Leveraging the 2022 Pan-Pacific High Seas Expedition for Integration into an Alaska Salmon Curriculum

By Kate Morse (Program Director, Copper River Watershed Project, <u>kate@copperriver.org</u>), Jennifer Hodges (3rd-5th Grade Teacher, Kenny Lake School, <u>jhodges@crsd.us</u>), and Tommy Sheridan (Alaska Blue Economy Center, University of Alaska Fairbanks, <u>tmsheridan@alaska.edu</u>)

Introduction

he primary objective of the 2022 International Year of the Salmon (IYS) Pan-Pacific Winter High Seas Expedition was to demonstrate the utility of an international pan-Pacific winter ecosystem survey to understand how increasingly extreme climate variability in the North Pacific Ocean and the associated changes in the physical environment influence the abundance, distribution, migration, and growth of Pacific salmon and surrounding species. The 2022 Expedition included five vessels that were deployed from January through April of 2022 into the North Pacific Ocean, including the F/V Northwest Explorer, which sampled an area of approximately 240,000 square kilometers in the central North Pacific Ocean between April 3 and April 17, 2022. Under the leadership of Chief Scientist Jim Murphy, an international research team of six scientists from the US and Canada participated on the F/V *Northwest Explorer*, including North Pacific Anadromous Fish Commission (NPAFC) Commissioner Tommy Sheridan.



NPAFC Commissioner Tommy Sheridan (left) and the F/V Northwest Explorer research team (photo credit: Tommy Sheridan).

Hailing from Cordova, Alaska, Sheridan, with the assistance of Copper River Watershed Project's Kate Morse, and Kenny Lake School's Jennifer Hodges, successfully connected the F/V Northwest Explorer's work with elementary school students in Kenny Lake, in real time. Throughout the vessel's 14-day expedition, the ship's scientists and IYS support staff were able to provide frequent updates to Kenny Lake School students via the Expedition website, including journal entries, through satellite telephone, and through occasional videos as bandwidth allowed. As Program Director for Copper River Watershed Project, Morse led shoreside lessons with her team of collaborators as Hodges and her students tracked the expedition and expanded their understandings of the Salmosphere to include open ocean research.

Copper River Watershed Project

Based in Cordova, Alaska, the Copper River Watershed Project (CRWP) promotes a salmon-rich, intact watershed and culturally diverse communities by forming partnerships for watershed-scale planning and projects. The CRWP was created to benefit communities along the Copper River, in the upper basin and delta of the Copper River. Its Board of Directors and the Staff of the CRWP are inspired by a vision of helping to diversify the economy of this unique region while sustaining its natural resources and cultural heritage.

Together with its partners, CRWP provides year-round, hands-on, watershed-themed learning experiences for youth of the Copper River watershed. CRWP believes that engaging youth in inspiring education programs that literally immerses them in their surroundings will help develop a strong connection to and sense of responsibility for taking care of their watershed and its resources now and into the future. These personal experiences and connections to their surrounding environment will instill a strong stewardship ethic in the region's future resource managers and harvesters.



Copper River Watershed Project's Kate Morse (top right) and Mt. Eccles Elementary School students in Cordova, Alaska (photo credit: Copper River Watershed Project).

Furthermore, by connecting students from different schools via technology and in the field, we hope to help participants see themselves as members of a watershed community.

Through what is described as a "ladder of engagement" approach, CRWP's education program provides engaging opportunities to students throughout their school years, starting in the classroom where elementary school students raise salmon in aquariums, continuing with stream and pond exploration field trips for middle school students, and culminating in a field-based summertime adventure for high school students known as The Copper River Stewardship Program (CRSP). CRWP also provides internships and scholarships to graduating high school seniors looking to pursue a secondary degree that will benefit the economy, ecosystem, or cultures of the Copper River watershed.

"The Copper River Stewardship Program was the first time I connected my passion for outdoor adventures with science, which helped me select a major that combined those two passions. I will be graduating this spring with a Bachelor's in Geography and plan on applying to the NOAA Corps to become an officer on a research vessel."—Former CRSP participant

Kenny Lake School

Located in the Upper Copper River watershed, Kenny Lake School serves students in the vicinity of Copper Center, which is a rural community of 338. A third of the school's students bus 45 minutes each way to Kenny Lake School from the nearby village of Chitina. Total enrollment maxes out at 60 students, although attendance is lower during the area's frigid winters when many parents opt to homeschool their children rather than brave icy roads.

Originally from Oklahoma, Jennifer Hodges has taught 3^{rd} , 4^{th} , and 5^{th} grade students at Kenny Lake School since 2017.

"After spending the summer of 2017 exploring Alaska from the top at Prudhoe Bay above the Arctic Circle down to Homer and visiting some amazing National Parks including Katmai, Lake Clark, Kenai Fjords, Denali, Gates of the Arctic, and Glacier Bay, I fell in love with the Wrangells and moved here! I am very blessed to call this amazing place my home and to share my passion of learning with the students of Kenny Lake School."—Jennifer Hodges

Hodges's students spend much of their time focusing on practical learning, such as participation in CRWP's "Salmon in the Classroom" program. Permitted through the Alaska Department of Fish and Game (ADF&G), and overseen by Morse, this program provides a unique opportunity for students to get up close and personal with the early life stages of salmon that are usually out of sight (and out of mind) under gravel, ice, and snow. As part of this program, students care for fertilized salmon eggs in classroom aguaria (six schools participate in the program throughout the Copper River watershed, including Kenny Lake School), and then feed surviving fry until they're released the following spring. Says Hodges, "The salmon have turned from being just fish in their backyard that they catch to eat, to fish that they are connecting to. With this project, they have a whole different perspective because they know what it takes to actually go through the stages of a salmon." Hodges continues, "It's really a delicate balance because we are dealing with traditions and culture of the Native people. This is their land, this is their salmon. And so we have to really be part of that."



Kenny Lake School's Jennifer Hodges (top left) and students on the phone with NPAFC Commissioner Tommy Sheridan while aboard the F/V Northwest Explorer (photo credit: Jennifer Hodges).

International Year of the Salmon

It's relatively rare for an American Commissioner at NPAFC to participate in the commission's field work, especially on an assignment as important and demanding as the 2022 IYS Pan-Pacific Winter High Seas Expedition. However, Sheridan has decades of field experience in Alaska's fisheries, and holds multiple fisheries-related degrees and certificates, all of which prepared him for the work. Further, following years of pandemic-induced disruptions to NPAFC's in-person opportunities for engagement, Sheridan was eager to contribute in any way possible. Says Sheridan, "Serving NPAFC as Commissioner is the opportunity of a lifetime, for which I will be eternally grateful. Being able to participate in IYS with the F/V Northwest Explorer's excellent crew and science team was absolutely beyond my wildest dreams and will serve as a pinnacle in my career."

Sheridan was pleasantly surprised to learn of the F/V *Northwest Explorer*'s telecommunication capabilities and was eager to utilize them to connect with students back home. After consulting with the vessel's captain, Chief Scientist Jim Murphy, and IYS support staff, and receiving the green light to reach out to Alaskan students, Sheridan knew exactly who to call first—Sheridan and Morse had collaborated frequently over the years on CRWP's education programs, especially Salmon in the Classroom. And in Hodges, Morse found an eager collaborator who pivoted their traditional focus on salmonids' aquatic life history to include open ocean considerations. The authors hope that future scientific endeavors of this magnitude will incorporate concurrent shoreside student engagement as a prominent component of their operational plans.

In addition to connecting with Sheridan while at sea, Hodges and her students also engaged with ADF&G Fishery Biologist and salmon shark expert Sabrina Garcia to learn more about their research, and its relevance to salmon ecology. These experiences were meaningful and impactful for participating students, some of whom are now considering careers in marine biology. Sheridan, Morse, and Hodges have been proactive in their outreach efforts since the Expedition, with the hope that future scientific endeavors of this magnitude will incorporate concurrent shoreside student engagement as a prominent component of their operational plans. This outreach has included attendance of and a poster presentation at the IYS Synthesis Symposium in Vancouver, Canada, October 2022, and multiple related workshops, in addition to this article. For more information, please see CRWP's and Kenny Lake School's YouTube video hyperlinked below, and connect with Morse, Hodges, or Sheridan at their provided contact information.



Authors' IYS poster submission (left) and YouTube QR code (right) with hyperlink (photo credit: Tommy Sheridan).



Kate Morse arrived in Cordova, Alaska, in 2003 for what was then a few-month internship with the Prince William Sound Science Center, Kate realized that she had landed in one of the most incredible outdoor classrooms on Earth. The few-month internship turned into 21 years and counting of developing and implementing field-based exploration opportunities for K-12 youth in the Copper River watershed and Prince William Sound region, working initially for the Science Center and since 2008 for the Copper River Watershed Project where she is currently the Program Director.



Jennifer Hodges was born and raised in Oklahoma. "I LOVE teaching, especially math & science!!! My favorite things to do are camping, hiking, traveling, reading, and learning! After spending the summer of 2017 exploring Alaska from the top at Prudhoe Bay above the Arctic Circle down to Homer and visiting some amazing National Parks including Katmai, Lake Clark, Kenai Fjords, Denali, Gates of the Arctic and Glacier Bay, I fell in love with the Wrangells and moved here! I am very blessed to call this amazing place my home and to share my passion of learning with the students of Kenny Lake School."



Tommy Sheridan is a fisheries expert based out of Cordova, Alaska. He has lived, worked, studied, and taught in and from Alaska for over two decades, with a focus on commercial fishery management, salmon hatchery operations, and more recently university service through the Alaska Blue Economy Center. Sheridan is an active public servant for several local, statewide, and international bodies, and was appointed as a United States Representative to the North Pacific Anadromous Fish Commission in 2020 where he continues to serve the Commission as Alaska's Commissioner.