featured on NPRB 2020 calendar.

## Contents

<b>Goal #1: Identify and pursue opportunities to conserve and restore marine and anadromous water habitats</b>	3
Mitigation and Restoration Projects.....	3
Regional Coastal Resilience Assessments .....	5
Oil Spill Response and Planning.....	6
Hydropower Projects .....	6
Invasive Species.....	7
<b>Goal #2: Provide EFH Conservation Recommendations that maximize mission-critical benefits for FMP-managed species and their habitats</b>	10
EFH Consultations on Fishing Activities.....	10
EFH Consultations on Non-Fishing Activities .....	10
<b>Goal #3: Continually identify data gaps and information needs, and use the best available science to conduct EFH reviews and consultations that support sustainable fisheries management, healthy marine ecosystems, and community resilience</b>	16
EFH Coordination.....	16
EFH 5-Year Review.....	16
Advance EFH Science .....	17
<b>Goal #4: Provide habitat expertise based on the best available science to improve habitat conservation and facilitate Ecosystem-Based Fishery Management (EBFM)</b>	19
<b>Goal #5: Participate in partnerships within and outside of NOAA that influence habitat conservation for FMP-managed species</b>	21
Publications.....	21
Partnerships.....	22
Southeast Alaska Fish Habitat Partnership (SEAKFHP).....	23
ShoreZone .....	24
Outreach, Conferences, and Presentations .....	24
<b>Goal #6: Improve HCD Organizational Excellence and Cohesion by integrating the Alaska Region Shared Values with our workplace interactions and products: Integrity, Respect, Collaboration, Accountability, and Open Communication</b>	27
Change Strategy .....	27
Staff Resources .....	27
Personnel News in 2020.....	27
<b>Final Word</b>	28

## **Goal #1: Identify and pursue opportunities to conserve and restore marine and anadromous water habitats**

### *Mitigation and Restoration Projects*

#### **Eklutna River**

Sean Eagan and Sean McDermott (NMFS Greater Atlantic Region) surveyed cross-sections below the old dam site in November of 2019. In the first  $\frac{1}{3}$  mile below the former dam, the channel aggraded approximately 1 foot in the two years since the dam was removed as anticipated. The channel bottom has switched from predominantly sand to predominantly small gravel which may allow smaller salmon to spawn, although no redds were observed. This substrate change was not anticipated. NMFS met with the utilities and other partners on November 15 to discuss methods to implement the 1991 Fish and Wildlife Agreement that calls for restoring lost channel habitat between the two dams, including allowing sufficient flow to pass the upper dam. While Sean hoped to continue surveying cross-sections in 2020, Covid-19 made this impossible to accomplish safely.

The Bureau of Reclamation obtained rights to divert 100% of the water from Eklutna Lake to a hydropower facility in 1955. In 1997, those water rights and the hydropower project were sold to three utilities with a settlement agreement that obligated the utilities to mitigate the habitat loss approximately 30 years later. While other methods of mitigating this habitat loss are possible, most participants at the meeting were inclined to put some water back in the Eklutna River.

Sean virtually attended the first technical work group meeting to determine how to return sufficient water back into the Eklutna River in order to entice salmon above the site where the lower dam once stood. The focus was identifying areas which could support off-channel rearing and spawning and acknowledging challenges such as the alluvial fans which produce large volumes of fines that imbed and cover spawning gravel. Public groups and the Eklutna Tribe are advocating for the utilities to move quickly to bring back salmon, however, the scientific approach including studies is slow; all parties agreed that concrete steps of progress each year are important.

NMFS submitted comments on the Initial information packet and is planning to submit comments on the Draft Study Plan. The 2020 goal of all stakeholders agreeing on a final study plan will happen in early 2021.

#### **Southeast Alaska Restoration Retrospective Working Group**

Cindy Hartmann Moore and Erika Ammann (Restoration Center) participated in a Southeast Alaska retrospective working group conference call. The group is working to produce a 10-year retrospective on aquatic restoration projects in Southeast Alaska. The project will also include information on future restoration opportunities available in the region. The project incorporates information from multiple agencies and organizations and will be a useful tool in planning and seeking funds for new restoration projects.

#### **Pinto Abalone Restoration and Culture**

Erika Ammann reported on recent solicitation of ideas by the Office of Habitat Conservation for continuing Habitat Focus Area (HFAs). The first-year classes of HFAs will be maturing soon and new HFAs can begin to be rotated in. Erika remembered Linda Shaw's pinto abalone HFA proposal from the first go-around of the program and as a result of the following discussion, Linda has been reaching out to various potential partners to develop a resurrected pinto abalone HFA idea, both within and outside of NOAA. Ruth Roys worked with Linda Shaw and Erika Ammann of the Restoration Center to synthesize a series of interviews with coast wide abalone experts combined with research to overview the status of pinto abalone in Alaska and make HFA recommendations. Linda Shaw followed up with Sitka pinto

abalone researcher Taylor White to review our thinking on this topic, and begin further refining ideas for the HFA. Next steps will include continuing the discussions with Taylor to include additional interested parties such as Jordan Hollarsmith of Auke Bay Laboratories.

### **NOAA Restoration Center**

The NOAA Restoration Center work in Alaska has focused mainly on fish passage and river connectivity in our community-based program as well as in our oil spill restoration program. Improving hydrologic function and fish passage has risen as a priority as thermal refugia become increasingly important for fish rearing in river systems as well as for migrating adults. The Exxon Valdez Oil Spill (EVOS) Trustee Council provides funding support for many of these projects.

#### **Kenai Peninsula**

Ongoing work undertaken with partners ADF&G, U.S. Fish and Wildlife Service (USFWS), and ADOT&PF in the Kenai Peninsula aims to restore passage and hydrologic function to over 90 miles of stream, replacing 4 culverts in areas that support declining Chinook salmon populations as well as pink, coho, and sockeye salmon, steelhead and Dolly Varden trout, and Pacific lamprey. In June of 2019, a culvert was installed in Crooked Creek. Crooked Creek is a 46 mile-long nonglacial stream. The upper 29 miles of Crooked Creek are within Congressionally-designated Wilderness of the Kenai National Wildlife Refuge. The Crooked Creek watershed is 35,141 acres and much of the lower 16.5 miles that is outside the Federal conservation unit is surrounded by riparian wetlands. The stream flows through Johnson Lake State Recreation Site, popular for camping by both residents and tourists, and the mouth is protected within Crooked Creek State Recreation Area, a recreational area with high visitation during the angling season. The culvert was replaced using a stream simulation model to pass all life stages of salmon opening up 33 miles of fish passage.

#### **Buskin River Restoration**

In the Buskin River system, NOAA and partners USFWS, ADF&G, and Kodiak Soil and Water Conservation District have removed over 20 fish passage barriers. The project restored access to over 6 miles of upstream habitat and 53 acres of lakes in the 26 square mile Buskin River drainage. This restoration work in Kodiak bolsters and enhances ecosystem function for a productive watershed. It further provides additional opportunity for impacted species populations to recover as well as commercial, recreational, and subsistence fishing. This project was completed in 2020.

#### **Copper River Watershed**

In the Copper River watershed, NOAA and partners USFWS, ADF&G, USFS and Copper River Watershed Partnership plan to restore 13 barrier culverts benefiting salmon and trout fisheries, numerous bird species, commercial fisheries, and tourism. This work addresses the top 13 priority culverts of the 73 culverts which cross the Copper River Delta resulting in restored fish passage and access to more than 22 miles of spawning and rearing habitat for multiple species of anadromous fishes. This project is ongoing.

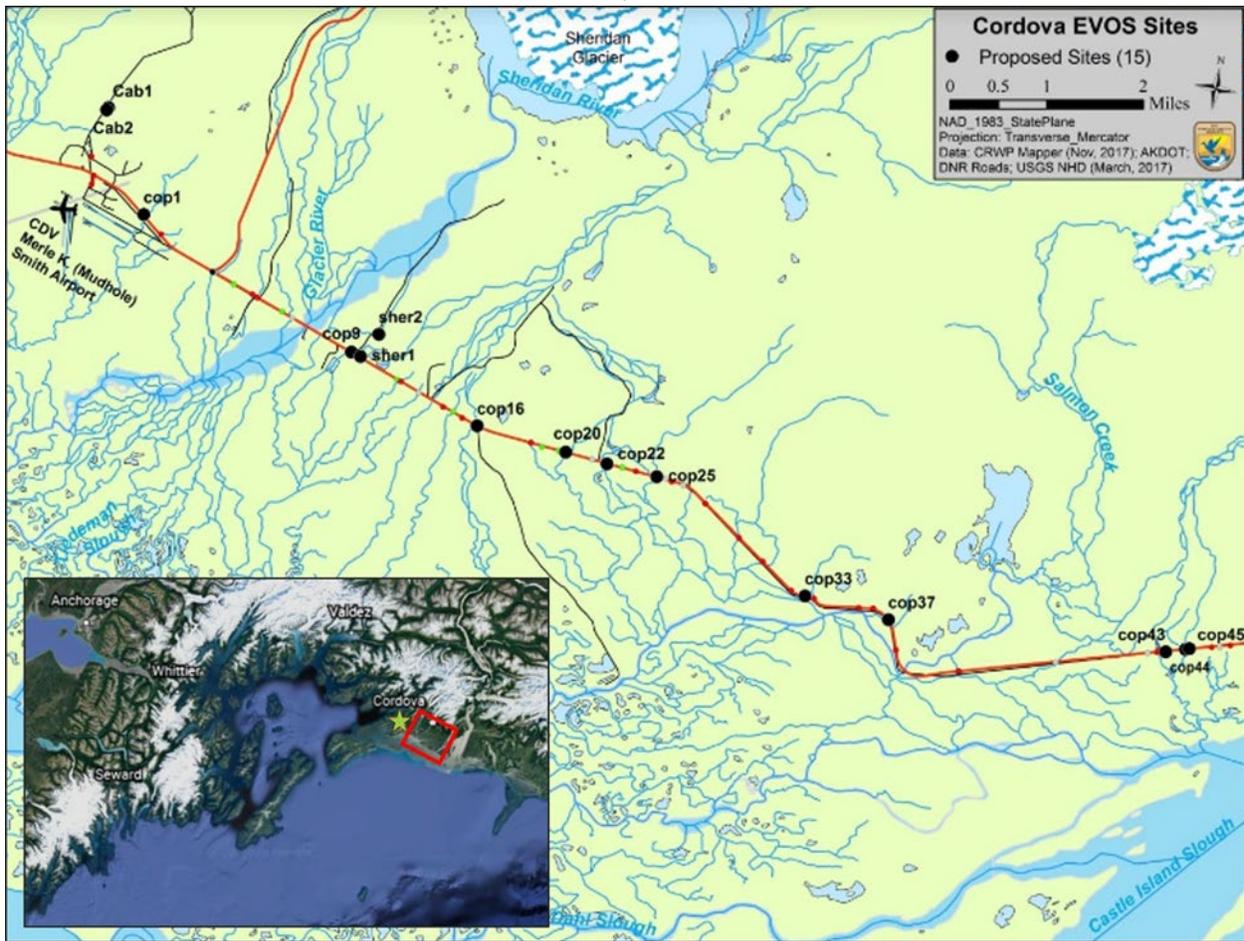


Figure 2: Copper River culverts prioritized for replacement with EVOS funds. [Credit](#)

### Tyonek Area Restoration

Outside of EVOS work, the NOAA Restoration Center funded and oversaw the removal of three fish passage barriers in the Tyonek area, opening up 9 upstream miles and 131 lake acres to salmon and eulachon species in an area of importance for Cook Inlet Beluga whales. This project was completed in 2020.

### *Regional Coastal Resilience Assessments*

#### Coastal Resilience Assessment for Alaska

NOAA Fisheries has partnered with the National Fish and Wildlife Foundation and the University of North Carolina Asheville's National Environmental Modeling Analysis Center to develop Regional Coastal Resilience Assessments (CRA), through the National Coastal Resilience Fund. Jodi Pirtle is helping to guide the effort for Alaska on the Advisory Team and Technical Work Group, which met on January 8th, 2020, at NOAA Fisheries in Anchorage. CRA combined many data sources in spatial models to identify Resilience Hubs, areas of open space surrounding population centers, where conservation and restoration projects may have the greatest potential to benefit both human community resilience and fish and wildlife populations and habitat.

Spatial data from AKR's EFH maps, ShoreZone, and invasive species monitoring are important contributions to develop this assessment for Alaska. CRA is a tool to support NOAA's mission-driven

actions to promote habitat conservation and resilient coastal communities. Alaska's CRA will be completed in FY21.

### *Oil Spill Response and Planning*

#### **Oil Spill Preparedness**

Seanbob Kelly represented the HCD at a meeting with the Alaska Department of Environmental Conservation and the U.S. Coast Guard Sector Anchorage. The purpose of the meeting was to provide input into Version 2018.1 of the [Area Contingency Plan for the Arctic and Western Alaska Area](#) (AWA ACP). The AWA ACP serves as a primary guidance during a response to an oil discharge or hazardous substance release. The AWA ACP describes the strategies of a coordinated federal, state, tribal, and local response to a discharge, or substantial threat of discharge of oil and/or a release of a hazardous substance from a vessel or on/offshore facility operating within Alaska's AWA area boundaries.

### *Hydropower Projects*

#### **Grant Lake Hydropower**

NMFS provided EFH Conservation Recommendations, License Terms and Conditions under Section 10(j) of the Federal Power Act, DEIS comments, and comments on six plans associated with construction activities.

#### **Susitna-Watana Project Review**

Sue Walker filed a Technical Review of Water, Fish and Aquatic Resource Studies for the Susitna-Watana Hydroelectric Project with the Federal Energy Regulatory Commission. This filing brought closure to a multi-year review process. Alaska Energy Authority initiated the licensing of the Susitna-Watana Hydroelectric Project in 2012 and by 2016, put the licensing proceedings in abeyance due to economics. As proposed, the project had potential to substantially impact NOAA trust resources, with potential implications for endangered species. Our technical review documents the progression of environmental study reports completed for the proposed project, and provides comments on the many study reports. Should this project be re-initiated in the future, this technical review will assist our staff and other stakeholders in familiarizing themselves with the licensing process, studies performed, unresolved issues related to the completed work, and recommendations for future studies.

#### **Igiugig Hydrokinetic Project**

Sean Eagan and Sean McDermott traveled to Anchorage to attend the first adaptive management team meeting for the Igiugig Hydrokinetic Project. The Igiugig Hydrokinetic Project is the first in-river hydrokinetic unit deployed in North America for generating electricity. It is deployed in the Kvichak River, a tributary to Lake Iliamna which supports the largest sockeye run in the world. The Seans were present to ensure NMFS interests are addressed, that monitoring methods are appropriate for observing impacts on sockeye smolts, and mitigation measures are in place in the event of a significant mortality event.

There were technical difficulties with the underwater cameras which were designed to document how the outmigrating smolt interacted with the turbines and the UAF staff that designed the monitoring system could not get to Igiugig to troubleshoot the problems. To protect the salmon smolt, the hydrokinetic unit was turned off and floated on the river surface both during sockeye smolt outmigration and during the adult return run. The hydrokinetic generator successfully produced energy the other 10 ½ months of the year.

## **Nuyakuk Hydroelectric Project**

This proposed run-of-river project hopes to provide power to Dillingham and seven surrounding communities. The Nuyakuk River is a tributary to the Nushagak River and flows between 1,200 c.f.s. mid-winter and 15,000 c.f.s. during peak July snowmelt. The project would withdraw 30 percent of the water above a cascade, run it through two turbines, and return it to the river a half mile downstream. The Nushagak Electric Cooperative would not build a dam or reservoir. Juvenile fish entrainment at the project intake and false attraction flows at the tailrace are two ways it may negatively affect salmon.

Sean Eagan submitted study requests to the Federal Energy Regulatory Commission (FERC) that will allow all parties to better understand the effects of this proposed development on salmon. NMFS requested a Future Flows Study to get Nushagak Electric Cooperative and FERC to acknowledge that they need to consider the flows likely to occur during the 50-year license term (2030 - 2080) rather than the flows of the past. NMFS staff will use the information from these studies to craft mitigation measures to protect migrating salmon. In an effort to avoid spreading Covid-19 to Dillingham, the project was put in abeyance in April of 2020. Although there have been a few ongoing discussions, this project was relatively quiet for the second ½ of the year.

## **Cooper Creek Project**

In accordance with the 2005 Settlement Agreement, Chugach Electric agreed to siphon warmer Cooper Lake water over the dam and into Cooper Creek in exchange for diverting 100% of the Stetson Creek, which has no fish, into Cooper Lake. While the diversion and siphon began flowing in late 2015 neither the additional power benefits for the utility nor the improved fish habitat in Cooper Creek have been fully realized. The siphon works when the lake is relatively full and habitat is improved. However, even after two fixes, when the Cooper Lake drops below 1173 feet the siphon loses suction and ceases to add the warmer water to Cooper Creek. NMFS staff attended multiple virtual meetings and the utility again plans to fix the faulty siphon the summer of 2021.

## **Battle Creek Diversion into Bradley Lake**

Alaska Energy Authority began diverting 80% of Battle Creek's water into Bradley Lake in late July of 2020. NMFS had planned a second summer season of studying the baseline condition of the Battle Creek Estuary. While Covid-19 made the logistics challenging, our consultant, Aquatic Restoration and Research Institute, completed one survey of fish, channel morphology and vegetation in 2020 before the diversion started. During the summers of 2021 and 2022 we will study how the estuary adapts to having significantly less fresh water.

## *Invasive Species*

### **Arctic Council Committee on Arctic Flora and Fauna (CAFF) Arctic Invasive Alien Species (ARIAS) Strategy Steering Committee Conference**

Linda Shaw participated in this conference call to discuss how CAFF can move forward with the ARIAS strategy to promote protection of the Arctic environment from invasive species. In addition to the U.S., Sweden, Iceland and Canada participated. Goals are to increase awareness, community based monitoring, data management and interaction with the business sector. Linda briefed the group on the Unalaska bioblitz and St. Paul Bering Sea Day events and the Bureau of Ocean Energy Management Alaska Annual Studies Plan for FY 2020 marine invasive species component. In addition to the community based monitoring topic, ballast water management in the Arctic was also discussed.

### **European Green Crab eDNA Project Planning**

Linda Shaw and Alaska Sea Grant Fellow Meredith Pochardt received discretionary funding, facilitated by the Pacific States Marine Fisheries Commission Memorandum of Understanding to undertake an eDNA European Green Crab (EGC) monitoring project in partnership with the Metlakatla Indian

Community that would occur in the summer season, 2021, after being delayed in 2020 due to COVID19. Coordination calls were held with EGC researchers from Washington State and British Columbia on monitoring design for trapping combined with eDNA water sampling. Further discussion regarded acquiring an eDNA qPCR assay recently developed in British Columbia. Little Port Walter is also participating and conducting pilot sampling combined with trapping in October, 2020 which will support capacity building as an inaugural eDNA project with the Auke Bay Laboratory. We were able to supply traps to the Metlakatla Indian Community in 2020, which will hopefully be combined as monitoring with eDNA sampling in 2021.

### **Western Regional Panel Best Management Practices (BMPs) for Commercial Fishing Vessels and Invasive Species**

Linda Shaw participated in a meeting of the Western Regional Panel Coastal Committee's subcommittee on developing best management practices for commercial fishing vessels to reduce the spread of invasive species. Linda shared feedback from her presentation on this subject to the Wakefield Symposium last May which led to the following results for group ideas: seek input from influencers in the commercial fishing industry and harbor masters, minimize BMPs as targeting the commercial fishing industry specifically with a broader vessel message instead, develop a checklist for fishermen to assess their specific risk for spreading invasive species through their operations that leads to suggested BMPs, keep BMPs clear but simple with visual graphic support. Linda is also coordinating with the NPFMC on this issue for a future presentation to the Ecosystem Committee.

### **Western Regional Panel Best Management Practices (BMPs) for Marine Mobile Infrastructure and Invasive Species**

Linda Shaw participated in a meeting of the Western Regional Panel Coastal Committee's subcommittee on developing BMPs for marine mobile infrastructure to reduce the spread of invasive species. Marine mobile infrastructure includes non-vessel floating structures such as jack-up rigs, dredges, floating docks and wave or wind energy structures. The purpose of this effort would be to inform agencies with permitting or other approval authority on the need to prevent the spread of invasive species on these structures, and encourage conditioning of their authorities to include the BMPs.

### **Western Regional Panel on Aquatic Nuisance Species Annual Meeting**

Linda Shaw virtually attended the 2020 annual meeting of the Western Regional Panel on Aquatic Nuisance Species, which was originally planned to be held in Anchorage, Alaska. The sessions were as follows: Aquatic Invertebrates, Coastal Issues, Aquatic Invasive Plants, and Invasive Fish and eDNA. Summarized take home points include: 1) the Coastal Committee is nearing finalization of the Commercial Fishing Vessel guidelines to prevent the spread of marine invasive species, which Linda worked on throughout the process. 2) All researchers are seeing an increase in recreational boating activity due to the COVID-19 pandemic as ways to socially distance while recreating. 3) Dutch Harbor and Akutan are considered the highest overall risk ports to spreading marine invasive species to Alaska's Arctic. While HCD's 2018 bioblitz support with the Smithsonian Environmental Research Center there was recognized, researchers are looking at ways to continue eDNA metabarcoding monitoring there and more continuous monitoring overall. 4) The Corps of Engineers Engineer and Research Development Center in Vicksburg, Mississippi works nationwide on invasive aquatic plant control. Linda recommends exploring partnering and/or information exchange with this entity as a possibility for an invasive aquatic plant component to the upcoming VetWorks person to be supported by AKR next year in Cordova.

### **Dutch Harbor Marine Invasive Species Bioblitz Final Report to Pacific States Marine Fisheries Commission**

Linda Shaw reviewed the Smithsonian Environmental Research Center's final report on the Dutch Harbor Marine Invasive Species Bioblitz to the Pacific States Marine Fisheries Commission. This event was held in September, 2018, and was partially funded by AKR. Outcomes were participation of more than 200

Unalaska residents in the community bioblitz and associated outreach activities. Linda briefed the Arctic Council's Conservation of Arctic Flora and Fauna working group while they were meeting concurrently in Dutch Harbor. The list of species sampled more than doubled previous lists in number of species, providing valuable baseline data as this area experiences robust vessel traffic amidst climate change. Data from specimen voucher and genetic collections are available on the Smithsonian National Museum of Natural History collections database and the Barcode of Life database. Preliminary results confirmed the continued presence of an invasive species, the Japanese skeleton shrimp, still limited to two floating docks, and the possible presence of a second non-native bryozoan.

### **Marine Invasive Species Updates**

- 1) A non-native free-floating red algae, *Agarophyton vermiculophylla* has been documented in low energy habitats on Prince of Wales Island including seagrass beds, mudflats, and estuaries. It is thought to have arrived via Japanese oysters. The impacts of this species are unknown although it has clogged fishing gillnets and seawater intakes in North Carolina where it has bloomed in greater abundance.
- 2) The Smithsonian Environmental Research Center will be providing an interim report of taxonomic results from sampling at the St. Paul Bering Sea Days event held in September 2019. There will be a delay in genetic analyses from this event due to COVID-19 impacts to the genetics lab.
- 3) The Smithsonian Environmental Research Center has been contracted by BOEM to do marine invasive species monitoring on the North Slope. This is in response to an HCD EFH recommendation for the Liberty project. However, this effort has also been delayed due to the COVID-19 impact to travel.
- 4) Invasive European green crab has been recently confirmed as present on the island of Haida Gwaii in British Columbia, Canada. This puts European green crab to within less than 150 miles from the Alaska border. The Alaska Department of Fish and Game is suggesting a transboundary partnership with Canada, SeaGrant, NOAA, and the Metlakatla Indian Community to address the issue. A similar transboundary effort was formed for the Salish Sea between Canada and the State of Washington.

### **West Coast European Green Crab Monitoring**

Linda Shaw participated in a west coast European green crab teleconference with reports from California, Oregon, Washington, British Columbia and Alaska. Monitoring results are showing two recruitment classes in Oregon thought to be originating from both the south and the north, strong numbers but steady locations in Washington and northward expansion to Haida Gwaii in British Columbia. British Columbia is looking for ways to expand monitoring to Prince Rupert which would be of benefit to Alaska. Metlakatla is working on expanding their educational outreach and monitoring as they are on the Alaska "front lines". Of interest to the Metlakatla Indian Community was a report of an effort in British Columbia to coordinate First Nations for monitoring and control. A virtual webinar or conference was suggested for early 2021.

### **Invasive Species**

Linda Shaw attended the all-taxa Alaska Invasive Species Workshop in Fairbanks and presented on the Bering Sea Days invertebrate and invasive species education and biodiversity assessment project. Linda networked with colleagues, including participants from Metlakatla, who are interested in adapting Bering Sea Days invasive outreach and education to their community, as well as numerous other topics including strategic planning, *Spartina* monitoring, and spreading the word for positions open in HCD.

## **Goal #2: Provide EFH Conservation Recommendations that maximize mission-critical benefits for FMP-managed species and their habitats**

### *EFH Consultations on Fishing Activities*

#### **Coordination with agencies on fishing vessel issues**

Felkley, Olson, and Eagleton coordinated with EPA, City of Kodiak, USCG, and ADFG to provide recommendations on locations that would minimize potential habitat impacts of scuttling derelict vessels, as well as avoiding conflicts with local commercial fishing. The initial site selected for scuttling the P/V Wild Alaskan by the City of Kodiak would have impacted small boat fisheries for Tanner crab and halibut longlining. Similar guidance was provided for the scuttling of the F/V Lumberman in Southeast Alaska. We also proposed locations for tainted salmon disposal after the sinking of the F/V Hanta Yo in Shelikof Strait. Finally, information related to fishing vessel traffic and fishing effort was provided to USCG for scheduling rocket launches SE of Kodiak.

### *EFH Consultations on Non-Fishing Activities*

#### **Consultation Tracking**

##### **ECO Consultation Tracking**

Seanbob Kelly presented the new Ecosystem Consultation Organizer (ECO) tool to HCD staff in Juneau. This national web based software allows HCD staff to manage the workload for documenting, tracking, and reporting consultations under the MSA 305(b)(2) & (b)(4). Following the presentation Seanbob worked one on one with HCD staff to ensure a smooth transition over to the new ECO system.

##### **ECO Improvement**

Seanbob Kelly has been working with other National Coordinators to improve the Environmental Consultation Organizer (ECO) tool. Following the last national meeting, the ECO team has been working on updates to better meet the needs of HCD and PRD staff in all regions. Seanbob participated in testing new features like improved search capability, GIS functionality, and general glitch fixes.

#### **Mining Activities**

##### **Kensington Mine Expansion**

Sean Eagan wrote scoping comments for the Kensington Expansion which the U.S. Forest Service and Coeur Alaska anticipate will cover the next 4.5M tons of tailings extracted or mining for approximately ten additional years. NMFS requested that the EIS analyze a broad range of options for tailings storage including: 1) dry stack tailings, 2) paste tailings, and 3) discontinuing placing tailings in the former Slate Lake and instead placing them on the Comet Side. Other issues mentioned included whether permitting the mine in 10-year increments leads to the fewest effects on fish habitat long-term.

##### **IPOP Mining in Nome**

This proposed project would mine the Bonanza Channel and Tidal Lagoon, near Nome, using a suction dredge that is specifically designed for shallow water estuary dredging and gold recovery. We provided comments to the USACE in 2018 and 2019 on exploration activities, and in September 2020 on the Public Notice of Application for Permit. In response to our comments, USACE notified NMFS on September 24, 2020, that they intend to conduct an EFH Assessment.

IPOP, the mining company, proposed to dredge and discharge 5 million cubic yards of spoils from 173 acres of estuarine and stream habitat over the next 5 years. In August 2020, they completed a model

dredging program that consisted of environmental baseline studies and water quality monitoring during model dredging in the Bonanza Channel. IPOP dredged and discharged 25 cubic yards of material from the bottom of Bonanza Channel using a 6” suction dredge towards the goal of characterizing the associated turbidity plume in the Bonanza Channel, evaluating water quality, and characterizing the material down to a maximum of 5 feet below the bottom surface.

During early coordination, we reviewed IPOP’s Narrative and worked with the USACE and other resources agencies on understanding the potential impacts to fish and fish habitat. The project has the potential to impact the marine tidal estuary, including eelgrass beds and transition zones that are important to EFH for Council-managed species. EFH in and adjacent to the action area includes all five species of Pacific salmon; and EFH for red king crab and many groundfish species has been designated outside the lagoon in Norton Sound.

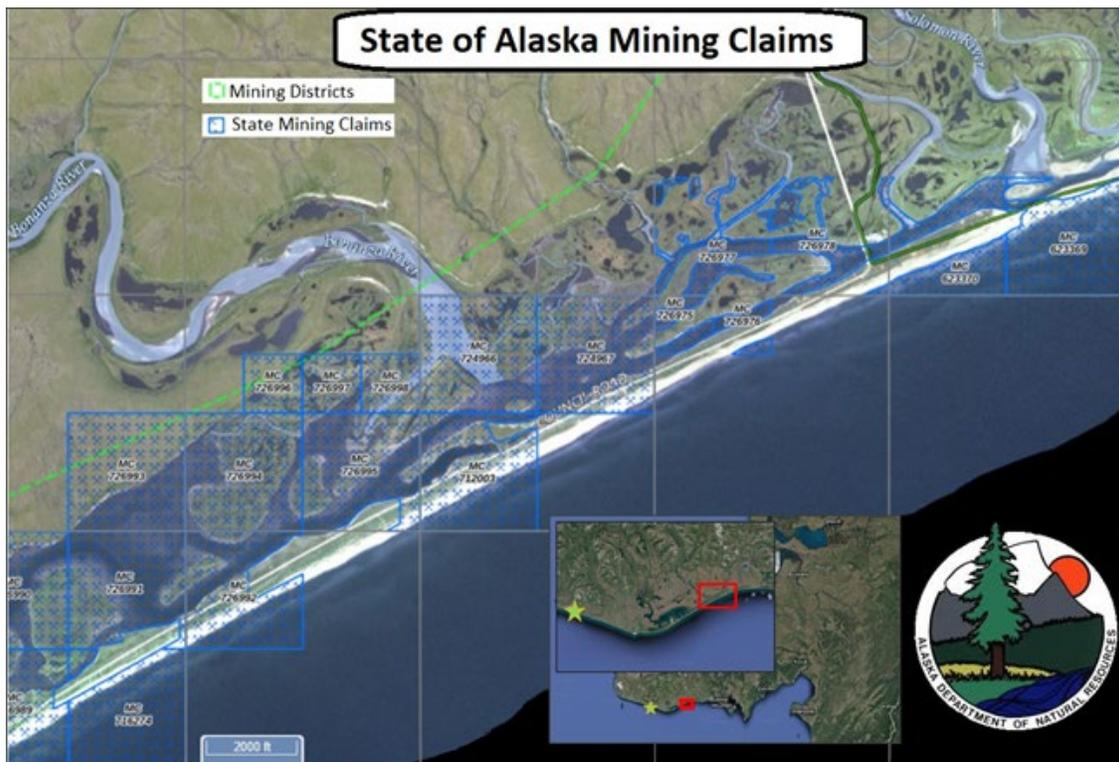


Figure 3: Map of the State of Alaska Mining Claims that IPOP proposes to mine. Insets show the IPOP Claims location (red box) with respect to Nome, Alaska (green star). Credit: IPOP.

### Pebble Mine

Since 2004, AKR-HCD has attended countless discussions regarding numerous aspects of the Pebble mineral prospect in the currently proposed ecological setting. AKR-HCD has also provided as many comments and recommendations intended to better understand the complexity of the EFH, the salmon that inhabit the region, but also to reduce and mitigate downstream impacts of large scale porphyry mining. On June 19th 2020, HCD received a Final EFH Assessment and request from the U.S. Army Corps of Engineers to initiate an EFH Consultation. Numerous staff from AKR-HCD, AKR Protected Resources Division as well as the NPFMC provided language, comments or structure to the final response letter and EFH Conservation Recommendations for freshwater and marine EFH. The letter concludes the Pebble Project would have substantial impacts to freshwater EFH. These impacts would be further

magnified given the likely expansion of the excavation and the need to manage and treat ever increasing volumes of waste and water in perpetuity.

## Ports and Harbors

### Ward Cove Ketchikan

Seanbob Kelly and Lydia Ames completed an EFH consultation with the USACE Regulatory Division. The proposed project would create a 1300 ft cruise ship dock in the Superfund Site that surrounds the old pulp mill. This project has the potential to adversely impact EFH designated at Ward Cove. HCD coordinated with the Environmental Protection Agency and NMFS Protected Resource Division to offer EFH Conservation Recommendations that will minimize any adverse impacts to EFH.



Figure 4: [Photo Credit](#)

### Elim Small Boat Harbor

Seanbob Kelly and Lydia Ames submitted a Conservation Recommendation letter in response to the USACE's EFH Assessment for a proposed small boat harbor in Elim, Alaska. The purpose of the project is to provide the community of Elim with moorage for vessels and other marine transport infrastructure. The USACE is currently evaluating four construction alternatives that vary in size and depth. NMFS provided Conservation Recommendations regarding best practices for pile driving, blasting, spill prevention, contaminants, and invasive species. NMFS will continue to work with USACE as the project proceeds.

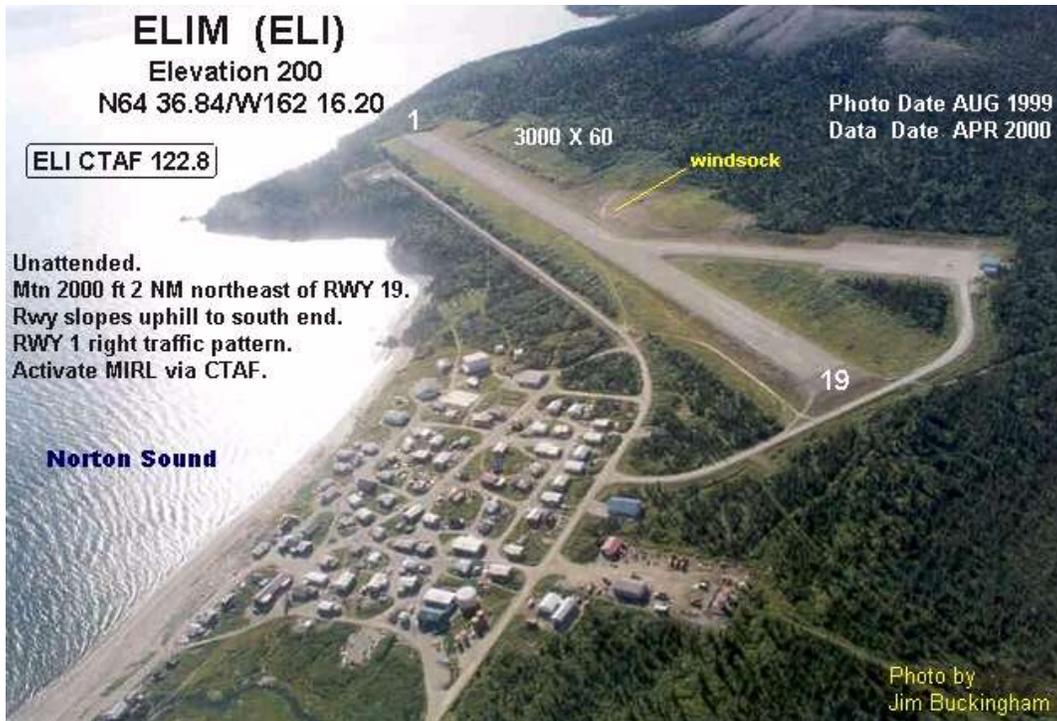


Figure 5: [Photo Credit](#)

### Hoonah Seaplane Facility Dredging and Creek Relocation

Seanbob Kelly and Lydia Ames submitted a Conservation Recommendation letter in response to the Alaska Department of Transportation and Public Facilities' (DOT&PF) EFH Assessment for proposed maintenance improvements to the Hoonah Seaplane Facility in Hoonah, Alaska. DOT&PF proposes to dredge 250 cubic yards (CY) of sediments to restore the depth of the current seaplane facility and relocate 520 linear feet of the Spud Creek outlet channel, eliminating stream sediments which settle under the facility. Spud Creek is not identified as anadromous, but marine waters in the area are designated as EFH for all five species of Pacific salmon. The relocation of Spud Creek will minimize the need for future maintenance dredging and lessen any potential effects on EFH. NMFS provided Conservation Recommendations regarding spill prevention, hazardous materials management, and a no in-water work timing window of April 1 to June 15 to minimize any unforeseen impacts to salmon resources.

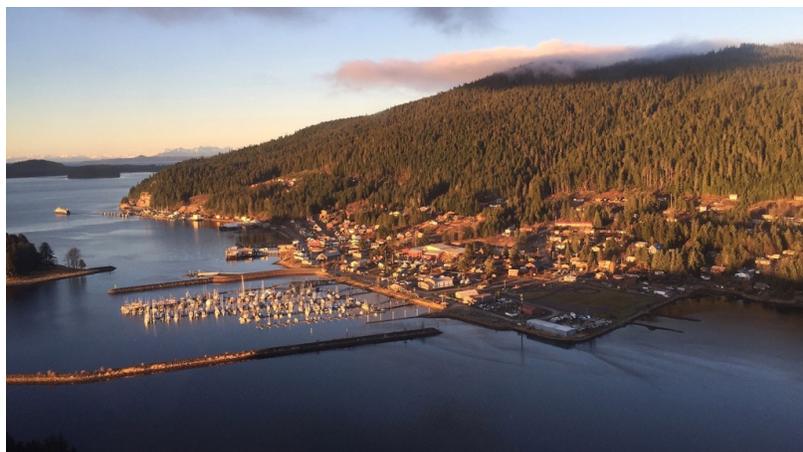


Figure 6: [Photo Credit](#)

## St. George Harbor

Kelly and Ames discussed the Environmental Assessment for the proposed project with representatives of AKR PRD and the USACE. Although HCD has previously reviewed an EFH Assessment for the proposed project and submitted comments, HCD is continuing to track project development to ensure that impacts to EFH are minimized.



Figure 7: [Photo Credit](#)

## Ketchikan Berth III Upgrade

We provided EFH conservation recommendations to the U.S. Army Corps of Engineers for a proposed addition of three new mooring dolphins to Berth III, to allow docking of larger class cruise ships such as the Norwegian Breakaway Plus class in Ketchikan. Ellen Ward, Molly Zaleski, and Sean Eagan worked together to provide recommendations for pile installation and removal that minimize sound pressure wave impacts during pile driving, and potential turbidity and contamination release during pile removal.

## Transportation Infrastructure

### Alaska Liquid Natural Gas pipeline (AKLNG) and Ambler Road to Resources

The AKLNG and the Ambler Road to Resources (ARR) are two very large scale infra-structure projects with enormous economic potential at both the state and national scale. The AKLNG proposes a 800 mile pipeline from Prudhoe Bay to shipping terminals in Cook Inlet, while the ARR proposes a 200 to 300 hundred mile transportation corridor from Fairbanks to mineral prospects near Ambler. Both projects promise to bring valuable petroleum and mineral resources to market. Each project transects numerous rivers and streams seasonally inhabited by five species of anadromous salmon. The projects have the potential to create significant barriers to salmon migrations at different life stages if potential obstructions are not accurately recognized and appropriate mitigation measures employed to allow migration. Doug Limpinsel provided EFH Conservation Recommendations to address these concerns and if implemented

correctly would significantly reduce and mitigate long term impacts to EFH Attributes and anadromous salmon. By providing defensible Conservation Recommendations and informing project proponents early, we improve the design, support EFH conservation and promote sustainable fisheries.

### Seafood Processing and Aquaculture

#### **Kelp and Oyster Farm Proposals**

Molly Zaleski submitted EFH conservation recommendations for 20 kelp or oyster aquaculture permit applications through ADNR or USACE, including a cluster of proposed kelp farms in two Prince William Sound bays, Simpson Bay and Sheep Bay. Recommendations highlighted protecting eelgrass beds and avoiding kelp harvest if herring spawn-on-kelp is present. Recommendations were adopted through both action agencies.

### Other Projects

#### **Mendenhall Glacier Visitor Facility Improvement Project**

Gretchen, Barb, and Molly submitted scoping comments to the US Forest Service on plans to improve the Mendenhall Glacier visitor center and trails around the glacier area. Some plans could impact sockeye and coho salmon habitat in Steep Creek and Mendenhall Lake, so HCD highlighted those issues.

#### **Marine Geophysical Survey of the Aleutian Arc**

Jodi Pirtle reviewed National Science Foundation's (NSF) Draft Environmental Assessment of a Marine Geophysical Survey by R/V Langseth of the Aleutian Arc regarding the proposed action to collect data via a high-energy (i.e., seismic) marine geophysical survey. HCD requested a revision to the EFH Assessment and identified three preliminary concerns. 1) The proposed action occurs in areas of EFH for several life stages of groundfish, crabs, and species of Pacific salmon. 2) The proposed footprint for high-energy geophysical survey operations overlaps with some of the Aleutian Islands Coral Habitat Protection Areas (AICHPA). These areas are closed to all bottom-contacting fishing gear and are sensitive to damage from other contact and seafloor disturbances. Survey operations, including the air gun array and other equipment streaming from the vessel, may permanently damage corals and sponges in these areas. 3) Atka Mackerel *Pleurogrammus monopterygius* spawn in the Aleutian Islands at depths generally <100 m and during the months of July-October, where males guard egg masses in rocky areas. Pirtle worked with AFSC to provide guidance to NSF with respect to Atka mackerel spawning habitat and timing. The proposed survey footprint coincides with Atka Mackerel EFH, including the timing of spawning and spawning habitat at survey stations most inshore. While potential impacts to Atka Mackerel spawning by survey activities may be of limited duration and impact, HCD requested that the EFH Assessment and survey footprint be modified to address this concern. NSF carried out the survey as planned in October, 2020.

#### **United States Navy Civilian Port Defense**

Julie Scheurer (PRD) and Jodi Pirtle developed a combined Endangered Species Act expedited letter of concurrence and EFH consultation for the Navy's Civilian Port Defense training event which was to be held in Juneau in 2020.

### **Goal #3: Continually identify data gaps and information needs, and use the best available science to conduct EFH reviews and consultations that support sustainable fisheries management, healthy marine ecosystems, and community resilience**

#### *EFH Coordination*

##### **National Habitat Leadership Team (NHLT) and Habitat ARA Meeting**

Gretchen Harrington attended NHLT and Habitat ARA meetings in Miami, Fl. The NHLT is comprised of leadership from the Office of Habitat, the Restoration Center, and the Habitat Divisions in the NOAA Fisheries regional offices. This meeting focused on advancing habitat science so representatives from each NOAA Fisheries Science Center and from the Office of Science & Technology join this meeting. This was a wonderful opportunity to get to know our Science Center colleagues around the country and begin to understand each other's work and priorities. We kicked things off with examples of successful collaborations across the country. We discussed a variety of national topics including ways we can advance the Agency's Ecosystem-Based Fishery Management efforts from a habitat perspective. We broke out into regional groups and spent time talking about regional priorities and potential for working together in each Region. We ended with presentations on Stony Coral Tissue Loss Disease and Mission: Iconic Reefs, and a tour of NOAA's Atlantic Oceanographic and Meteorological Laboratory (AOML) including their coral research laboratory at the University of Miami's Rosenstiel School of Marine and Atmospheric Science (RSMAS).

##### **Council Coordinating Committee (CCC) Habitat Workshop**

As a result of a CCC workshop in 2019 that was focused on developing a cross-regional forum for RO and FMC staff to share best practices for EFH consultations on non-fishing and offshore marine planning actions, the CCC Habitat Working Group (CCC HWG, Eagleton & Olson) held a workshop asking "What information, products, and tools can FSCs provide for the Councils to better identify and prioritize habitats and the fish species, fisheries, and fishing communities that rely on those habitats most at risk and vulnerable to change?" FSC habitat representatives presented regional perspectives on EFH.

##### **EFH Coordinators**

HCD staff completed their annual planning meeting with the USACE Civil Works Division. Every year representatives of each agency meet to discuss upcoming civil works projects in Alaska that may impact EFH. This early coordination minimizes adverse impacts to EFH. This year, members of Council Staff were invited to engage in the process. New working relationships were formed and the USACE has agreed to speak to the NPFMC and the Ecosystem Committee regarding projects with the potential to impact fishing economies in Alaskan communities.

#### *EFH 5-Year Review*

##### **EFH 2022 Review**

NMFS is preparing for the next EFH 5-year Review of the ten EFH components of FMPs for 2022. The following EFH components will be substantially revisited: 1 - EFH Descriptions and Identification (lead Pirtle), 4 - Non-Fishing Activities that May Adversely Affect EFH (lead Limpinsel), and 7 - EFH Species Prey (lead Zaleski). With respect to 2 - Fishing Activities that May Adversely Affect EFH, the fishing effects model will not be run, since experts determined little information is available to revise the analytical model at this time. 9 - EFH Research and Information Needs will also be reviewed and updated.

## **Essential Fish Habitat at June Council Meeting**

A team from HCD and the AFSC, including Jodi Pirtle, Ned Laman, and Jim Thorson, presented a Discussion Paper to the Council's Scientific and Statistical Committee (SSC) to share new research from four in-progress studies that will be available to the Council for the 2022 EFH 5-year Review. The presentation generated much interest from the SSC and stakeholders who provided valuable input to strengthen this work in progress. Many individuals representing several programs at AFSC and academic institutions contributed, in addition to HCD's Gretchen Harrington and postdocs Jennifer Marsh and Cheryl Barnes.

## **Essential Fish Habitat at Groundfish Plan Teams**

A team from HCD and AFSC, including Jodi Pirtle, Ned Laman, and Jim Thorson, presented new research to support the 2022 EFH 5-year Review to a meeting of the Joint Groundfish Plan Teams on September 9th. The presentation generated much interest from Plan Team members, stock assessment authors, and the public who provided valuable input to strengthen this work.

## *Advance EFH Science*

### **EFH Research Plan RFP**

Five proposals from the AFSC were received for the annual EFH RFP. The Habitat Ecological and Process Research (HEPR) program reviewed five EFH Proposals for FY20. Scientific merit, probability of success, relevance to EFH, and overall project quality metrics are scored from 0-5 and then are given an overall score. The HEPR Team scores proposals to offer an objective review of proposals relevant to EFH management. Research will directly forward EFH knowledge for use with the NPFMC and hopes to compliment other research platforms. A total of approximately \$400,000 dollars are requested for the five investigations. The Regional EFH Coordinator (Eagleton) participates in this annual process and answers EFH process questions during review. The process is a recognized use of the Region's discretionary funding for the Habitat Conservation Division to fund EFH research for management application.

### **EFH Research Projects**

HCD staff participated in several studies to advance habitat science and EFH information. These studies are listed below by region with lead principal investigator (PI), HCD PIs and collaborators, funding source, and status.

#### **Alaska**

- **A unified nearshore catch database to refine juvenile essential fish habitat models and maps for Alaska (AFSC Nearshore Fish Atlas update).** Lead PI: Mandy Lindeberg. HCD: Jodi Pirtle. Funding: Alaska Essential Fish Habitat Research Plan. Status: Complete, a publication is in review with Fisheries Research.
- **Refine nearshore essential fish habitat to improve non-fishing effects consultation for Alaska.** Lead PI: Jodi Pirtle. HCD: Jodi Pirtle, Arnaud Grüss. Funding: Office of Habitat Conservation, Refine Essential Fish Habitat. Status: Complete, a publication is in review with Fisheries Research.
- **Advancing essential fish habitat species distribution modeling for North Pacific Fishery Management Plan species.** Lead PI: Ned Laman. HCD: Jodi Pirtle. Funding: Alaska Essential Fish Habitat Research Plan. Status: Active, contributing to the 2022 EFH 5-year Review.
- **A simulation and case-study comparison of existing and spatio-temporal methods to apportion coastwide catch limits for subregional management.** Lead PI: Paul Spencer. HCD: Jodi Pirtle. Funding: Office of Sustainable Fisheries, MSA Implementation. Status: Active.

- **Designation of dynamic habitat under a changing environment.** Office of Sustainable Fisheries, MSA Implementation. Lead PI: J. Thorson. HCD: Jodi Pirtle, Cheryl Barnes. Status: Active.
- **Pilot project using eDNA metabarcoding to improve nearshore EFH consultations and descriptions.** Lead PI: Jacek Maselko. HCD: John Olson. Funding: Office of Habitat Conservation, Refine Essential Fish Habitat. Status: Active.

#### **Gulf of Alaska**

- **Optimal overwintering thermal habitat of juvenile walleye pollock from the Gulf of Alaska.** Lead PI: Ben Laurel. HCD: J. Pirtle. Funding: Alaska Essential Fish Habitat Research Plan. Status: Active, contributing to the 2022 EFH 5-year Review.
- **Developing a novel approach to estimate habitat-related survival rates for early life history stages using individual-based models.** Lead PI: Kalei Shotwell. HCD: Jodi Pirtle. Funding: Alaska Essential Fish Habitat Research Plan. Status: Active, contributing to the 2022 EFH 5-year Review.

#### **Bering Sea & Aleutian Islands**

- **Spatio-temporal environmental covariates refine salmon Essential Fish Habitat within the Bering and Chukchi seas of the U.S. Exclusive Economic Zone off Alaska.** Lead PI: Ellen Yasumiishi. HCD: J. Pirtle. Funding: Office of Habitat Conservation, Refine Essential Fish Habitat. Status: Active, an M.S. student with the UAF Cunningham Lab will begin in January, 2021.

#### **Arctic**

- **Model-based fish distributions and habitat descriptions for Arctic cod, saffron cod, and snow crab in the Alaskan Arctic.** Lead PI: J. Pirtle. HCD: J. Pirtle, Jennifer Marsh. Funding: U.S. Bureau of Ocean Energy Management. Status: Active, contributing to the 2022 EFH 5-year Review.

#### **Refine EFH eDNA Project**

Scientists from ABL and managers from several agencies (Jacek Maselko, Chris Lunsford, and Wes Larson (AFSC), John Olson (AKR), Steve Maclean (NPFMC), Chris Hoffman (USACE)) developed a pilot project to test the utility of eDNA sampling to identify fish presence/absence and species composition in nearshore areas. Originally sampling was to be conducted from small vessels; due to COVID restrictions, however, socially-distanced sampling was conducted from shore. In September 2020, ABL staff collected water samples at six sites on the Juneau road system: Auke Rec, Amalga, Eagle Beach, Bridget Cove, Echo Cove, and Cascade Point. In total, 180 1 liter water samples were collected at high and low tides and in different habitats (eel grass, sand, and kelp/rock). All the sites were previously beach-seined as part of the Nearshore Fish Atlas project, so that species presence and composition can be compared to sampling done with beach seines. ABL completed eDNA extraction from the 180 samples in November 2020. Those samples will be sequenced in December, and sequence data will be analyzed to create a species presence/absence matrix for each site and at high and low tide stages. Results will be analyzed with multivariate approaches such as NMDS and RDA to investigate variation in species composition and how various environmental parameters influence site-specific diversity. If eDNA metabarcoding is shown to be successful at detecting EFH species presence/absence in nearshore areas, the USACE will consider implementing eDNA sampling for nearshore projects such as harbor developments. Sampling could be conducted before, during, and after construction for a comprehensive analysis of the effects of large-scale human activities in the nearshore environment. These methods could also provide stock assessment authors at ABL with the ability to examine species presence/absence in nearshore waters over an entire year, particularly with early life stages of managed species.

## **Goal #4: Provide habitat expertise based on the best available science to improve habitat conservation and facilitate Ecosystem-Based Fishery Management (EBFM)**

### **Ecosystem Based Fisheries Management Coordination**

NOAA Fisheries' National EBFM Workgroup (WG) held a first biennial workshop virtually in July 2020. Jodi Pirtle and Gretchen Harrington worked with Kara Meckley (OHC) to develop an Interdisciplinary Session and Presentation to discuss the role of habitat and socioeconomic information in EBFM. Jodi Pirtle also contributed to the Alaska Futures Presentation with EBFM WG members from SFD and AFSC. The virtual meeting in July was a success with high attendance and excellent discussions. The EBFM WG discussed outcomes and next steps following the workshop at their monthly meeting in September, 2020, including better integration of interdisciplinary information from habitat science and socioeconomics in EBFM, and strengthened coordination between Science Centers, Regional Offices, and Fishery Management Councils in EBFM activities. Alaska workgroup members, including HCD's Jodi Pirtle, and SFD and AFSC staff, are reviewing progress on EBFM milestones in the Alaska EBFM Implementation Plan, regional priorities, and ways to improve information sharing and coordination.

### **Ecosystem Status Reports**

John Olson provided information for 2020 Ecosystem Status Reports (ESRs) for the Gulf of Alaska, Aleutian Islands, and Bering Sea. Contributions utilized output from the Fishing Effects (FE) model to quantify areas disturbed by fishing, as well as updated areas closed to fishing. During this update, the code for the FE model was optimized for future model runs.

### **Ecosystem and Socioeconomic Profiles for Alaska Stocks**

Ecosystem and Socioeconomic Profiles (ESP) were established as a new component of the SAFE Reports as a pathway to include stock-specific ecosystem and socioeconomic information (e.g., habitat information developed through EFH research) in stock assessments. Several ESPs that have been developed include species distribution model maps developed to advance EFH information, including Alaska sablefish, Gulf of Alaska walleye pollock, and Bering Sea and Aleutian Islands blue king crab. ESPs for additional stocks are in development that will also include this habitat information.

Cheryl Barnes developed a predation index as a stock-specific indicator from her groundfish research that she contributes to stock assessment authors for their SAFE Reports and ESPs. Cheryl and her collaborators quantified annual variation in pollock predation by five major groundfish species, including arrowtooth flounder (*Atheresthes stomias*), Pacific cod (*Gadus chalcogrammus*), Pacific halibut (*Hippoglossus stenolepis*), sablefish (*Anoplopoma fimbria*), and walleye pollock conspecifics. Together, these groundfishes are thought to account for over 80% of total pollock mortality in the Gulf of Alaska. The predation index includes estimates of total predator biomass procured from recent stock assessments, relative predator densities modeled from survey catch data (collected by the Resource Assessment and Conservation Engineering (RACE) Division, AFSC and International Pacific Halibut Commission), mean annual rations obtained from bioenergetics models, and age-specific proportions of pollock consumed (as estimated from food habits data collected by the Resource Ecology and Ecosystem Modeling (REEM) Program, AFSC).

A set of three ESP Workshops were planned by AFSC, beginning in 2019. Jodi Pirtle attended the first workshop at AFSC in April 2019, and presented *Habitat Information to Support Ecosystem and Socioeconomic Profiles for Alaska Stocks*. Jodi Pirtle and Cheryl Barnes attended the second workshop at AFSC in March 2020, where Ned Laman (AFSC) and Jodi presented *Species Distribution Modeling to*

*Describe Essential Fish Habitat can Support Ecosystem and Socioeconomic Profiles for Alaska Stocks.* Jodi and Cheryl also attended a supplementary workshop virtually hosted by AFSC in September 2020. A third workshop is planned for 2021. In collaboration with Kalei Shotwell (AFSC), Jodi, Ned, and Jim Thorson (AFSC) have established a pathway to contribute habitat information developed through EFH research to stock assessment authors developing ESPs.

Exciting outcomes of participating in the ESP Workshops and contributing to the ESPs has been building habitat interest within the stock assessment community, including interest to include new habitat information developed for the 2022 EFH 5-year Review in the ESPs and thinking about how future approaches to EFH science can be structured to develop stock-specific indicators that can be regularly updated for the ESPs, which can eventually lead to using habitat information in stock assessment and spatial allocation models.

### **Alaska Groundfish Harvest Specifications**

Jodi Pirtle reviewed the annual Groundfish Harvest Specifications Supplemental Information Report prepared by NMFS AKR SFD and provided an update with respect to relevant EFH and habitat conservation activities.

### **Environmental DNA (eDNA) workshop and sampling training**

Meredith Pochardt, HCD AK Sea Grant Fellow, attended the 3rd Environmental DNA Technical Exchange Workshop in St. Petersburg Florida. Workshop topics included eDNA automated sampling technology, using eDNA for abundance and biomass estimation, eDNA database development and protocol standardization, metabarcoding, using eDNA for invasive species EDRR, and international perspectives from Canada, Australia, New Zealand, Japan, and Germany. Meredith presented a poster on her research using eDNA for eulachon population monitoring in southeast Alaska.

Meredith also presented training for AFSC and HCD staff on eDNA sampling techniques and protocols. The training covered sample collection, filtration, and preservation for lab procedures. AFSC is looking to incorporate eDNA sampling into some ongoing boat-based surveys and HCD staff are looking to utilize eDNA for invasive species early detection initiatives.

### **Vector Auto-regressive Spatio-temporal (VAST) Models Training**

Cheryl Barnes, Jen Marsh, Arnaud Grüss, and Jodi Pirtle participated in a VAST Model training provided by Jim Thorson and others at AFSC in Seattle in February 2020. Arnaud Grüss also provided instruction for a training module. Cheryl, Jen, Arnaud, and Jodi are currently involved in projects applying VAST models, which include both spatial and temporal components in the variance structure to develop predictions of species distribution in space and time (e.g., dynamic habitat models).

## Goal #5: Participate in partnerships within and outside of NOAA that influence habitat conservation for FMP-managed species

### *Publications*

#### **EBFM Collaborative Publications**

HCD collaborated on a nationally assembled team of scientists and managers from diverse disciplines. Led by the U.S. Geological Survey's National Climate Adaptation Science Center, teams were assembled to research, outline and write two papers. The papers build on a growing body of literature recognizing increasing uncertainty in resource management predictions introduced from climate driven ecosystem change, and suggest considering novel approaches to management and objectives beyond resistance. Both papers were accepted for formal publication. The first, published in the Journal of the American Fisheries Society entitled Responding to Ecosystem Transformation: Resist, Accept, or Direct (RAD), acknowledges the variety of influences that may affect our understanding of change, influence management decisions under different scenarios, and presents the RAD framework using case studies and discussion. The second, entitled Managing for R-A-Dical Change: Resist, Accept, or Direct Ecosystem Transformation, will appear in Frontiers in Ecology and Environment. This paper supports the first, though expands the discussion to suggest rather than simply resist inevitable change, accepting and directing change toward a preferred or beneficial outcome may be advantageous. As important to HCD; many aspects of this exercise, its approach, research results and literature sources can be applied to our current Non Fishing Impacts review, as climate change is altering ecosystem processes influencing the range, distribution and abundance of species and complicating management predictions. New knowledge and literature sources will also substantiate and inform revisions to EFH conservation recommendations.

#### **Peer-reviewed Publications**

- Barnes, C. L.**, A. H. Beaudreau, M. W. Dorn, K. K. Holsman, and F. J. Mueter. 2020. [Development of a predation index to assess trophic stability in the Gulf of Alaska](#). Ecological Applications. 30(4):e02141. doi.org/10.1002/eap.2141
- Barnes C. L.**, A. H. Beaudreau, R. N. Yamada. *In press*. The role of size in trophic niche separation between two groundfish predators in Alaskan waters. Marine and Coastal Fisheries [forthcoming].
- Goldstein, E. D., **J. L. Pirtle**, J. T. Duffy-Anderson, W. T. Stockhausen, M. Zimmermann, M. T. Wilson, and C. D. Mordy. 2020. [Eddy retention and seafloor terrain facilitate cross-shelf transport and delivery of fish larvae to suitable nursery habitats](#). Limnology and Oceanography. 65:2800-2818. doi.org/10.1002/lno.11553
- Grüss, A.**, **J. L. Pirtle**, J. T. Thorson, M. R. Lindeberg, A. D. Neff, S. G. Lewis, and T. E. Essington. *In review*. Modeling nearshore fish habitats using Alaska as a regional case study. Fisheries Research [forthcoming].
- Grüss A.**, J. T. Thorson, C. C. Stawitz, J. C. P. Reum, S. K. Rohan, and **C. L. Barnes**. In revision. Synthesis of interannual variability in spatial demographic processes supports the strong influence of cold-pool extent on eastern Bering Sea walleye pollock (*Gadus chalcogrammus*). Progress in Oceanography [forthcoming].
- Marsh J. M.**, F. J. Mueter, J. T. Thorson, L. Britt, and S. G. Zador. 2020. Sidebar 5.1: Shifting Fish Distributions in the Bering Sea. [In State of the climate in 2019. Bulletin of the American Meteorological Society](#).
- McConnaughey, R. A., S. S. Intelmann, **J. L. Pirtle**, S. G. Lewis, and K. R. Mabry. 2020. National Ocean Mapping, Exploration, and Characterization (NOMECA) NOAA Fisheries - Alaska Response. AFSC Processed Rep. 2020-05, 35 p. Alaska Fish. Sci. Cent., NOAA, Natl. Mar. Fish. Serv.,

7600 Sand Point Way NE, Seattle WA 98115. URL:  
<https://repository.library.noaa.gov/view/noaa/26366>

- Thorson J. T., M. Fossheim, F. J. Mueter, E. Olsen, R. Lauth, R. Primicerio, B. Husson, **J. M. Marsh**, A. Dolgov, and S. G. Zador. 2019. Comparison of near-bottom fish densities show rapid community and population shifts in Bering and Barents Seas. *In Arctic Report Card 2019*, Richter-Menge J, Druckenmiller ML, Jeffries M, *Eds.* URL: <http://www.arctic.noaa.gov/Report-Card>
- Winship, A. J., J. T. Thorson, E. M. Clarke, H. M. Coleman, B. Costa, S. E. Georgian, D. Gillett, A. Grüss, M. J. Henderson, T. F. Hourigan, D. D. Huff, N. Kreidler, **J. L. Pirtle**, **J. V. Olson**, M. Poti, C. N. Rooper, M. F. Sigler, S. Viehman, and C. E. Whitmire. 2020. [Good Practices for Species Distribution Modeling of Deep-Sea Corals and Sponges for Resource Management: Data Collection, Analysis, Validation, and Communication](#). *Frontiers in Marine Science*. 7:303. doi.org/10.3389/fmars.2020.00303

## *Partnerships*

### **Fish Habitat Partnership Comprehensive Plans**

The Kenai Peninsula Fish Habitat Partnership (FHP) and Southeast Alaska FHP developed strategic plans for their respective areas in support of healthy fish, habitat, people and economies. The plans establish a forum to promote collaboration among the many interest groups. Habitat staff filed these two plans with the Federal Energy Regulatory Commission as 'comprehensive plans' to support the equal consideration of non-energy resources. Once accepted by the Commission, these FHP plans will be given greater consideration during the licensing of hydropower projects in support of fisheries and habitat interests.

### **EXPRESS Initiative**

We have been working with NMFS NOS & OCS, USGS, USFWS, & BOEM to extend the [EXPRESS](#) (Expanding Pacific Research and Exploration of Submerged Systems) initiative, a multi-agency collaborative mapping group focusing on ocean mapping on the West Coast, to Alaska.

### **FERC Licensing Presentation to South East Alaska Fish Habitat Partnership**

Sean Eagan presented on the FERC licensed hydropower facilities in Alaska and the FERC process for licensing a new hydropower facility. Eagan explained the six-year process from filing a preliminary permit to receiving a license to operate a hydropower facility from FERC.

### **Northern Lynn Canal Eulachon Population Monitoring**

Meredith Pochardt (HCD AK Sea Grant Fellow) assisted the Chilkoot Indian Association with an ongoing eulachon population monitoring program that utilizes eDNA to determine eulachon spawning abundance. This study began in 2014 and was the basis for Meredith's MS research. This year 6 rivers (Chilkoot, Chilkat, Ferebee, Katzehin, Skagway, and Taiya) were sampled. The overall eulachon run seemed strong with most runs lasting over 10 days.

### **National Ocean Mapping Exploration and Characterization**

AKR and AFSC worked together to identify mapping priorities in response to a Presidential Memorandum on Ocean Mapping of the US EEZ and the Shoreline and Nearshore of Alaska, which requested a national strategy. Bob McConnaughey (AFSC) and Jodi Pirtle coordinated the Alaska Response, where staff identified 28 priority mapping areas in the waters off Alaska that were reported to NOAA's Office of Integrated Coastal and Ocean Mapping. NOAA Fisheries can use this information to 1) better understand how priorities align with the needs of other NOAA and Federal offices, 2) allow for more efficient coordination and funding, and 3) enable partners to leverage assets and resources to fill the most pressing data and information gaps. We will keep NOAA Fisheries in Alaska and our stakeholders informed of the subsequent stages of this process. An AFSC Processed Report was produced as an outcome of this work (McConnaughey et al. 2020).

## **Alaska Coastal Mapping Strategy**

The Alaska Mapping Executive Committee (AMEC) coordinates critical Alaska mapping. AMEC is largely a terrestrial and coastal nearshore effort led by USGS and NOAA National Ocean Service, where RDML Tim Gallaudet is a co-chair. This year, AMEC worked on the implementation plan for an Alaska Coastal Mapping Strategy (ACMS) with NMFS involvement. Ellen Ward, AKR POC for the ACMS, worked on the Coastal Mapping Strategy Implementation Plan. Ellen has been coordinating with Jodi Pirtle and Bob McConnaughey (AFSC), the POCs for the National Ocean Mapping, Exploration, and Characterization led by NOAA Office of Integrated Coastal and Ocean Mapping (NMFS Alaska Priorities Processed Report), which is focused on the EEZ, for alignment of the offshore and coastal mapping efforts. Ellen and Jodi attended the Coastal Subcommittee meeting on October 1, 2020.

## **Alaska Deep Sea Coral and Sponge Initiative - Workshop and Science Plan**

The AFSC hosted a workshop in May 2020 to launch the next Alaska Deep Sea Coral and Sponge Initiative (AKCSI), funded through the Deep-Sea Coral Research and Technology Program (DSCRTP). Participants from NOAA Fisheries and partners, including the NPFMC, academic institutions, fishing industry groups, and others came together virtually over four days to share information and identify research priorities for 2020-2023 AKCSI. Breakout sessions on six areas of research emphasis identified and ranked research priorities for funding studies during the initiative. John Olson (DSCRTP POC for the Alaska Region) is on the steering committee and led a session on the effects of human activity on corals and sponges in Alaska. Jodi Pirtle led a session on population dynamics, biology, and biological interactions. Gretchen Harrington participated in the workshop. The workshop [report](#) was published in July 2020.

Following the workshop, 18 proposals were received addressing identified research priorities. John Olson developed four proposals: Incorporate coral sponge covariates into Fishing Effects model; Risk assessment of the impacts of commercial fishing on corals and sponges in Alaska; Refine estimates of longline & pot gear footprint and interactions with corals and sponges; and Data mining: Inventory & process visual survey data. The first three were funded and the fourth is a contingency if COVID makes 2021/2022 field work impossible. HCD staff is also involved in three other proposals: Assessing the effectiveness of area closures to maintain healthy deep-sea coral and sponge communities; Validation of coral and sponge distribution modelling in the Gulf of Alaska; and eDNA collections for identifying fish associations with coral and sponge. In total, 14 projects will be funded with approximately \$1m available in each of 2021 and 2022.

## ***Southeast Alaska Fish Habitat Partnership (SEAKFHP)***

We regularly participate in SEAKFHP meetings. The meetings include special presentations, including:

- Update of a recent mining workshop on the impacts of mining on the rivers of western North America.
- Quantifying the monetary value of Alaska national forests to commercial Pacific salmon fisheries.
- Update on the Hoonah Native Forest Partnership that highlighted fish and stream assessment work and a landscape-level model for predicting juvenile coho salmon rearing.
- Update on Alaska Department of Environmental Conservation (ADEC) water quality monitoring project in SE Alaska.
- "Aquatic Organism Passage Progress" which covered projects that restore fish passages in the Tongass National Forest, "In Search of Missing Streams and Fish Habitats in Alaska", a new story map showing how to find unidentified streams and expand knowledge of salmon habitat.

## *ShoreZone*

For the coastal-nearshore environment, we have the ShoreZone mapping system. ShoreZone catalogs both geomorphic and biological resources. The high resolution, attribute-rich dataset is a useful tool for extrapolation of site data over broad spatial ranges for creating a variety of habitat models and oil spill response tools. Low tide, oblique aerial imagery sets this system apart from other mapping efforts of this type. You can “fly the coastline” (aerial video), view and download still photos, and access physical and biological data using our interactive website. ShoreZone is available at: <https://www.fisheries.noaa.gov/alaska/habitat-conservation/alaska-shorezone>

### **Alaska Business Magazine ShoreZone Article**

The article “[Imaging Alaska Coast to Coast](#)” by Isaac Stone Simonelli, was published in Alaska Business magazine. HCD’s Cindy Hartmann Moore was interviewed for the article as was Mandy Lindeberg from the AFSC and Sue Saupe from Cook Inlet Citizens Regional Advisory Council. From oil spill to climate change, Alaska ShoreZone provides essential insights. The article covers imaging and mapping, funding the surveys, storing and sharing the data, tracking climate change and expanding vision.

### **Mapping Ecological and Cultural Values in Alaska**

A workshop titled "Mapping ecological and Cultural Values in Alaska Waters: Approaches and Opportunities" was organized by Audubon Alaska and other organizations and held on Friday, January 31. Cindy Hartmann Moore participated via webinar. The workshop included presentations on ecosystem valuation and discussion. During the discussion, Cindy shared some information on ShoreZone in the Bering Sea.

### **ShoreZone Presentation to Alaska Refuge Biologists**

Cindy Hartmann Moore and Steve Lewis (SF) gave a 45-minute presentation on ShoreZone to U.S. Fish and Wildlife Service (FWS) refuge biologists. Cindy and Steve were the featured presenters on the monthly refuge biologist’s call for Alaska’s refuges. Alaska Refuges were partners on previous ShoreZone surveys. Previous partner refuges include: Yukon Delta, Togiak, Alaska Peninsula, Izembek and Becharof National Wildlife Refuges. The remaining ShoreZone imagery gaps are in the Aleutian Islands and on Forrester Island which are both part of the Alaska Maritime National Wildlife Refuge. HCD wants the refuges to utilize the existing ShoreZone imagery and mapping data and to be a partner on new ShoreZone work.

### **Partner Contributions to ShoreZone**

Cindy Hartmann Moore, Ellen Ward, and Steve Lewis (SFD) worked with ShoreZone partners on future projects. The Cook Inlet Citizens Advisory Council (CIRCAC) put funding toward a ShoreZone reimagining survey of Outer Kenai. The Kenai Fjords National Park is contributing to this survey. The imagery will likely be collected in 2021 pending pandemic travel restrictions. The FWS refuge branch in Alaska also obligated funds for ShoreZone this fiscal year to undertake mapping upgrades to Alaska Peninsula ShoreZone data. HCD staff assisted with the information needs for this work.

## *Outreach, Conferences, and Presentations*

Habitat conservation is the foundation for sustainable fisheries. HCD shares information about our efforts through a variety of venues. These include professional meetings, conferences, publications, and presentations to the public.

### **National Environmental Policy Act Education**

Doug Limpinsel spoke to a class at the University of Alaska’s Bristol Bay Campus. The class provided a basic understanding of the NEPA including; its history and justification, supporting legislation, and provided a detailed discussion on the contents and level of analysis found in a typical Environmental

Impact Statement (EIS). Doug Limpinsel was invited to discuss the MSA and how EFH Consultations dovetail into the NEPA and EIS process. An overview was presented describing fisheries management plans and important roles of the fishing industry, observer fisheries data, scientific analysis and stock assessments, and the management role of the NPFMC. Also discussed were EFH definitions, associated ecosystem processes, the different types of EFH consultations and assessments and the role of EFH conservation recommendations in mitigating impacts to EFH and fisheries. AKR-HCD has presented similar talks before and was also invited to present that discussion in the lecture series at the next Western Alaska Interdisciplinary Science Conference.

### **American Fisheries Society (AFS) and The Wildlife Society Joint Conference**

The AFS and The Wildlife Society held their first joint conference of the two societies in Reno, Nevada. At the session organized by the U.S. Geological Survey's National Climate Adaptation Science Center, Doug Limpinsel presented a discussion identifying many of the current indicators of climate change in ecosystem processes that support and influence EFH and our fisheries. Examples of change across biomes, riverine, estuarine and marine processes were highlighted, concluding with the increased incidence in unusual mortality events seen in sea bird and mammal populations. Overall, that conference was very informative and well attended. AKR-HCD and the AFSC were well represented in several discussions. This specific presentation was also presented at the 2020 AFS Virtual Conference held in September 2020.

### **American Fisheries Society Collaboration**

Doug Limpinsel completed and made public the first in a series of posters that illustrates the numerous EFH attributes and ecosystem processes that support our federally managed fisheries in Alaska. The [concept poster](#) was accepted for presentation at several different AFS events, recently featured on the AFS Fish Habitat website, and was invited to appear at the 2020 AFS Virtual Conference in the Science Communications speed presentations session. The poster will also be featured at the Habitat Sections information booth at the AFS 150 Year Anniversary Conference in Baltimore Maryland in 2021.

### **Invasive Species Monster Mash**

NOAA Fisheries Alaska partnered with Federal and Alaska State agencies to produce an invasive species "Monster Mash" Halloween public service campaign that highlighted a different Alaska invasive species through social media each day of Halloween week. Following up on a coordination facilitated by Erika Amman (RC), Linda Shaw (AKR HCD) contributed review and photos for this project. Northern pike, elodea, Atlantic salmon, and *Didemnum vexillum* are the species highlighted in spooky monster themed profiles to learn about the creatures invading Alaska's waters and how to prevent their spread. NOAA Fisheries Alaska facebook page shared the Monster Mash.

### **Alaska Deep-Sea Coral and Sponge Workshop**

The AFSC and Alaska Region hosted a workshop in May 2020 to launch the next Alaska Regional Initiative of the NOAA DSCRTP. Participants from NOAA Fisheries and partners, including the NPFMC, academic institutions, fishing industry groups, and others came together virtually over four days to share information and identify research priorities for studies by the Alaska Initiative in 2021-2024. Breakout sessions on six areas of research emphasis identified and ranked research priorities for funding studies during the initiative. John Olson DSCRTP POC for the Alaska Region is on the steering committee and led a session on the effects of human activity on corals and sponges in Alaska. Jodi Pirtle led a session on population dynamics, biology, and biological interactions. Gretchen Harrington participated in the workshop. John and Jodi are working with the steering committee and session leads to integrate priorities among topics and develop a workshop report, steps on the path to selecting and funding studies to meet the goals of the DSCRTP for NOAA Fisheries in Alaska.

### **Stock Assessment Workshop**

AFSC held workshops in March and September 2020 on Ecosystem and Socioeconomic Profiles (ESP) for Alaska stocks. The virtual September workshops focused on ESP stock-specific indicator development and pathways following the March workshop on data and models available to develop ESP metrics and indicators. Jodi Pirtle and Cheryl Barnes contributed to the workshop, including presentations. Species distribution models- developed to map EFH for Alaska stocks- have been extended to the ESPs as metrics of habitat distribution for species life stages in our fishery management areas. The next ESP Workshop will be in 2021.

### **Ecosystem Based Fisheries Management Workshop**

NMFS National EBFM Workgroup held a virtual workshop in July 2020. Jodi Pirtle and Gretchen Harrington contributed to two presentations and panel discussions.

### **Alaska Marine Science Symposium**

HCD attended the Alaska Marine Science Symposium (AMSS) in 2020 and presented work from collaborative habitat research and habitat conservation projects. Cheryl Barnes presented a talk on her groundfish predation research. Jen Marsh presented a poster on her Arctic species distribution models. Jodi Pirtle presented a poster on habitat linked vital rates of juvenile walleye pollock in the Gulf of Alaska.

## Goal #6: Improve HCD Organizational Excellence and Cohesion by integrating the Alaska Region Shared Values with our workplace interactions and products: Integrity, Respect, Collaboration, Accountability, and Open Communication

### *Change Strategy*

#### **Change Strategy Teams**

Several HCD staff participated on Change Strategy teams in 2020. Gretchen Harrington is a member of the Senior Leadership Team, the Management Team, and Communication and Engagement Team. Matt Eagleton is a member of the Management Team. Jodi Pirtle is a member of the Core Team. Seanbob Kelly is a member of the Learning Team. Change Strategy Implementation Teams also included many HCD staff. Gretchen Harrington was a member of the Learning and Growth Culture Team, Seanbob Kelly was a member of the Mentoring and Coaching Team, and Sean Eagan and Linda Shaw were members of the Communications Plan Team. Implementation Teams put into action the recommendations made by Change Strategy Flash Teams in 2019. HCD staff received team and individual leadership training, including formal training and experiential learning, through their participation in Change Strategy and their personal development as change leaders benefits our Region.

#### **Leadership Training**

HCD staff participated in the Human Capital Management Office (HCMO) Leadership Excellence Courses, Managing for Results and Managing a Virtual Workforce

### *Staff Resources*

#### **HCD Welcome Packet**

We worked as a team to develop a [New Hire Welcome Packet](#). The Welcome Packet contains our organization chart and goals, helpful onboarding checklists, HCD and AKR policies and procedures, frequently asked questions, useful links, photos of HCD in action, and a list of commonly used acronyms. This HCD internal resource can be regularly updated.

### *Personnel News in 2020*

#### **HCD said Goodbye to:**

Cindy Hartmann Moore	July
Dr. Arnaud Grüss (post-doctoral fellow)	July
Ruth Roys (Pathways intern)	August
Meredith Pochardt (Sea Grant fellow)	August
Lydia Ames	November

#### **HCD Welcomed:**

Dr. Cheryl Barnes (post-doctoral fellow)	January
Bill Hines	January
Molly Zaleski	February
Angel Leppert	March
Charlene Felkley	June
Dr. Ellen Ward	June
Stefanie Coxé	August

## Final Word

Healthy Oceans can be described as marine fisheries, habitats, and biodiversity sustained within healthy and productive ecosystems. NMFS's long-term goal of Healthy Oceans begins with healthy habitats. The work that HCD engages in to conserve, protect, and restore living marine resources through consultations and other activities is critical in providing for resilient coastal communities and ecosystems. Healthy habitat is necessary for sustainable fisheries, protected resources, and almost every other NOAA and NMFS program. Simply put, HCD's work provides the foundation for the "house that NOAA built." In 1996, Congress strengthened that foundation by amending the MSA to include EFH provisions. Congress stated in the MSA: "One of the greatest long-term threats to the viability of commercial and recreational fisheries is the continuing loss of marine, estuarine, and other aquatic habitats."

All living marine resources are vulnerable to habitat degradation, which can threaten the biodiversity on which they depend. These habitats are at risk from human activities, which degrade or destroy habitat quality and quantity. HCD's efforts to conserve habitat are as diverse as the resources NMFS manages. These efforts are both reactive and proactive in nature. Staff involvement in these activities includes:

- Identification and conservation of EFH through the use of the best and most-recent science available
- Providing guidance to stakeholders
- Fishery management activities
- Environmental reviews of fishing and non-fishing activities in order to avoid, minimize, or offset the adverse effects of human activities on EFH, including climate change and ecosystem-based considerations
- Conservation of living marine resources in Alaska
- Active participation in partnerships and the NOAA Habitat Blueprint.

[Come visit us and learn more!](#)