Accomplishments Report

Alaska Region's Habitat Conservation Division

Fiscal Year 2023

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Our Mission

The Alaska Region's mission is science-based stewardship of living marine resources and their habitat in the waters of the North Pacific and Arctic Oceans off Alaska. Responsibilities include supporting sustainable fisheries, restoring and conserving protected species, and promoting healthy ecosystems and resilient coastal communities. The Habitat Conservation Division (HCD) in NOAA Fisheries' Alaska Region (AKR) supports the mission and carries out the agency's statutory responsibilities for habitat conservation under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the Fish and Wildlife Coordination Act, the National Environmental Policy Act, the Federal Power Act, and other laws. Habitat conservation, protection, and restoration are the foundation for sustaining the nation's fisheries. To prioritize our activities, make decisions in an ecosystem context, and strengthen the science behind our decision-making, HCD works closely with the Alaska Fisheries Science Center, other NOAA line offices, the North Pacific Fishery Management Council, other federal and state agencies, non-governmental organizations, local governments, and a variety of industry and conservation groups.

Our Developing Team

A Message from Cathy Coon, ARA HCD

As a newcomer to the NOAA Alaska region, it is striking to me how many employees are tied to the mission, and how the AKR has embraced learning and growth as a culture. Additionally, I am impressed and inspired by what I have observed and experienced: Efficient and ever-improving communication, the focus and energy toward learning and development, the move to create high-functioning teams, and a commitment by senior management to support the mission through strategic planning while leveraging staff experiences, and instituting healthy life-work balance. There are many ways to cultivate this culture within Divisions, and HCD is thriving.

"What we do has a greater impact than what we say." HCD has taken great strides when it comes to bettering our team and how we serve. During this last year we have focused on building our team. As of December 2023, we are 92% staffed and we have implemented growth and development of that team within our standard operating procedures. We completed one retreat, continued the team development program with the new staff, completed improvement trainings, brought EFH mitigation training to the region, and most recently began a Brown Bag series so HCD staff and management can bring in interesting subjects and subject matter experts to help us all grow.

We continue to improve the services we provide via funding research and fulfilling our mission (see HCD by the numbers).

I am excited to be a part of this team at this time and am grateful for the quality of the leadership and intellect within the Division. I look forward to what 2024 will bring and how we can continue to support the stewardship of the nation's oceans' resources and their habitat.

Our Retreat 2023

A 'retreat' is defined as a time for team-building, reflection and focusing inward on our people and how we work together to accomplish goals. Over the past few years, NOAA Fisheries' AKR has been committed to Organizational Excellence, which enables us to collectively transform how we think about our culture, shared values, work norms, and overall performance. HCD has taken these ideals and ran with them, most recently with our 2023 HCD retreat. The goals of this retreat included:

- Team Building and Development: Continue to foster a high functioning HCD team culture
- Advance HCD and AKR Strategic Planning efforts
- Individual Professional Development and Growth

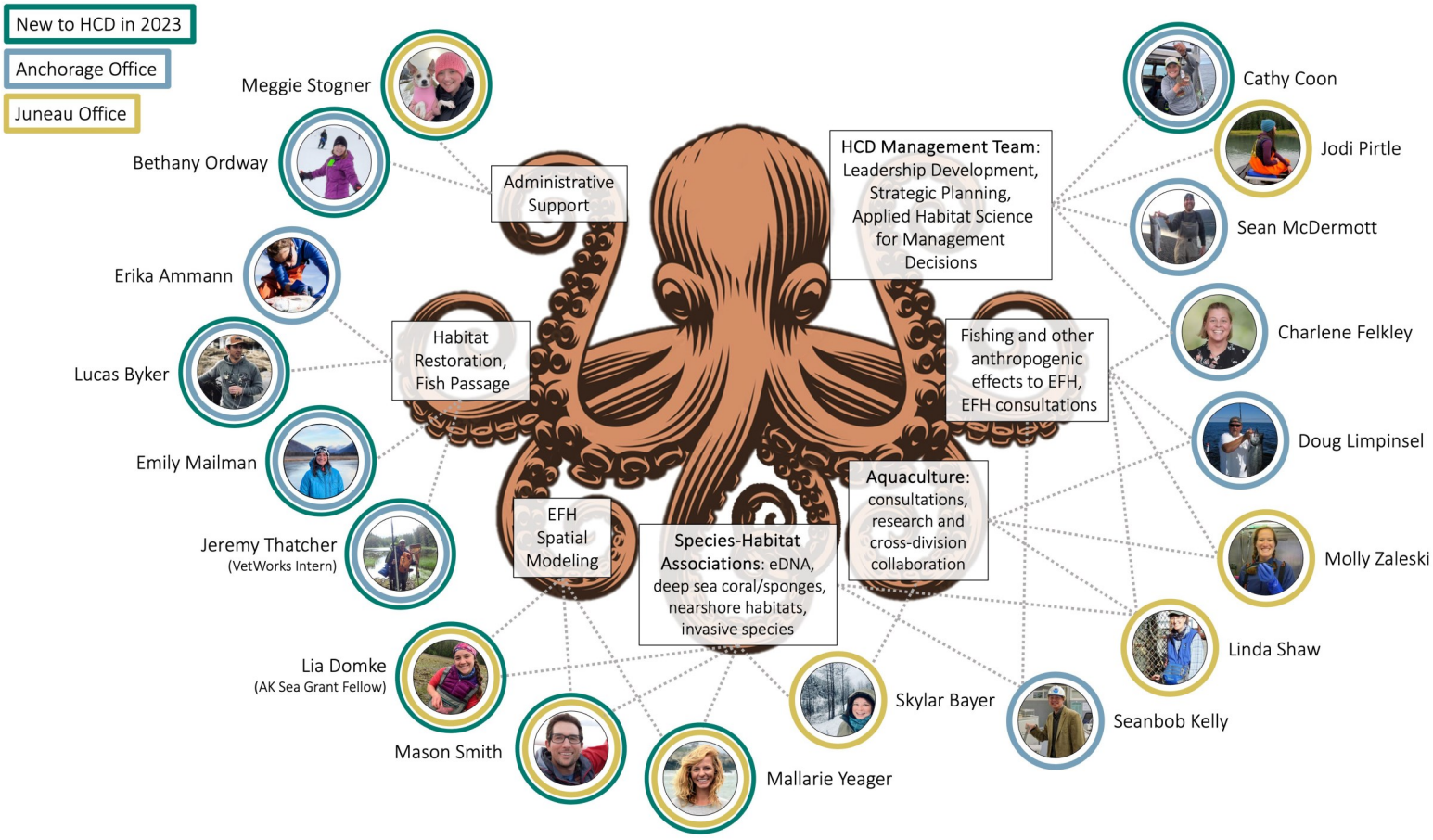
Feedback from team members highlighted the importance of getting together and discovering each other's interests and skill sets. We took the time to learn from each other then connected those interests and skills to HCD's goals and mission. HCD staff contributed by helping to create/prioritize action items in order to improve the service we provide. Some immediate action items that have come out of this process include:

- Conducting both internal (for new staff) and external (USCG civil engineers) EFH 101 training.
- Developing a procedure for implementing climate change-related conservation recommendations in our EFH consultation process.
- Launching new prioritized projects that address current habitat science information needs.
- Planning our next all-team growth opportunity; we have scheduled Emotional Intelligence training.

Team Development

HCD piloted the Team Development Program (TDP) in 2021 to embed the AKR Way/Organizational Excellence in the way we work, build capacity around team effectiveness, and promote purposeful individual learning and growth. Since then we have engaged in TDP training and action-based learning, integrated this learning in our day to day work with very encouraging results, empowered staff to work together and produce high quality results to meet our HCD Goals and enhance mission-performance, and developed, compiled and shared the HCD Team Development Toolbox to be used to benefit the organization. The design of the TDP enables opportunities for there to be a 'Leader in every Chair' - we are all responsible and accountable for co-creating the team that we want to be. In this spirit, HCD built a retreat in 2023.

Our Growth in 2023– Completing our Team



The HCD Team: *This graphic shows the Alaska Region Habitat Conservation Division staff. Each arm of the octopus represents a key objective at HCD and the dotted lines show which staff work towards which objective(s). The colored rings signify in which office a person works (blue = Anchorage, yellow = Juneau) and whether they were hired this year (green). This figure highlights the breadth of collaborative work we do at HCD, showcases the new staff hired and how much our team has grown this year (78% increase).*

Summary of 2023: By the Numbers

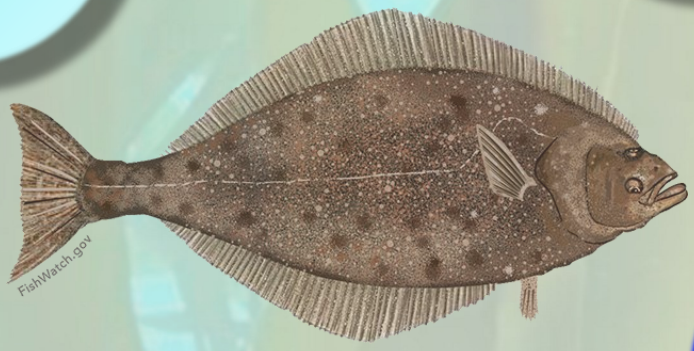
6 Staff Publications

57 Early Coordination consultations conducted

35 Completed EFH Consultations

70% % EFH consultations Improved by HCD recommendations

Average whole-sale value of Alaska fish landings per year **~$4.5 Billion**



$506,947 Funded 6 Alaska EFH research projects

13 Outreach actions (posters, conference presentations, EFH training, Soundings, web story)

Funding awarded to support habitat restoration in AK **> $7.8 Million**

Habitat Division supports Regional Management in the **Essential Fish Habitat 5-year Review**

The MSA includes provisions for the identification and conservation of EFH. A complete review of all EFH information, including scientific publications and reports, is conducted at least once every 5 years and is used to amend EFH provisions in the Fishery Management Plans (FMP) by the North Pacific Fishery Management Council (Council).

The 2023 EFH 5-year Review launched in 2019. The work of the 2023 Review centered on advancing the species distribution models (SDMs) to map EFH, improving the fishing effects model and the evaluation of fishing effects to EFH, updating the review of non-fishing effects on EFH with current scientific literature, refining information on prey of EFH species, and updating research and information needs. Over the past year, the HCD completed several significant milestones for this review.

The supplemental analysis for the SDM EFH maps and the EFH fishing effects evaluation were reviewed by the Scientific and Statistical Committee in October 2022, with recommendations for advancement in the review process. HCD published the revised Non-fishing Effects Report in the Spring of 2023 and worked with Alaska Fisheries Science Center (AFSC) to revise the Alaska EFH Research Plan. HCD and Council staff presented the complete 2023 Review to the Advisory Panel and Council with the Summary Report in February 2023.

"…The 2023 EFH 5-year review represents an impressive update on the best available science to incorporate ecosystem-based fisheries management and help the council make better-informed decisions on issues which are related to habitat for managed species."
~Jon Kurland

"The science background is really impressive on both a national and global scale; it's cutting edge work and I think we really can be proud of what we've been able to accomplish."
~Bill Tweit

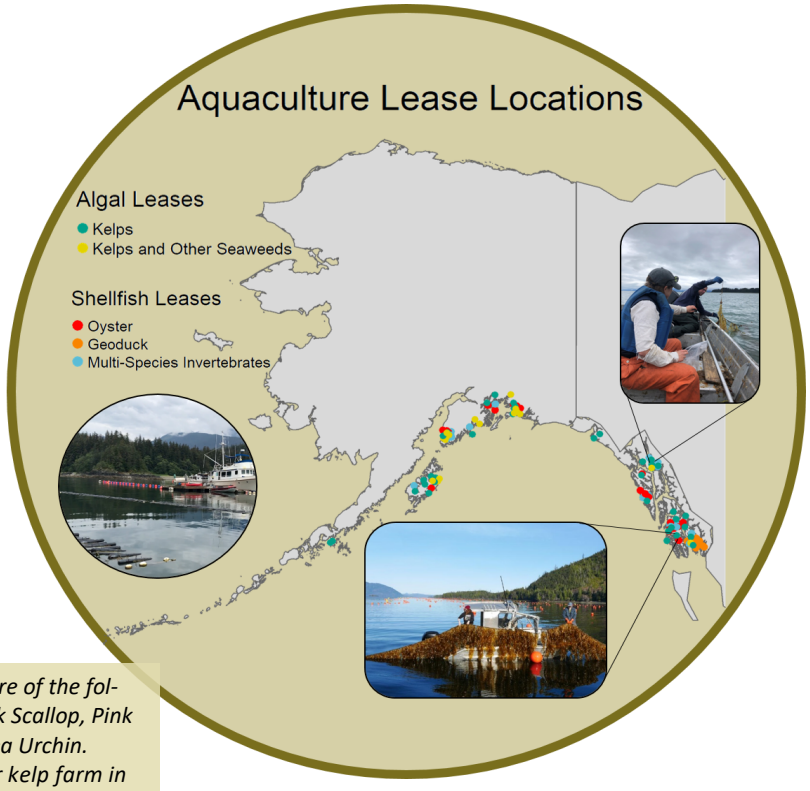
The Council passed a motion at the February meeting to initiate analysis to amend the Council's FMPs to incorporate the updated EFH information based on the new and best available science identified in the 2023 Review:

- EFH component 1 (descriptions and identification). Amend 4 FMPs to update EFH descriptions and maps, including up to EFH Level 3 information on habitat-related vital rates. Add or revise the EFH text descriptions and add or replace the maps for—
  - 41 species or complexes in the BSAI Groundfish FMP,
  - 46 species or complexes in the GOA Groundfish FMP,
  - all five species in the Crab FMP, and
  - all three species in the Arctic FMP.
  - For the Salmon FMP, replace the distribution maps for all five species with the EFH maps.
- EFH component 2 (fishing effects). Update the fishing effects information in the BSAI Groundfish, GOA Groundfish, and Crab FMPs to reflect updates to the fishing effects model, analysis, and evaluation from the 2023 EFH 5-year Review.
- EFH component 4 (non-fishing effects). Revise the EFH appendices in the BSAI Groundfish, GOA Groundfish, Crab, and Arctic FMPs where conservation recommendations for non-fishing activities are described.
- EFH component 7 (prey of EFH species). Revise text or habitat description table information for two species of BSAI sharks, BSAI pollock, GOA Pacific cod, and BSAI red king crab in the BSAI Groundfish, GOA Groundfish, and Crab FMPs.
- EFH component 9 (research and information needs). Revise the EFH appendices with updated research and information needs in the BSAI Groundfish, GOA Groundfish, Crab, and Arctic FMPs.

HCD, NOAA Fisheries' Sustainable Fisheries Division, and Council staff have been working on the 2023 EFH 5-year Review Omnibus Amendments package since February 2023 for Council initial/final action in fiscal year 2024. This 2023 EFH 5-year Review builds on the work from the previous review cycles, incorporates new environmental and habitat data, uses a new ensemble species distribution modeling approach to map EFH and evaluate fishery impacts on EFH, updates the assessment of non-fishing impacts on EFH using current literature, and assesses information gaps and research needs. Our work on the 2023 EFH 5-year Review sets a high bar nationally for habitat science supporting EFH and other ecosystem-based fishery management needs.

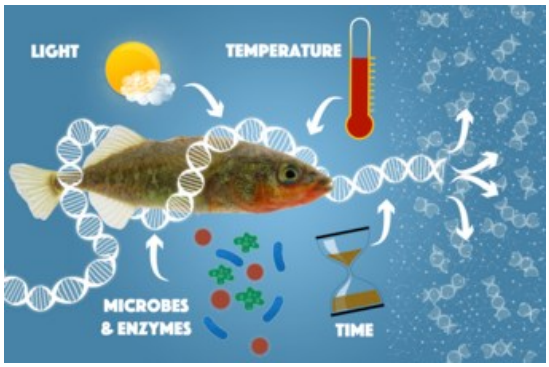
Kelp, Oyster and Multitrophic Aquaculture Permitting

HCD successfully provided conservation recommendations for 26 aquaculture permits this year led by Molly Zaleski to both Alaska Department of Natural Resources (ADNR) and U.S. Army Corps of Engineers (USACE). A Majority of these permits received recommendations or comments through early coordination efforts either through ADNR or directly with farm applicants, while some (~15% of the annual lease applications) required more formal consultations when going through USACE permitting for aspects outside the ADNR jurisdiction. HCD staff have participated in early coordination with these aquaculture lease proposals to evaluate siting and potential consequences to EFH and provide recommendations to help diminish any and all impacts. See the map to the right of current aquaculture lease locations by species type found throughout the coastal Gulf of Alaska.



In legend: *Multi-Species Invertebrates are leases which have one or more of the following species: Blue Mussel, Cockle, Littleneck Clam, Purple-hinged Rock Scallop, Pink Scallop, Blue King Crab, Pinto Abalone, Red Sea Cucumber and Green Sea Urchin.*
Photos from top to bottom: *HCD staff Skylar Bayer visiting SeaQuester kelp farm in Juneau, AK (photo credit: Jamie Currie), A successful oyster farm near Juneau, AK (photo credit: Hannah Wilson), A flourishing kelp farm in Doyle Bay, AK operated by Seagrove Kelp Co. (photo credit: Jordan Hollarsmith).*

eDNA: Consultations, Coral, and Crabs



The advantage of eDNA is that the presence or absence of an organism can be determined at various locations even if the organisms are not captured, visible, or otherwise able to be sampled. This makes eDNA highly advantageous for environments that are difficult and expensive to observe. HCD staff and the Alaska Fisheries Science Center (AFSC) jointly developed eDNA sampling protocols. These protocols allow for rapid, cost-effective, and standardized collection of data about species distribution and relative abundance.

The detection of species using eDNA, especially in hard to reach/data poor areas (e.g., Atka and Safety Sound, Alaska), improves biodiversity assessments and provides information about status, distribution, and habitat requirements for lesser-known species (e.g. deep sea corals and sponges). Similarly, the application of eDNA sampling methods is effective for invasive species (e.g. green crab and rock vomit) monitoring in the Alaska Region. As we learn more about how to use eDNA, we will develop new approaches to answer the most pressing questions of a community or an organism's ecology.

DNA*, short for* ***d****eoxyribo****n****ucleic* ***a****cid, is the hereditary material in organisms that contains the biological instructions for building and maintaining them. The chemical structure of DNA is the same for all organisms, but differences exist in the order of the DNA building blocks, known as base pairs. Unique patterns of base pairs, particularly repeating patterns, provide a means to identify species, populations, and even individuals.*

What is Environmental DNA (eDNA)?
Environmental DNA (eDNA) is DNA released from an organism into the environment. Sources of eDNA include secreted feces, mucous, gametes, shed skin, and carcasses; basically anything released from the organism. Credit: FISHBIO

Fish Passage and Restoration

The funds available from the Inflation Reduction Act (IRA) and the Bipartisan Infrastructure Law (BIL) have provided a once-in-a-lifetime opportunity for reconnecting previously-severed anadromous fish habitat, improving infrastructure, and enhancing climate resilience in communities across Alaska. With the influx of funding, HCD staff helped facilitate the dispensation of funds, providing technical expertise to ensure fish passage projects are completed with the maximum benefit to anadromous fish and participating in working groups and conferences related to fish passage issues.

Completed fish passage culvert replacement on the Cordova Highway in Cordova, AK.

Fish passage restoration on the Buskin River in Kodiak, AK.

With the large set-asides of BIL and IRA funds for Tribes, it is unsurprising that opportunities for collaboration with tribal partners were abundant. HCD staff capitalized on multiple opportunities to strengthen existing partnerships and forge new ones. One highlight of the tribal coordination opportunities was with the Chickaloon Native Village (CNV). The CNV was awarded a NOAA grant and funding through Restoring Priority Tribal Fish Passage through Barrier Removal. The CNV Council will be replacing several culverts along Premier creek, a tributary to the Matanuska River, which have acted as barriers to upstream EFH. VetWorks intern Jeremy Thatcher was able to participate in a field day with CNV which was designed to disseminate information on the survey, design, and implementation of fish passage projects to tribal partners from across the state.

With the proliferation of fish passage projects occurring across Alaska, HCD staff had numerous opportunities to provide conservation recommendations to ensure fish passage projects are completed with the highest possible benefits to anadromous fish. One highlight was an EFH consultation completed by Doug Limpinsel in collaboration with the U.S. Forest Service (USFS). USFS has identified 693 road and trail crossings within the Tongass National Forest which do not meet fish passage standards. These barriers impact an estimated 154 miles of upstream EFH, of which 90 crossings restrict access to 33 miles of upstream anadromous salmon EFH. USFS proposes to eventually replace and restore all of the antiquated crossings, estimating 10-20 crossings will be restored annually.

Pink salmon traversing a culvert.

Fish passage restoration project under construction on the Buskin River in Kodiak, AK.

Attending conferences and participating in working groups allows HCD staff to gain professional development while simultaneously communicating their technical expertise to partners. One highlight of this effort was HCD staff's participation in the 2022 Mat-Su Salmon Science and Conservation symposium. This symposium is organized by the Mat-Su Basin Salmon Habitat Partnership, which is a member of the National Fish Habitat Partnership. This two day event (in person) was attended by nearly 100 participants from state and federal agencies, academia, NGOs, tribes, and private individuals interested in Pacific salmon habitat. Topics presented ranged from recent science related to toxins from tires, fish passage improvements, and collaborations with gold miners to support habitat restoration. Erika Ammann and Monica Keim shared resources on upcoming funding opportunities supported by the BIL and joined a panel discussion to clarify any questions.

Mendenhall Glacier Visitor Center

HCD and USFS staff at a site visit during our compensatory mitigation training this summer (2023) overlooking where the fish passage work will happen for Steep Creek.

The USFS proposed a large-scale improvement project at the Mendenhall Glacier Visitor Center. They conducted an initial Environmental Impact Study and HCD's points of contact, Linda Shaw and Molly Zaleski, reviewed the study and provided conservation recommendations. Since these recommendations, the USFS presented updated alternatives, which were a direct result of ~400 public comments including: developing more trails and trailheads, adding floating docks, and a boat ramp with extended parking on the west side of the lake. HCD again provided conservation recommendations for the updated alternatives based on their roles as cooperating agency representatives for early coordination of an EFH assessment.

These recommendations focused on minimizing the impact area of the proposed work and including NMFS in the development of compensatory mitigation strategies. Upon these recommendations, the USFS Tongass National Forest published a Draft Record of Decision (DROD) which considered several alternative plans for the project. The NMFS Alaska Region recommended Alternative 4 which would minimize impacts to EFH with the least amount of wetland fill and riparian destruction. The DROD ultimately selected Alternative 5, which is considered to be a compromise selection. This alternative does not include boat tours on Mendenhall Lake and will not fill in Zig Zag pond. Additionally the selected project will include management and monitoring of water quality impacts and invasive species, rerouting of Steep Creek, and a bottomless arch culvert to improve fish passage and hydrology of Steep Creek under Glacier Spur Road. The USFS acknowledges that Alternative 5 will adversely affect EFH and that compensatory mitigation of wetland and riparian impacts will be a focal issue for the USACE.

The Mendenhall Glacier from Photo Point during the August, 2021 jökulhlaup showing flooding nearly topping the usually elevated walkway, highlighting the need to integrate climate change impacts to environmental reviews in Alaska.

Cross Regional Collaborations

The increasing demand for electrical energy and the rise of offshore wind (OSW) turbine technology has pressed some Regional HCD Offices to have a better understanding of the technology, potential impacts, and agency responsibilities under the permitting process. In 2023, the Greater Atlantic Region Fisheries Office (GARFO) invited interested personnel from other regions development opportunities to participate in learning more on the topic and provide support where possible. Because OSW facilities have been suggested in Alaska, Doug Limpinsel volunteered to attend what could be described as the Master Class in OSW. Doug completed a period of reviewing and tracking a project to get a better understanding of the process. He remains involved in bi-weekly meetings of the GARFO OSW Regulatory Team and represents AKR on the monthly NMFS National Offshore Wind Working Group discussions.

Habitat Conservation with Tribal Coordination and Cultural Resources

Executive Order 13175 sets the framework for regular and meaningful consultation and collaboration with Alaska Native representatives in the development of policies, legislation, regulations, and programs. For HCD, this includes consideration of cultural resources in the development of our program priorities. In FY2023, we had two significant actions that were informed by the inclusion of Alaskan Tribal communities and traditional ecological knowledge. HCD staff and Metlakatla Indian Community Department of Fish and Wildlife (MICDFW) biologists discovered the invasive European green crab (*Carcinus meanus)* on the Annette Island Reserve in 2022. This discovery inspired the formation of a collaborative effort to respond, provide outreach, and build capacity to address this harmful invasive species. By fall of 2023, MICDFW, with some funding support from HCD, had removed upwards of 3,000 green crab from Tamgas Harbor. These efforts have documented a Fall spike in catch, possibly associated with molting, and gravid females in the spring, information that could help inform future control or eradication efforts.

Dams built on the Eklutna River have significantly diminished the returning Pacific salmon run, including the exclusion of sockeye from the Eklutna Lake. Because of those dams, the people of the Native Village of Eklutna (NVE) have been without an important cultural and subsistence resource for nearly a century. Returning salmon, especially sockeye, to the Eklutna watershed is central to their restoration interests. In our work to implement the provisions of the 1991 Settlement Agreement for the Eklutna Hydropower Project, an agreement intended to mitigate impacts to fish and wildlife, we have been in close coordination with the NVE Tribal leadership. We held a Government-to-Government consultation to inform our proposed recommendations for the anticipated mitigation plan which influenced our final decision. Our final recommendations were closely aligned with the interests of NVE, supporting their traditional cultural and subsistence way of life.

The outcome of our work here at HCD is greatly improved by working with native communities on issues that matter to them and support our agency's mission. Their traditional ecological knowledge and connection to marine and aquatic resources support a better outcome for our trust resources and build partnerships that will have long lasting benefits for habitat conservation.

With fast-growing concern about the threat of invasive species in Southeast Alaska, NOAA and Sea Grant are helping tribal and coastal communities build monitoring and trapping efforts into environmental plans. Of particular concern is European green crab, now increasing on the West Coast and wreaking havoc on nursery habitat and native crab, shellfish and salmon, among other vital resources. The aim is to encourage local participation in managing the invaders as they continue to move north.

Invasive European Green Crab

We provided presentations to the Alaska Invasive Species Partnership workshop and marine subcommittees, Western Regional Panel on Aquatic Invasive Species, and Tlingit-Haida Southeast Environmental Summit. HCD is also working with the Alaska Department of Fish and Game and other partners to update an outreach sign that was produced for use on the Annette Island Reserve for the rest of the State, which is under State jurisdiction and different regulations.

HCD staff also served on the steering committees for two workshops, one in southern Southeast Alaska that brought community representatives to Ketchikan and Metlakatla for training and field experience with green crab early detection and one in Homer that developed a statewide rapid response plan. HCD staff also brought the Alaska perspective as part of the planning committee for a revision of the national European green crab management plan.

HCD contributed to population genetic analyses of Alaska green crab, completed an eDNA sample collection and analyses, assisted MICDFW's utilization of a new State Aquatic Resources permit for shipping green crab samples, and participated in the development of project ideas, collaboration and communication within and outside of the State, including Congressional inquiries.

As an in-reach project, HCD staffer Linda Shaw and NOAA Invasive Specie Program Coordinator, Joe Krieger, collaborated to submit a "Postcard from the Field" highlighting invasive European green crab discovery and response in Alaska.

Atka Harbor Project:

Leveraging partnerships in support of FWCA

Participation in the Fish and Wildlife Coordination Act (FWCA) as a cooperating agency provides opportunities for NMFS staff to work in the field with other agencies and Alaska Native groups. The first step in the FWCA process is to inform planning by collecting data through existing databases or field work on understanding fish species presence/absence, and other habitat characteristics of potential project sites. This information supports site selection and configuration of the construction, and potential methods needed to conduct those studies.

Through the FWCA, the USACE invited AKRO HCD staff to participate as a cooperating agency in the environmental data collection of a feasibility study for the Atka Small Boat Harbor for the Native Village of Atka Island. This project was made possible through the Tribal Partnership Program, Section 203 of Water Resourced Development Act. HCD staff member Skylar Bayer joined members of USACE and the Alaska Department of Fish and Game to conduct an initial habitat and environmental assessment on the island of Atka in the Aleutians. The four-person team conducted seine net, minnow trap, eDNA, camera, and crab pot surveys. The team was able to accomplish all the tasks set out for the September trip with the help of the Native Village of Atka. These data are necessary to assess the feasibility and potential environmental impacts of a new harbor project and potential dredge dumping sites on Atka. USACE members will be headed out again this winter for final surveys and HCD staff will develop a Planning Aid Letter in 2024 for the project.

Chris Hoffman (USACE) and Skylar Bayer (NMFS) recording data from beach seining. Photo by Matt Ferguson.

PRESENTATIONS

- McDermott, S. Adaptive management for MHK. video presentation. Water Power Week. May 10, 2023.
- Pirtle, J. Advances in species distribution models for essential fish habitat and ecosystem-based fisheries management. Alaska Marine Science Symposium. January 25, 2023.

POSTERS

- Coxe, S.L. A Collaborative Approach to Conserving Essential Fish Habitat. Alaska Marine Science Symposium. January 25, 2023.
- McDermott, S. D. Limpinsel, S. Kelly. Science Needs Supporting Habitat Conservation: Raising the bar to address anthropogenic impacts. Alaska Marine Science Symposium. January 25, 2023.
- Shaw, L. Living on the edge: Status of invasive green crab (*Carcinus maenas)* rapid response efforts in southern Southeast Alaska. Alaska Marine Science Symposium. January 25, 2023.
- Barnes, C. Prospective Students: New Opportunities With The Integrated Marine Fisheries Lab At OSU.

OUTREACH, TRAININGS, & WORKSHOPS

- EFH training with USFS; **April 2023**
- **Look out for Invasive Green Crab** - Linda Shaw web story
- Soundings: AKR's EAC; Seanbob Kelly, **April 2023**
- Soundings: India and Nepal, Part 1. India: A Passage to India or In Search of Bagheera; Linda Shaw, **April 2023**
- Soundings: India and Nepal, Part 2. Nepal: On to Nepal in Search of Unicorns (Indian One Horned Rhino); Linda Shaw, **May 2023**
- Soundings: Meet Skylar Bayer: Celebrating Disability in STEM through Story; Skylar Bayer, **June 2023**
- Soundings: eDNA: The Corps, Coral, and Crabs; Skylar Bayer, Seanbob Kelly, and Linda Shaw, **August 2023**
- Molly Zaleski volunteered with a middle school group during Sea Week to do beach surveys, nearshore species IDs, and a beach clean-up.

PUBLICATIONS


Photo by Linda Shaw

Bayer, S. and G. Serrato Marks [eds]. 2023. Uncharted: How Scientists Navigate Their Own Health, Research, and Experiences of Bias. Columbia University Press. 328 p.

Echave K. B., J. L. Pirtle, J. Heifetz, and S. K. Shotwell. 2023. Cautious considerations for using multiple covariate distance sampling and seafloor terrain for improved estimates of rockfish density. Mar Ecol Prog Ser 703:125-143. https://doi.org/10.3354/meps14219.

Gibson, G. A., W. T. Stockhausen, S. K. Shotwell, A. L. Deary, J. L. Pirtle, K. O. Coyle, and A. J. Hermann. *Can seamounts in the Gulf of Alaska be a spawning ground for sablefish settling in coastal nursery grounds? Fisheries Research. 261: 106625.* https://doi.org/10.1016/j.fishres.2023.106625.

Harris, J., E. A. Laman, J. L. Pirtle, M. C. Siple, C. N. Rooper, T. P. Hurst, C. L. Conrath. 2022. Advancing model-based essential fish habitat descriptions for North Pacific species in the Aleutian Islands. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-458, 406 p. https://doi.org/10.25923/ffnc-cg42.

Laman, E. A., J. L. Pirtle, J. Harris, M. C. Siple, C. N. Rooper, T. P. Hurst, C. L. Conrath. 2022. Advancing model-based essential fish habitat descriptions for North Pacific species in the Bering Sea. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-459, 538 p. https://doi.org/10.25923/y5gc-nk42.

Limpinsel, D., S. McDermott, C. Felkley, E. Ammann, S. Coxe, G.A. Harrington, S. Kelly, J.L. Pirtle, L. Shaw, and M. Zaleski. 2023. Impacts to Essential Fish Habitat from Non-Fishing Activities in Alaska: EFH 5-year review from 2018-2023. National Marine Fisheries Service, Alaska Region, Juneau, Alaska. U.S. Dep. Commerce, NOAA Tech. Memo. MFS-F/AKR-30. doi: 10.25923/9z4h-n860.

Limpinsel, D. 2023. Identifying Essential Fish Habitat and Recognizing Non-Fishing Human Impacts. Oncorhynchus: Newsletter of the Alaska Chapter, American Fisheries Society. 43(3). Summer 2023.

Pirtle, J. L., Laman, E. A., Harris, J., Siple, M. C., Rooper, C. N., Hurst, T. P., Conrath, C. L., and Gibson, G. A. 2023. Advancing model-based essential fish habitat descriptions for North Pacific species in the Gulf of Alaska. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-AFSC-468, 541 p. https://doi.org/10.25923/ygdf-5f65.

For more information about the Habitat Conservation Division and the work they do, scan this QR code:

Fare thee well, friends, we wish you all the best!

- ~ William Hines retired after a long and rewarding career with NOAA Fisheries.
- ~ Gretchen Harrington took new position as Division Chief for Sustainable Fisheries.
- ~ Barb Lake is now working for Alaska Department of Fish and Game.
- ~ Stefanie Coxe is now a former NOAA Corps officer exploring new career opportunities.