

Alaska State Ferry Now Tracking Ocean Acidification

Ferry: M/V *Columbia*

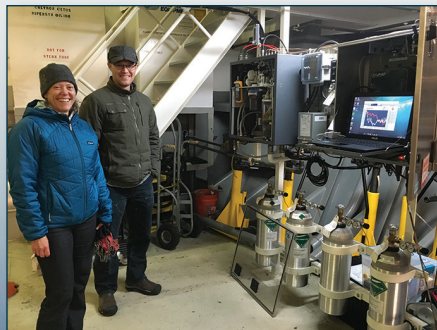
- 500 passenger capacity
- Route: Bellingham to Skagway (1,854 miles/wk)
- Collects water samples every 3 minutes
- Measurements: Temperature, dissolved oxygen, salt content, and CO₂

An Alaska state ferry now serves as a platform for ocean acidification monitoring thanks to a collaborative partnership between a group of Alaska and Canada research entities, NOAA, and the Alaska State Department of Transportation. A surface seawater monitoring system was installed on the M/V *Columbia*, the largest vessel of the Alaska Marine Highway System fleet, which runs a weekly 1,854-mile round-trip route between Bellingham, Washington and Skagway, Alaska. The project is part of an international effort that began in 2014 to understand the impact of ocean acidification along the British Columbia (BC) and Alaska coasts, and is a key priority of the Alaska Ocean Acidification Network.

The Alaska Marine Highway System (AMHS) provides an ideal research platform to study ocean acidification due to its vast geographic coverage and routine sailing schedule. Seawater is pumped through a bow thruster port about six feet below the sea surface, and enters a monitoring system on the *Columbia* car deck where sensors record the temperature, salt content, and dissolved oxygen and carbon dioxide (CO₂) concentrations. By continuously tracking these variables, scientists study seasonal changes in ocean chemistry, how the chemistry varies from place to place, and what drives these changes.

Wiley Evans (Hakai Institute, BC), lead oceanographer on the project, installed the instruments on the *Columbia* with help from Geoff Lebon (Joint Institute for the Study of Atmosphere and Ocean (JISAO) and NOAA Pacific Marine Environmental Laboratory (PMEL)). "Ocean acidification is a moving target. It's the trajectory of our coastal waters being influenced by increasing atmospheric CO₂ content, and in order to capture that, we need to take measurements over a long period of time," he says. "That's the goal of this platform. It's not just one year, it's not just three, we're really trying to make sure that this is a long-term commitment."

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Allison Bidlack of Alaska Coastal Rainforest Center at UAS and Wiley Evans of the Hakai Institute stand next to the monitoring system on the card deck of the *Columbia*. Bidlack and Evans began fostering this partnership that would lead to the project in 2014.

Alaska Ocean Observing System

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The M/V *Columbia* is Alaska's largest state ferry with a 500-passenger capacity. The monitoring system became operational in November.

Welcome Clayton Hamilton

Clayton Hamilton, a Juneau-based fisherman, has been working with the Alaska Ocean Acidification Network since October as part of the Alaska Marine Conservation Council's Fishing Fellowship program. Primarily focused on fishing community engagement, Clayton is working closely with network director Darcy Dugan to reach out to fishermen to raise awareness about ocean acidification and better understand fishermen's information needs. Here's an excerpt from a recent Q&A with Clayton:



Q: How did ocean acidification emerge on your radar, and what makes you interested in the topic?

OA has been on my radar from the outset. What it actually means for fishing, fish and the ocean community, I'm not sure, and that's a big part of my motivation to learn more for myself and to start speaking with the broader community about what OA will mean in the future. The ocean is going to get more acidic and that will have real impacts on landings and on the ecosystem as a whole. Only by understanding this phenomenon will we be able to cope with it.

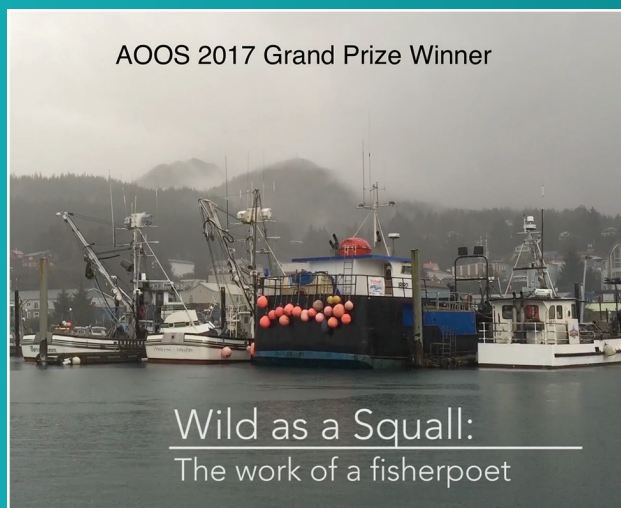
Q: What's your sense on how fishermen think about ocean acidification? Are your fishing colleagues aware of the issue?

The fishermen I have met here in Alaska are in tune with the world they live in. Fishermen are aware of the issues and often very well informed and connected, despite the somewhat isolated nature of the work and lifestyle. Ocean acidification can be a difficult issue to approach initially as pH is not a factor we are used to dealing with. That being said, Alaska fishermen are well-placed as advocates for ocean management and are leading the way when it comes to fighting for habitat in Alaska.

Read the rest of the Q&A on the Alaska OA Network website: <https://tinyurl.com/yca8ofdl>. ■

Alaska HAB Network Launches Website and Data Portal

The Alaska Harmful Algal Bloom Network (AHAB) was formed in 2017 to provide a statewide approach to HAB awareness, research, monitoring, and response in Alaska. Coordinated by AOOS and Alaska Sea Grant, its members include state and federal agencies, research entities and Tribes. This month, AHAB launched an informational website and data portal with the latest phytoplankton and shellfish testing results. Using the look and feel of the AOOS Ocean Data Explorer, the portal provides users with an advisory status (red=advisory, yellow=advisory for some species, green=no advisory, or no recent data) in areas where testing has been conducted. To date, routine monitoring occurs in Southeast Alaska and lower Cook Inlet. AHAB encourages people to use the portal but reminds recreational harvesters that the portal does not "certify" the safety of shellfish at these sites and that users must harvest at their own risk, <http://www.aoos.org/alaska-hab-network/>. ■



AOOS 2017 Film Contest Winners

The 2017 Grand Prize in the fourth annual AOOS Short Film Contest was awarded to Alistair Gardiner & Pola Lem for their film *Wild as a Squall: The work of a fisherpoet*. The film, one of 15 submitted, incorporated commercial fishing and one man's love of the sea with the beauty of film and poetry, and is a must see at <https://tinyurl.com/fisherpoet>.

The Honorable Mention went to Alisa Aist's *The People Who Count Fish*. This young filmmaker has submitted to previous contests and continues her film art with an interesting take on fish counting in remote Alaska.

A big thank you to all the artists who have submitted their creations to our last four contests. See all the film submissions along with previous winners and entries at <http://www.aoos.org/>. ■

Animal Telemetry Network Workshop

Animal telemetry is a method of tracking movements and behavior of marine animals in oceans, coastal rivers, estuaries and great lakes. Animal tracking provides data regarding animal responses to the coupled ocean, atmosphere, and physical environment through which they live and move. Some tracking tags are equipped with sensors and provide high-resolution physical oceanographic data in addition to animal movements. These additional sensors reveal important insights into regions of the oceans that are difficult and expensive to monitor by more traditional methods (e.g., offshore environments, Arctic).

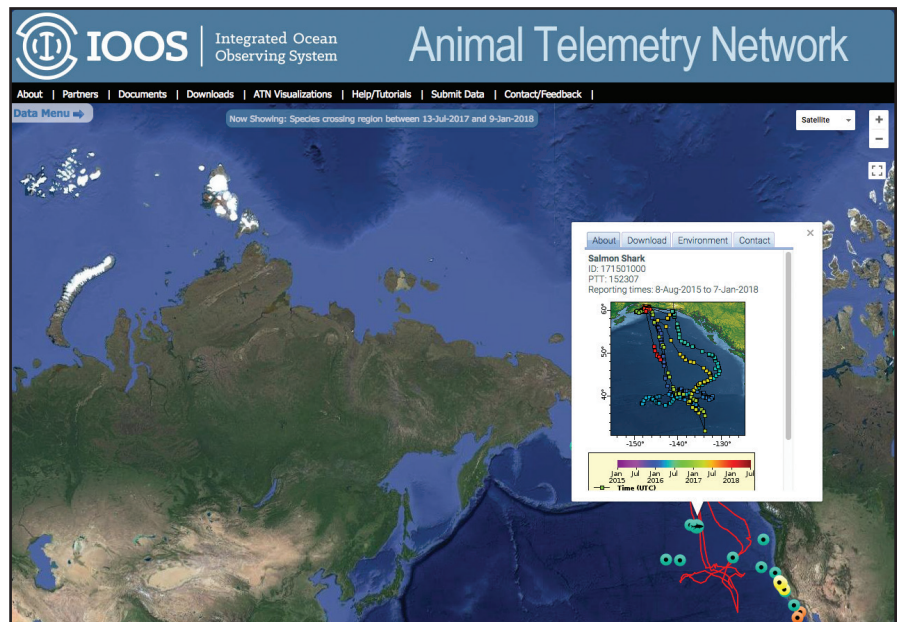
A U.S. National Animal Telemetry Network (ATN) implementation plan was developed by the ATN Task Team of the Interagency Ocean Observations Committee in 2016 to address international animal telemetry data standards and best practices. The plan responds to multiple objectives within the National Ocean Policy Implementation Plan to better understand biological interactions in the ocean. The U.S. ATN is an alliance among federal, state, Tribal, regional, academic, and industry tagging partners to maximize collaborations within the ATN community and increase access to and sharing of animal telemetry data. These data can be used to generate information products that provide science-based information for species and ecosystem-based management. The ATN is designed as a distributed technology and information network that applies consistent international data standards and best practices to achieve seamless integration of data, not only among various ATN observing assets and animal telemetry efforts, but with other observing systems.

AOOS hosted a regional ATN Workshop in Anchorage on December 5-6, 2017 with funding from the multi-agency U.S. ATN. The workshop was one in a series of regional workshops being convened to identify and receive input on local stakeholder priorities for animal telemetry observations of aquatic species, and to develop a regional inventory of existing telemetry assets and capabilities.

The workshop was attended by 47 (+ 11 remote) regional researchers, resource managers, industry delegates and coastal and Tribal community representatives to discuss animal telemetry activities, data applications, and needs specific to Alaska coastal and oceanic waters. On Day 1, four panels of subject matter experts for each represented stakeholder sector were convened to provide an overview of the panelists' animal telemetry objectives and activities.

Breakout sessions were held on Day 2 of the workshop, and tackled three main objectives. The first was to develop matrices of animal telemetry observation needs in the AOOS Region and to compare the needs against the current assets. The goal was to identify fundamental observational gaps. The second breakout aimed to identify challenges and concerns with animal tagging efforts in Alaska and the potential benefits of participating in the ATN for Alaska researchers and others doing work with animal telemetry projects across the region. The third breakout session pondered effective telemetry data aggregation and sharing pathways, both within the AOOS region as well outside the region nationally and internationally.

A workshop report summarizing discussions and recommendations is underway and will be made available on the AOOS website. More information on the U.S. ATN can be found on the ATN Homepage: <https://ioos.noaa.gov/project/atn/>. ■



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A Unique Partnership

Pulling off this project has involved committed partners and some finesse, and involved meeting regulation standards and accommodating delays in the AMHS schedule due to maintenance issues. Hakai Institute currently leads the effort and partnered with AOOS, Alaska Coastal Rainforest Center at the University of Alaska Southeast, JISAO-NOAA PMEL, and the Alaska Department of Transportation and Public Facilities to implement this project.

The *Columbia's* sensors link with a Southeast Alaska and BC nearshore ocean acidification network comprised of several onshore observatory stations and moorings with carbonate sensors instruments. The data will be soon available on the AOOS data portal.

Chief Mate Jim Annicelli will be on the *Columbia* this season as it sails the Inside Passage. He's been with the AMHS for nine years, but has worked for more than 40 years in the maritime industry around the globe, including on container vessels that collect ocean acidification data for NOAA. "When you really get right down to it, we have to be paying attention to our environment," he says. "There's a lot at stake."

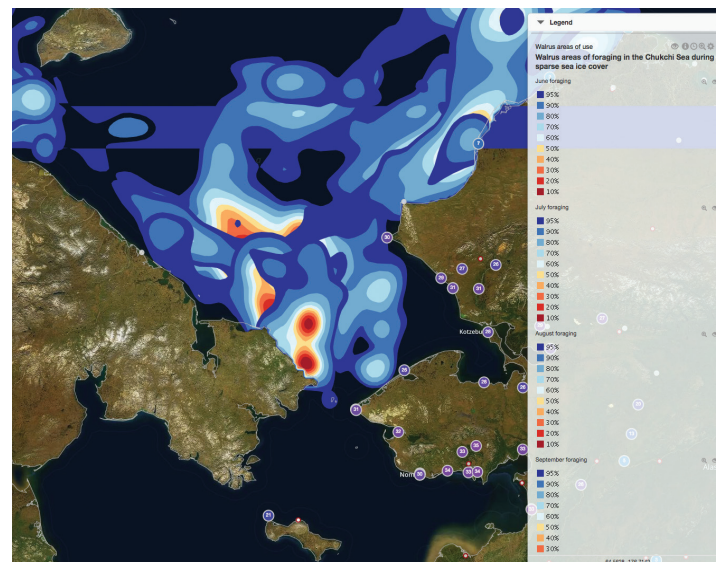
Posters explaining the project will greet passengers on the *Columbia* and at ferry terminals in communities along the way. ■



Defenders of Wildlife Project Adds Data Layers to AOOS Data Portal

Defenders of Wildlife (<https://defenders.org/alaska/our-alaska-office>) in Alaska recently worked with the AOOS data team at Axiom Data Science to develop the Bering Strait Response Teaching Tool (<http://bsrtt.defenders.org/>), which aggregates data from ocean waters in Norton Sound, the Bering Strait, and Kotzebue Sound. Defenders has been working with 15 Alaska Native Bering Strait communities and state/federal spill preparedness and response agencies to increase community engagement in this region in spill preparedness, planning and response. This engagement aims to minimize spill impacts on marine mammals and provides a unique two-way path to allow people to ask questions of spill agencies while sharing Indigenous Knowledge. Response plans can then be guided by science and Indigenous Knowledge. The following layers, developed for the teaching tool, will also now be available directly through the AOOS Ocean Data Explorer:

- NMFS Critical Habitat Areas
- Pacific Walrus Coastal Haulout Database 1852-2016 (<https://tinyurl.com/aoswalrus>)
- Alaska Cetacean Biologically Important Areas
- Walrus areas of use (<https://tinyurl.com/aoswalrus2>) ■



AOOS Data Portal: Walrus areas of foraging in the Chukchi Sea during sparse sea ice cover.



AOOS Executive Director Molly McCammon was selected as a member of Governor Bill Walker's new Climate Action for Alaska Leadership Team, established in October by Administrative Order 289 and chaired by Lt. Governor Byron Mallott.

The team will provide the Governor and his cabinet with recommendations and guidance on climate change on an ongoing basis, and specifically, an action plan by September 1 focusing on mitigation, adaptation, research, and response.

McCammon is especially interested in ensuring that ocean issues such as ocean acidification, coastal erosion, and changing marine fisheries and ecosystems are addressed by the team.