Rising Tide

– movement –

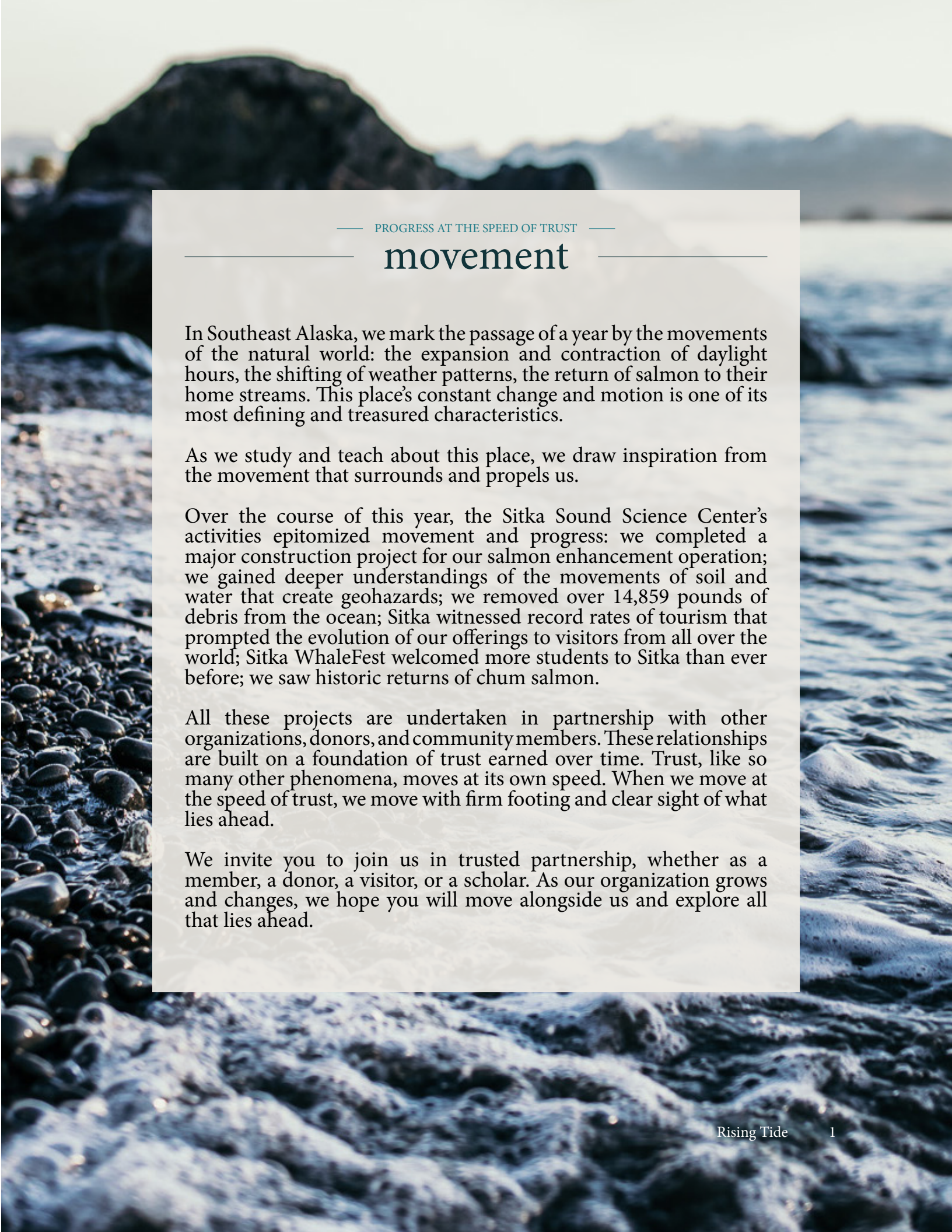
SITKA SOUND SCIENCE CENTER

NEWSLETTER 2023

Contents

We are on Lingít Aaní — Lingít Land. The Lingít people have been indigenous to these lands and waters for over 10,000 years. Gunalchéesh to the Lingít people for their stewardship of Lingít Aaní since time immemorial and today.

Photo Credits:
Zofia Danielson (front cover),
Caitlin Blaisdell, Ryan Morse SCS,
Dustin Angell, & SSSC Staff



PROGRESS AT THE SPEED OF TRUST

movement

In Southeast Alaska, we mark the passage of a year by the movements of the natural world: the expansion and contraction of daylight hours, the shifting of weather patterns, the return of salmon to their home streams. This place's constant change and motion is one of its most defining and treasured characteristics.

As we study and teach about this place, we draw inspiration from the movement that surrounds and propels us.

Over the course of this year, the Sitka Sound Science Center's activities epitomized movement and progress: we completed a major construction project for our salmon enhancement operation; we gained deeper understandings of the movements of soil and water that create geohazards; we removed over 14,859 pounds of debris from the ocean; Sitka witnessed record rates of tourism that prompted the evolution of our offerings to visitors from all over the world; Sitka WhaleFest welcomed more students to Sitka than ever before; we saw historic returns of chum salmon.

All these projects are undertaken in partnership with other organizations, donors, and community members. These relationships are built on a foundation of trust earned over time. Trust, like so many other phenomena, moves at its own speed. When we move at the speed of trust, we move with firm footing and clear sight of what lies ahead.

We invite you to join us in trusted partnership, whether as a member, a donor, a visitor, or a scholar. As our organization grows and changes, we hope you will move alongside us and explore all that lies ahead.

Research

Swimming Upstream

In 2023, five hardworking crew members tackled a summer that brought unprecedented chum salmon returns, a historic glacial flood, and extreme precipitation over the course of the Chum Project field season. Over 6,500 fish were sampled this summer, far surpassing last year's total of 1,000 salmon. This project studies the impacts of straying hatchery salmon on wild salmon populations. The Sitka Sound Science Center has been contracted by the Alaska Department of Fish and Game to lead field data collection efforts on chum salmon populations in Northern Southeast Alaska since 2017. Crews collect information on the life history of chum salmon by sampling otoliths (the ear bones of fish)- to tell if the salmon is wild or hatchery in origin, scales- to age the fish, and tissue samples- to link familial relationships between generations of salmon. Our intrepid field crew sampled record numbers of salmon this summer, which was made all the more impressive as they dealt with their fieldhouse being evacuated due to a glacial dam burst courtesy of the Mendenhall River, along with a large atmospheric river event. With this last field season for the project complete, the next steps are to analyze the vast amount of data collected over the years and to publish results. Ultimately, this research will answer important questions regarding the effects hatcheries have on our wild salmon populations.

Chum Project Crew at Fish Creek

Sitkan Gets Doctorate and a Directorship

In June, SSSC welcomed the return of Dr. Lauren Bell to the research department as our new Research Director. Born and raised in Homer, Lauren received her BS from Stanford University and her MS from the University of Alaska Fairbanks. She worked as a research biologist at the SSSC from 2015-2017, and then stepped away to pursue her PhD at University of California Santa Cruz. For her doctoral research, she studied how seaweed communities in Sitka Sound provide food and habitat for coastal food webs, and how changing oceans conditions could shift these functions. With Lauren's arrival, prior Research Director Dr. Ron Heintz took on a new title of SSSC Senior Researcher. These changes have expanded the department's capacity to build and maintain local partnerships and purse projects relevant to our community

The Scent of a Many-Armed Predator

This summer, SSSC hosted a rotating group of scientists from the University of California Santa Cruz, the University of Oregon, and Oregon State University as they investigated the impacts of returning sunflower sea stars *Pycnopodia helianthoides* along Southeast Alaska's coasts. Sunflower stars are voracious subtidal predators whose populations were virtually wiped out by sea star wasting disease all along the west coast of North America in the last decade. Sunflower stars primarily eat sea urchins, which themselves are voracious predators of kelp. There is intense interest in whether the loss of sunflower stars contributed to the loss of kelp in the region, as well as how sunflower stars might facilitate the recovery of kelp forests. Southeast Alaska is one of the few regions on the west coast where these sea stars seem to be making a comeback. This collaborative group of researchers spent the summer diving on local reefs and performing experiments in the wet labs of

the Science Center with the goal of understanding how both the physical presence and the chemical "scent" of these roaming predators can impact the feeding behaviors of nearby urchins. Their hope is that this research will highlight the complex ways that sunflower stars help shape their environments, so that we can better anticipate future shifts in these marine ecosystems.

Changing the Tides on Trash

SSSC and Ocean Conservancy co-hosted the 38th annual International Coastal Cleanup in Sitka this August near Fred's Creek on Kruzof Island—a beach SSSC cleans annually. An energetic crew of 50 volunteers, including members of U.S. Senator Dan Sullivan's Office, a sponsor of the Save Our Seas Act cut derelict nets from driftwood logs and pulled fragments of plastic out of crevices in the volcanic rocks.

SSSC added new points to our marine debris data, with cleanups as far south as the Rakof Islands and along the eastern side of Baranof Island. Crews consisting of SSSC staff, NSRAA volunteers, and community volunteers worked together to clean these remote sections of coast. These cleanups were completed under contract for the Northern Southeast Regional Aquaculture Association, NSRAA. This project was undertaken in connection with the settlement of an enforcement action taken by the State of Alaska Department of Environmental Conservation for NSRAA's violations of the Clean Water Act.

The 3rd annual Jamie Gorman Memorial Cleanup, was our largest this year. Funded by donations made by friends and family after the death of beloved community member Jamie Gorman, the clean up goes to one of Jamie's favorite surfing spots: the volcanic reef and driftwood piles of Shoals Point on Kruzof Island. We thank the U.S. Coast Guard for their help in air-lifting the 1200 lbs of collected garbage from this remote beach.

SSSC is grateful to our partners who supported us through funding and volunteer power in 2023. We would like to thank those who have donated to the Jamie Gorman Marine Debris fund and volunteers who helped clean Sitka's shores this year. The Science Center's cleanup partners include:

Alaskan Brewing Company
Coastal CODE Program,
Ocean Conservancy,
Senator Dan Sullivan's Office,
Sitka Tribe of Alaska,
Sitka Conservation Society,
Sustainable Southeast Partnership,
Northern Southeast Regional Aquaculture Association,
City of Borough Sitka,
Sitka Trail Works,
Alaska Longline Fisherman's Association,
University of Alaska Southeast,
KCAW Raven Radio,
Central Council Tlingit and Haida,
Takshanuk Watershed Council,
Center for Alaskan Coastal Studies,
Aleut Community of St. Paul Island,
NOAA Marine Debris Program,
Alaska Sea Grant,
Sitka High School,
United States Coast Guard,
Adams Alaskan Safaris,
Gorman Family,
Community Volunteers.

38th annual International Coastal Cleanup, Fred's Creek

Tumbling Trash and Aging Algae

The SSSC research team embarked on an exciting new project under contract with NOAA to investigate the impacts of marine debris on intertidal ecosystems in Alaska. Most of the trash washing up on Alaskan beaches falls in the driftwood lines and wrack --algae that washes up on beaches— in the high intertidal zone. As wrack decomposes, it releases many important nutrients and acts as a fertilizer for the surrounding terrestrial and aquatic ecosystems. It is unknown whether marine debris that is often found in association with these piles of wrack is impacting them. SSSC Research Coordinator, Zofia Danielson, along with Research Director, Lauren Bell, and Senior Researcher, Ron Heintz, developed a small study on a beach in Sitka to address this knowledge gap. Our team installed wire cages filled with fragments of marine debris and kelp that weathered several atmospheric rivers and gales. Over the course of the experiment, the team monitored temperature, light, grazing by the many crawling insects that inhabit wrack piles, and changes in nutrients over time. The research team looks forward to exploring more connections between wrack and marine debris in 2024.

Harnessing Rural Community Networks for Health

Alaskans often view themselves as independent and self-reliant, but during major crises such as the COVID-19 pandemic, it's the coming together that helped people in the North thrive. With funds from the National Science Foundation, SSSC sponsored a workshop called "Beyond COVID: Pandemic Preparedness in the Circumpolar North" which brought together scientists and elders from the Alaskan and Canadian Arctic to share findings and lessons from COVID studies conducted during the pandemic. A common theme during the meeting was that Alaska Natives were able to cross the gulf between self-reliance and community welfare by valuing and utilizing their traditions. Multiple surveys described how many Alaska Natives overcame their hesitancy to get the vaccine through trusted personal connections with friends or family. When food supply chains broke down rural communities responded by relying on traditional food gathering. Some communities sent out hunters and distributed the food to elders; others purchased community freezers or food storage facilities to ensure community members had access to traditional foods. Alaska Native people also reported that collecting traditional food improved their mental well-being. The pandemic was difficult for rural Alaskans and Canadians and the lockdown isolated people from their families and friends. However, the workshop revealed a sense that the pandemic years led to improved communication between the state, tribal health organizations, and communities.

Anne Zink, keynote speaker for the "Beyond Covid Pandemic Preparedness in the Circumpolar north

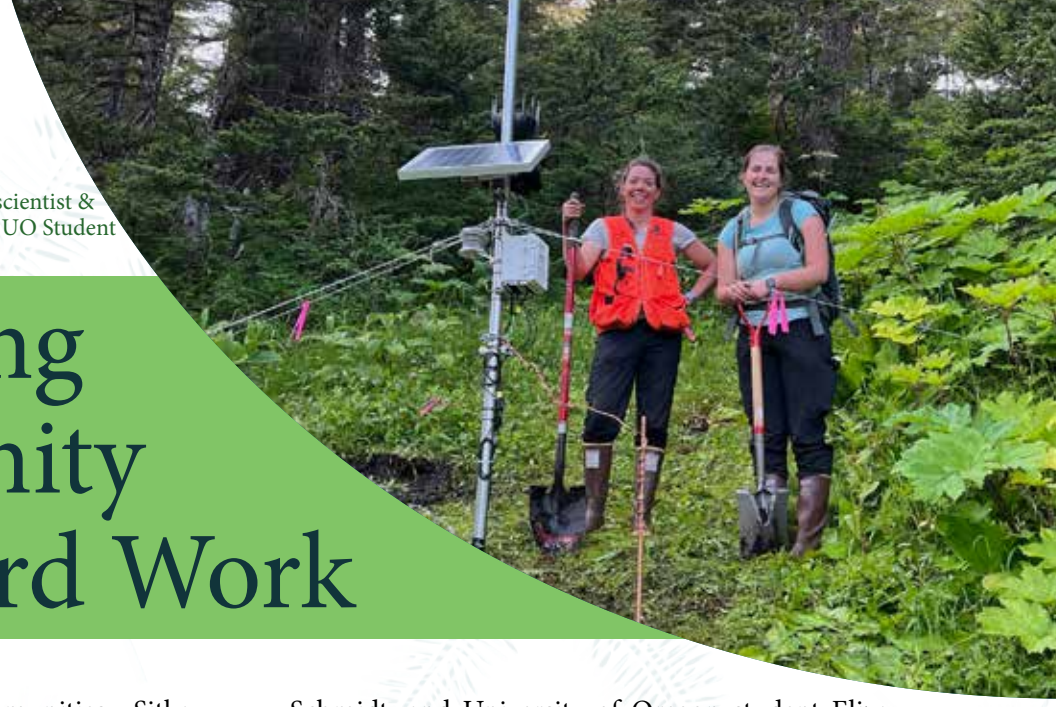
Southeast Tribal Environmental Forum

Central Council Tlingit and Haida (T&H) Indian Tribes of Alaska once again hosted its regional conference in Juneau this August 28-September 1. SSSC Research staff, Senior Researcher Ron Heintz and Lead Geoscientist Annette Patton attended and shared Kutí research updates and learn about environmental management projects led by tribes across Southeast Alaska. Highlights included hearing reports on the invasive green crab monitoring efforts led by Metlakatla Indian Community and registering as official "Weather Spotters" with the Juneau National Weather Service office.

Presenting on a World Stage

Landslide hazards work is a topic of global concern. This November SSSC Executive Director Lisa Busch and Lead Geoscientist Annette Patton attended the Sixth World Landslide Forum in Florence, Italy. It wasn't all espresso and pasta—Lisa and Annette shared important insights about community collaborations and creating warning systems that reflect Alaskan rural values. They also got to learn from international experts about cutting-edge landslide science.

Annette Patton,
SSSC Lead Geoscientist &
Eliza Lawrence, UO Student



Expanding Community Geohazard Work

In partnership with tribal communities, Sitka Sound Science Center is expanding its work on collaborative community-reflected geohazard research around Southeast Alaska. Kutí (the Língít word for weather) is a five-year, $5 million National Science Foundation project that aims to provide geotechnical research that can help rural, coastal communities prepare and protect themselves from landslides and flooding. The project is an expansion of the community-based landslide warning system that was developed in Sitka after the deadly landslide of 2015 that killed three people and destroyed property. The Kutí approach relies on building trusted relationships between tribal council members and environmental staff, research scientists, and agency experts. The six communities (Hoonah, Skagway, Yakutat, Craig, and Kasaan) have expressed a need to be better prepared for landslides and flooding. Residents and hazard experts share their knowledge and conduct research in a way that will help the community members stay safe from the increased risk of natural hazards that is a result of climate change.

Crawfish Inlet

This year the research scientists worked with environmental manager in Hoonah, Klukwan, and Skagway to better understand the geology of each community. In July, SSSC lead geoscientist Annette Patton, Central Council Tlingit Haida Indian Tribes of Alaska's Regional Geoscience Specialist Jacyn Schmidt, and University of Oregon student Eliza Lawrence spent time in Hoonah understanding how the complex limestone hydrology relates to landslide processes. Water in limestone behaves differently than in most landscapes, flowing through cracks and conduits, sometimes disappearing in sinkholes and returning to the surface at springs. Those pathways can be hard to predict from topography alone! If water follows different patterns, landslide initiation may also occur in unusual patterns.

Later in the summer, Kutí partners, guest experts, and Klukwan residents gathered in Klukwan to convene a workshop about geohazards. Residents of the Chilkat Valley are familiar with landslide and flood impacts, with abundant knowledge about the landscape. Alaska geoscientists and hydrologists have also spent decades learning about landslides at the 19-mile and 23-mile debris flow fans that cross the Haines Highway. The workshop brought together these diverse perspectives to get a clearer sense of which areas near the village are most exposed to geohazards. Sharing this extisting knowledge is a critical step in clarifying what data our project team might use to refine hazard maps and risk estimates in the villages.

In Skagway, hazards come from rockfall along cliff bands more than from rain-induced landslides. This process poses different challenges,

Ron Heintz, Senior Researcher, surveying land slide

because it can be very difficult to predict the multiple potential triggers of rock fall. In mid-September, University of Oregon student Ian Wachino and collaborators traveled to Skagway to deploy an array of environmental seismometers on the ridgeline above town. The 36 "nodes" operated in place for about a month, recording small seismic waves from environmental perturbations like waves or vehicle traffic. These measurements may identify which disturbances are "felt" most by the mountain, but their main use is to characterize rock strength and identify zones of weakness like fractures in the rock slope. In combination with the high-resolution topographic data that was collected earlier in the summer, Ian and his collaborators will be able to estimate if there are specific areas along the ridgeline that are most susceptible to rock fall.

Other branches of the Kutí project are led by SSSC collaborators, including outreach and environmental sensing workshops organized by engineers at Oregon State University and with support from Hoonah Indian Association, T&H, and the SSSC. Social scientists at RAND Corporation have begun conducting interviews with local experts in each community regarding risk perception. Themes from these interviews will inform the design of risk reduction strategies and communications. And finally, Atmospheric Scientists at the Center for Western Weather and Water Extremes and the National Weather Service in Juneau are collaborating to characterize regional weather patterns and determine which Atmospheric Rivers are most likely to result in major impacts.

These ongoing collaborations in Klukwan, Hoonah, and Skagway all rely on the close partnerships with Daniel Klanott, Morrigan Shaw, Natalie Dawson, and Jessica Kayser-Forster (Chilkat Indian Village), Hoonah Indian Association, and Skagway Traditional Council, as well as the individuals in each community who have led our partnerships. Additionally, growing partnerships with Yakutat Tribe, the Organized Village of Kasaan, and the Klawock Indigenous Stewards Forest Partnership are illuminating existing knowledge and directions for future research in Yakutat and on Prince of Wales Island. Project partners also include Jacyn Schmidt and other researchers at Tlingit and Haida, Kari Lanphier with Oregon State University, Josh Roering with University of Oregon, Rob Lempert and Peggy Wilcox with RAND Corporation and Scripps Center for Western Weather and Water Extremes. The project also collaborates with the National Weather Service, US Forest Service, US Geological Survey, and the Alaska Division of Geological and Geophysical Surveys, and of course, our own Annette Patton and Ron Heintz.

Kutí

Língít meaning weather

tlingitlanguage.com/dictionary

The Kutí project is a partnership between tribal communities and Sitka Sound Science Center to expand work on collaborative community-reflected geohazard research around Southeast Alaska funded by the National Science Foundation.

Brian Ulaski leading a snorkeling group

SIRF's Up

This year, SSSC was honored to host two scientists for our Scientist in Residency Fellowship (SIRF) program: Dr. Brian Ulaski and Dr. Deanna Nash.

The fellowship brings scientists from a wide range of disciplines to SSSC for a one-month mini sabbatical. While in Sitka, the researchers practice their communication skills and learn how to engage with rural Alaskans. This program is funded by the University of Alaska Fairbanks National Science Foundation Established Program to Stimulate Competitive Research (EPSCoR) and the National Science Foundation Coastlines and People (Kutí) Project.

BRIAN ULASKI is a postdoctoral researcher in the College of Fisheries and Ocean Sciences at the University of Alaska Fairbanks. As a marine ecologist, Brian studies how suspended oyster and seaweed culture techniques used in Alaska mariculture influence biological communities at established farm sites. During his stay in Sitka, he led a seaweed-focused community snorkel at Magic Island, taught Mount Edgecumbe High School students about urchin grazing effects on kelp forests, participated in a KCAW morning interview, and presented at a University of Alaska Southeast Natural History Seminar about his graduate work on the effects of seaweed harvest in Alaska.

DEANNA NASH is a postdoctoral researcher for the Center for Western Weather and Water Extremes at Scripps Institution of Oceanography, University of California San Diego. Deanna's research as an atmospheric scientist focuses on improving our understanding of meteorological conditions during Atmospheric Rivers—weather events that result in extreme precipitation and increase the risk of landslides and floods. During her stay, she not only experienced an atmospheric river, but also presented about her work modeling atmospheric rivers at a UAS Natural History Seminar, participated in a KCAW morning interview, and led a community "Cloud Walk" to Heart Lake, where Sitkans learned about common clouds in Southeast Alaska.

Facility Updates

Blake Conaway, Facilities Manager & Chance Gray, Operations Director

We are so SPIFy

Sitka Sound Science Center's new Spawning Platform and Incubation Facility (SPIFy) got its ribbon cut by three stars in the Science Center flag. The line up included (Little) 12-year-old Chance Davis, who volunteered in the hatchery while his dad Colum worked on the CBC Construction crew that built the facility; Marina Olney-Miller who was a high school hatchery intern (and artist); and Angie Bowers, past SSSC aquaculture director and current mariculturist and professor at University of Alaska Southeast Sitka. The facility is already many times more efficient than the 1970s era "spawn shed" it replaced. With incubation and spawning co-located, the 1100 square foot building means less hauling of equipment and supplies between buildings. Most importantly, students can learn on modern aquaculture systems helping to produce a workforce that is needed by the half billion-dollar salmon aquaculture industry here in Alaska. CBC Construction built the technical facility which has a spawn platform, new raceways and a multipurpose educational room in addition to a new incubation area.

Funding support from: Murdock Trust Rasmuson Foundation; Northern Fund of the Pacific Salmon Treaty; Northern Southeast Alaska Regional Aquaculture Association; Douglas Island Pink and Cargill Incorporated; USDA- Senator Murkowski (ear mark); Board members: Trish White, Rob Allen, Elizabeth Bagley, Alana Petersen, Linda Waller, Kitty LaBounty, Michael Mausbach, and Drew Wilson.

Historic Pipe Gets Makeover

The freshwater that is diverted from Indian River to Sitka Sound Science Center for the salmon hatchery travels in a 112 year old wood stave pipe underground for 1100 feet. Over the years, the pipe has erupted and flooded an above ground building on the Sheldon Jackson Campus. Because the 42-inch diameter pipe is not full of water all the time, it has begun to rot in some places. To maintain its water security, SSSC is "slip lining" the wood stave pipe with a modern high density polyol ethaline pipe and cementing them in place. Local K and E Construction will be completing the work.

Aquarium, Laboratory and Grounds (AL-G) – Oh My!

With three phases of its master plan completed, SSSC is ready for the fourth phase. The Aquarium Laboratory and Grounds (AL-G) project will improve, overhaul, and modernize the inside of the Sage building which include remodeling the Molly O. Ahlgren Aquarium, updating the wet and dry research laboratories, updating the mechanical and electrical system, and redesigning the outdoor space to be more attractive. With input from 80 people in the community, SSSC has enlisted a team of designers and has already completed the first 35% of the design work. Architect Steve Simpson is heading an amazing the team including James Peterson designing the aquarium, REspec working on engineering, and Anderson Planning designing the landscaping. The project is expected to cost $8 million.

Completed SPIFy

Education

Scientists in the Schools Weighs In

The sea urchin is carefully selected, weighed, and placed in a small, enclosed chamber for the next 6 hours. Two equally carefully weighed and sketched squares of seaweed are added to the chambers. Scientist in the Schools Dr. Brian Ulaski asks the class to weigh in - which will the urchin prefer - sugar kelp *Saccharina latissimi* or sea lettuce *Ulva lactuca*? Most of the Mount Edgecumbe High School Marine Biology students vote for sea lettuce, basing their hypothesis on what they have just learned about the unique feeding structures of urchins, others vote for sugar kelp because it tastes so good. Prior to the experiment, Brian described the role of urchins in kelp forest ecology and how their feeding behaviors affect their environment. Twenty four hours later the students will weigh and measure the remaining seaweed and collaborate to draw conclusions about urchin preferences in seaweed.

Hailee Rae Chavarillo
photo credit Dustin Angell

Dr. Ulaski is part of the Science Center's Scientists in the School program, which brings scientists into every grade level so Sitka students can learn about emerging topics in aquatic, marine, and terrestrial science from working scientists. Earlier in the year, Dr. Joanna Young brought 9th graders into the field to illustrate the importance of observations in asking questions. In 8th grade, Dr. Scott Gabara facilitated a mussel shell strength unit as part of the grade level's chemistry unit. 5th graders examined squid adaptations by conducting an eye length to body length comparison between squid and humans with visiting scientist, Dr. Ben Burford. Biomimicry inventions with Dr. Lara Roketenetz allowed 2nd graders to understand animal adaptations and survival. Kindergarten is not too young for important science experiences. Dr. Alexis Will enjoyed creative play with kindergarteners so that they felt like seabird scientists and understood the importance of healthy oceans for seabird survival.

We are not alone in our commitment to such impactful connections between scientists and students. Our hopes for our young people are shared by Royal Caribbean Group, who are currently funding this extraordinary program for the second year in a row.

University of Alaska's Established Program to Stimulate Competitive Research (EPSCoR) also supported the SIS program through placement of five fine scientists in Sitka last year.

Sarah Tobey, science education & community coordinator with student in an ACE-IT program | photo credit Ryan Morse SCS

ACEING IT

Adventure, Community, and Engineering were the central themes of a grant partnership between the SSSC, the City and Borough of Sitka Parks and Recreation, and Youth Advocates of Sitka this summer. In a program called ACE-IT, these core values created fun and enriching summer programs for Sitka youth and families as well as unusual learning experiences for young staff and educators. Funded by the State of Alaska's Department of Early Education and Development, ACE-IT is dedicated to summer programs in Sitka.

Chart Your Course

Maritime career pathways took centerstage this summer through "Chart Your Course", a weekly summer education program for secondary students to gain understandings about careers important in our community and beyond. Participants learned to inspect scuba tanks as part of a scientific diving session with divers Lauren Bell and Chance Gray. In a following session, they worked through a 2-page checklist of boat engine maintenance tasks with wildlife charter captain Davey Lubin. For the capstone session, the group was privileged to be treated to a behind the scenes tour of a Royal Caribbean cruise ship capped by a lunch aboard. The Royal Caribbean leadership and the ship's engineers, navigators, and captains explained the fascinating systems of the huge ship and the responsibilities of officers in charge of safe cruising. Of course, the endless buffet of food and desserts is likely to be the sustaining memory of such a remarkable experience.

Science Stories Make for A Library of Fun

SSSC and Sitka Public Library's youth program teamed up to create a summer education program that integrated stories of scientists, reading and science activities. Each week, free programs in the library multi-purpose room for kids ages 6-12 celebrated the life and work of a scientist who has been under-represented or unrecognized in their field. Sitka's burgeoning young scientists dove into activities inspired by the work of the scientist in the story. Kiddos performed chemistry experiments, engineered mousetrap cars, and learned how worms create soil. Science Center staff packed everything from art materials to high-powered microscopes over to the library to provide science and engineering programs for all.

Students explore the intricacies of a lingcod skull

STEMing from Traditional Knowledge

"Science and traditional knowledge may ask different questions and speak different languages, but they may converge when both truly listen to the plants." – Robin Wall Kimmerer

With funding from Sealaska Corporation, SSSC partnered with Sitka High School on a project that examines this convergence of knowledge. Following the guidance of our SeaSTEM Advisory Committee, SSSC educators sought pathways to engage Sitka High Schoolers in technical training based around cultural knowledge. Through a unit developed with Sitka High's Traditional Ecological Knowledge course taught by Caitlin Woolsey, high school students completed a research project concerning the health of xáay, yellow cedar, in Sitka. Connecting climate issues with traditional knowledge of yellow cedar made the lessons much more impactful to students. Several community members and culture bearers shared their knowledge with the group to expand their learning. SSSC education and research staff worked with students to develop foundational skills for working in the field with monitoring devices. In small groups, students came up with their own research questions, set up field sites, collected the data, and prepared final presentation posters. The Science Center supported seven modules in the Traditional Ecological Knowledge course, including field preparation, field monitoring, installing new monitoring equipment, field research, research presentations, salmon smoking, and drum-making.

All the students presented their findings to community members in Sitka, while nine of the students traveled to Juneau in April to present their research alongside other students from Southeast Alaska. Finally, research from a small yellow cedar stand in Sitka, Alaska moved from the local stage to the national stage as three TEK class students brought their research to the national AISES conference (American Indian Science and Engineering Society) in Spokane, Washington with SSSC staff. Not only did they participate in a high school poster session with other students from around the country, but they also toured a nearby university, attended science lectures, and networked with Indigenous STEM professionals.

Chiming In

Partnerships within our community inspire new ideas and enrich our learning, so imagine our excitement when the SSSC education team was invited to visit the Alaska Youth Stewards in Hoonah with Central Council of Tlingit and Haida (CCTH) and Oregon State University (OSU). The Oregon State University's "OPENs Lab" creates open-sourced environmental monitoring equipment that is currently deployed at yellow cedar stands in Sitka for high school research. Their Weather Chimes offer a plug-and-play style sensor that can measure soil temperature and moisture, air temperature and humidity, rainfall, light, and more.

The Alaska Youth Stewards in Hoonah are paid high school students who gain experience in fieldwork, community service, and cultural stewardship to support the Hoonah Indian Association (HIA) throughout the summer. In June, Sarah Tobey SSSC, Jacyn Schmidt CCTH, and OSU undergraduate students Bryce Truong and Alexei Burgos-Davila

Pauline Duncan teaching
traditional food processing techniques
photo credit Ryan Morse SCS

brought four Weather Chimes to the students, showed them how they work, and worked with the team to deploy the sensors at four locations around Hoonah. The sensors are going to be used to monitor streams and habitats that may be impacted seasonally. Deployment was successful, and the Alaska Youth Stewards team were able to provide feedback to adjust the Weather Chimes to be well-suited for harsh Alaskan seasons. The experience in Hoonah will certainly inspire our own efforts in workforce development programs.

Purvis-Calvin Scholarship

With generous donations from Bob and Mary Purvis, Sitka Sound Science Center was able to award a scholarship to a graduating senior in May of 2023. In the summer of 2022, rising senior Warren White was selected for a paid hatchery internship funded through a National Science Foundation grant called Aquaculture Science Knowledge (ASK). Warren discovered a special affinity for systems work, such as plumbing systems, and applied for a facilities assistant after school position funded by the Purvises. Warren worked after school and on Saturdays through the entire school year. His work ethic and consistent cheerfulness made him an invaluable staff member. Unanimously, the staff voted to celebrate Warren's fine work with a scholarship to support his post-secondary endeavors. Warren wrote a reflection about his experience at the Science Center. "Each workday, I had a different task or tasks to do, one of my favorite things about the job. Because the day-to-day work is so varied, so is the stuff I have learned." Warren was able to publicly express his gratitude to Bob and Mary at the "Salmon Release" community celebration. We are grateful as well that Bob and Mary chose to invest in high school students in Sitka.

South Meets North

As many Sitka residents know, stepping out of the Sitka Rocky Gutierrez Airport for the first time inspires awe and excitement. SSSC has greeted grinning groups of visiting students off the tarmac through our field course program for over 10 years. Often, as is true with schools like the University of Exeter or Maybeck High School, the instructors look forward to their annual return, smiling just as wide as their students. This year, we were fortunate to have a new field course visit us from Auburn University in Alabama led by Dr. Christopher Berk.

Dr. Berk was a student of Sitka naturalist Richard Nelson and of University of San Francisco's Drs. Sharon and George Gmelch in 2004 on a field course to Tasmania and remembers it as one of the most influential aspects of his educational journey. As a professor, Chris looked forward to being able to provide a similar experience for his students. Dr. George Gmelch encouraged Chris to lead a program in Sitka, sharing his tips and tricks gathered over the years. The students from Auburn University met with experts in Sitka's community to take a deep dive into our local culture from traditional arts to fishing.

University of San Francisco

As Dr. Chris Berk states, "Students have told me they learned more in 8 days than most full-semester courses they have taken. I loved hiking through the landscape, our many wonderful speakers, tours, and other experiential learning moments."

Mathias Bowers leading a Tide Pool Walk

Science "Modeling"

As part of the Organnizaton of Biological Field Stations, SSSC participated in an exchange with a distant Field Station to share ideas about programs and their successes and challenges. We were fortunate to welcome Dustin Angell, Director of Education from Archbold Field Station in Florida. Dustin's stay coincided with "Shellfish Camp", a spring break camp for youth offered in partnership with Sitka Conservation Society. The students explore shellfish from every angle – anatomy, art, cooking, and field expeditions. Dustin generously contributed to this camp by taking stunning portraits of participants as part of an innovative arts project at his field station ccalled "My Science Future" that develops science identities in children. Each of our campers literally saw themselves as scientists by posing with scientific tools and clothing.

Being an Aquarist Has Lots of Potential

Blatchley Middle schoolers were able to get a glimpse at what it's like to be a professional aquarist this year during Discover Your Potential week. Students who came to SSSC had a crash course in what it takes to oversee an aquarium and care for its inhabitants, including feeding resident critters, observing behavior and interactions between species, and observing medical treatment. Highlights from the week included students building their own miniature aquariums that showcased a small, easily overlooked species, and examining a plethora of parasites under microscopes.

Mageda Nader teaching visitors about the hatchery

Increasing Access to the Aquarium

SSSC staff worked with Sitka School District (SSD) this fall to offer a free annual membership opportunity to all SSD families who qualify for Free and Reduced Lunch. The Octopus Membership pilot program provides broad community access to our aquarium throughout the year.

Salmon and Science on Tour

In 2023, Sitka received more than twice the cruise ship passengers it did in 2022. This dramatic increase in visitation led to record numbers of visitors to the Sitka Sound Science Center. In response, our interpretive staff increased their commitment to storytelling, collaboration, and fun. This year, SSSC emphasized providing a context for visitors to understand our unique community and our breathtaking ecology through the unifying theme of salmon. Our engaging interpreters developed and refined tours of the hatchery that emphasized their own unique interests. Everyone told the story of salmon in Southeast Alaska through a personalized lens, such as conservation, geography, understanding where your food comes from, or the human relationship with nature. Over 25,000 visitors left with new understandings about our way of life and their own personal connection to ideas of place and sustainability. When not guiding tours or introducing guests to local marine life in the aquarium, interpreters dedicated themselves to independent projects used to educate the public beyond the summer season.

Sitka WhaleFest

The Sounds of Science

Record audience numbers showed an interest in this year's WhaleFest theme: Sound Science: Voices from the Ocean. We explored "sound" science from a variety of angles: using sound waves for communication within the ocean, how scientists use sound to study underwater ecosystems, diverse approaches of inquiry in our natural world, and connections to current research in Sitka Sound.

Heidi Pearson presenting at WhaleFest

Speakers came to present their research that ranged from sonification of arctic landscapes to Sitka Sounds' seaweeds. Speakers included: Lauren Bell (SSSC), Kevin Boswell, Kim Goetz, Matthew Burtner, Christina Bonsell, Heidi Pearson, Erin Falcone, J. G. M. "Hans" Thewissen.

Two of Sitka WhaleFest's stalwarts, Craig George and Don Sineti, were honored during WhaleFest by whaling captain Billy Adams, Kate Stafford, Michael Castellini, Jan Straley, and Madison Kosma.

Craig George presented at WhaleFest numerous times. One of his more memorable talks was with whaling captain Billy Adams and ended with the sharing of muktuk among the audience in 2016. He is remembered by his joyous spirit and musical talent that he often shared during research trips and at the Maritime Grind alongside Don Sineti. Don attended more than 15 years of WhaleFests as a shantyman, a maritime history expert, an artist, and a teacher. He visited the elementary schools and gave performances to a myriad of Sitka audiences from the preschool to the pioneer home. This year, David Moore, Don's annual Sitka host and long time friend, honored Don during the Maritime Grind. Both men brought a wonderful spirit of curiosity and joy to WhaleFest that will not be forgotten. We are grateful for their contributions to our community events.

Sitka WhaleFest was made possible by an amazing crew of SSSC staff, volunteers, and so many others. Sponsors and donors included Sandra Kincheloe, Sitka Seafood Market, North Pacific Research Board, Saltchuk Family of Companies, Grenold and Dorothy Collins, Alaska Airlines, National Science Foundation, Southeast Alaska Regional Health Consortium, Rachel Myron and Steve Lewis, and Allen Marine. Sponsoring WhaleFest not only helps to bring world-renowned scientists to Sitka for our symposium, but also supports our programs encouraging students to engage in STEM (science, technology, engineering, and math) majors and careers. For more information on sponsorship visit SitkaWhaleFest.org

Robert Hoffmann teaches formline design

The Sounds of Students

WhaleFest 2023 became the hot spot for marine-minded high school and undergraduate students attracted by an impressive line-up of speakers, dynamic education workshops, and fun opportunities to mingle with peers. Nearly 100 visiting students and coaches/chaperones from across the region registered this year with additional local high school students attending lectures. Students reveled in workshops like ROV Challenge hosted by Prince William Sound Science Center; Marine Mammal Necropsy led by Sitka High School teacher Stacy Golden and other supporting scientists; and Whale Metal Art taught by Sitka High School teacher, Mike Viera. Adults had opportunities for their own fun by combining art, cooking, and adventure with science in a handful of workshops. Well-known

Mary Goddard hosting the Tongass to Table Workshop

local artist Norm Campbell inspired illustrators with drawing activities and exercises in his scientific illustration workshop. Participants were thrilled when WhaleFest speaker Hans Thewissen joined the workshop and added a scientific perspective by describing the back-and-forth process that happens between scientists and artists in the pursuit of information- heavy illustrations.

Making Waves

5th-grade teachers at Keet Gooshi Heen Elementary went the extra mile to incorporate this year's WhaleFest theme of Voices of the Ocean into their students' artwork. One teacher, Jen Reid, explored the concept of sound waves and sounds in the ocean with her students by using marine mammal recordings from NOAA. Their final art pieces contained artistic interpretations of the selected marine mammal, their sound in spectrogram form, and their preferred habitat. Finally, the students learned how to make QR codes that sent viewers to a spectrograph recording of the selected marine mammal.

Penelope Ford, 4th grade | Student Art Show

Hatchery

Bill Coltharp,
Aquaculture Director

New Incubation Room

The hatchery's new incubation building came online July 31st after the custom plumbing system was installed. This is not your usual gravity-fed incubation building. This incubation facility is equipped with state-of-the-art automatic valves, pumps, and sensors to control all water needs as they arise. Multiple water sources and back-up pumps were added to ensure animal health at all times. The automatic controls that run the systems will detect low water, high water, and pump and power outages, sending out alarms while automatically switching over to the backup system needed. We have had lots fun using the new facility for the first time with the Sitka High School, Pacific High School, and the University of Alaska Southeast Aquaculture students.

Emma Spies hanging barrier net

Chumageddon!

We experienced one of the biggest chum returns this year, with roughly 40,000 chum salmon making it into the raceways. We share our permit for chum eggs with the Northern Southeast Regional Aquaculture Association (NSRAA), and we were able to get an extra 9 million eggs from chum out of our raceway and send them to Medvejie hatchery to assist in their egg take efforts.

New Hatchery Apprentice

This summer, we welcomed Emma Spies as our newest crew member. Emma was born and raised in Southern Maine. She attended the University of Maine where she studied marine sciences. She completed the University of Alaska Dive Semester back in 2019 and quickly fell in love with Sitka. The one year apprentice program allows for learning about the seasonality of hatchery work.

Another Successful Year of ASK

It was another successful year of the Aquaculture Science Knowledge program. Macee Steinson, Theo Everson, and Annan Weiland joined us for three months of hard, fun work this summer. Thanks to a grant funded by the National Science Foundation, high school students can learn not only aquaculture-related skills, but also basic work-related skills.

Aquarium

Nudi Recruits

The similarity between natural water aquariums and a box of chocolates is that you never know what you're going to get. This year we received a variety of nudibrachs. Because our aquarium uses water piped directly from Sitka Sound, the water in our tanks is full of a multitude of microscopic organisms floating in with the tide. Most marine life starts as small plankton before maturing into their larger, more recognizable forms. These plankton travel with the water currents and sometimes find themselves settling within our tanks. We call this process recruitment and some of our favorite recruits are sea slugs!

This year we saw many different slugs, mostly nudibranchs, from the common opalescent nudibranch *Hermissenda crassicornis* and red-gill nudibranch, *Coryphella verrucosa*, to some more unusual species like hooded nudibranch *Melibe leonine* and giant dendronotid *Dendronotus iris*. These incredible animals have abilities ranging from being able to steal stinging cells from their prey, consuming toxic sponges, or diving down into the sand to chase a meal.

Puget Sound king crab
Echidnocerus cibarius

Greater Moon Jellyfish
Aurelia labiata

Parenting of Crabs

How do you care for a crab? Aquarist Matt Wilson always has this on his mind. All aquatic animals need food, a safe habitat, and clean water, but as Matt works with these animals he's learned that there's a lot more to the details and nuance of being a good crab parent. Each species of crab has different needs, and these differences require different care and husbandry strategies.

This year we've seen species like our brown box crab, *Echidnoceros foraminatus*, make it through the challenge of molting its old shell. These crabs are very slow growing and molt only every other year, so when the time comes, it's crucial for the crab to have had lots of calcium-rich food like mussels and urchins to have the energy and nutrients to grow the new shell underneath. They also need a safe place to hide since they will be soft and vulnerable. We were delighted to see ours in a fresh new shell this January.

Our Puget Sound king crabs, *Echidnoceros cibarius*, have continued to grow with each molt revealing new colors. One of them was missing a pair of legs due to an injury a year ago, but now they have regenerated, and you'd never know they were gone.

Meet our Team

WELCOME ABOARD

Lauren Bell
Research Director

Lisa Teas Conaway
Communications Coordinator

Emma Spies
Hatchery Technician Apprentice

Ian Derauf
Jesuit Volunteer

Maia Carter
After-school Educator

Junior Calhoun
Maintenance Apprentice

Ella Neumann
Research Data Manager

Lena Keilman
Retail / Education Intern

NEW PATHWAYS

Alana Peterson
Served as SSSC Board Treasurer
remains on SSSC finance committee

Minh Iwamoto
Big Sky Ski Resort in Montana

Emily Klawitter
Fisheries Technician with
LGL Environmental Associates

Alex McCarrel
Groundfish Biologist with
AK Department of Fish & Game

CORE TEAM

SSSC Staff

Lisa Busch
-Executive Director

Janet Clarke
-Education Director

Lauren Bell, PhD
-Research Director

Nagham Sabah
-Finance Director

Bill Coltharp
-Aquaculture Director

Chance Gray
-Operations Director &
Dive Safety Officer

Ron Heintz, PhD
-Senior Researcher

Blake Conaway
-Facilities Manager

Amy Rowe
-Retail Manager

Lina Kapp
-Visitor Experience
Manager

Brooke Rivera
-Administrative Manager

Matt Wilson
-Aquarist

Annette Patton, PhD
-Lead Geoscientist

Zofia Danielson
-Research Coordinator

Sarah Tobey
-Science Education &
Community Coordinator

Kari Paustian
-Education Coordinator

Haley Jenkins
-Fish Culturist

SSSC Board

Rob Allen
Michael Mausbach
Trish White
Kitty LaBounty
Linda Waller
Elizabeth Bagley
Drew Wilson

One Cent for Salmon

Silver Bay Seafoods proudly donates one cent to science research and education at SSSC for every can of salmon they sell.

MISSION

We are dedicated to increasing awareness and understanding of aquatic, marine, and terrestrial ecosystems of coastal Alaska through education and research.

VISION

To be the leading scientific and educational institution in coastal Alaska through innovative, inspiring, and community-centered programming.

VALUES

Integrity — We model scientific integrity through evidence-based research and accessible educational programming.

Curiosity — We believe that a playful curiosity of the world inspires innovation and growth.

Respect — We honor and respect the history of this place and look towards its future to inform our present decisions.

Community — We build relationships across our community in support of a shared appreciation for discovery and overall community well-being.

Membership

Love to visit the Science Center or have your kids participate in our summer camps? We've got a membership level that's right for you!

$30
Seedling
Unlimited admission for 1 person for 1 year.

$50
Seastar
Unlimited admission for 2 people for 1 year.

$75
Grizzly
Unlimited admission for 3 people for 1 year.

$100
Salmon
Unlimited admission for 5 people for 1 year & 25% discount on summer camp registration.

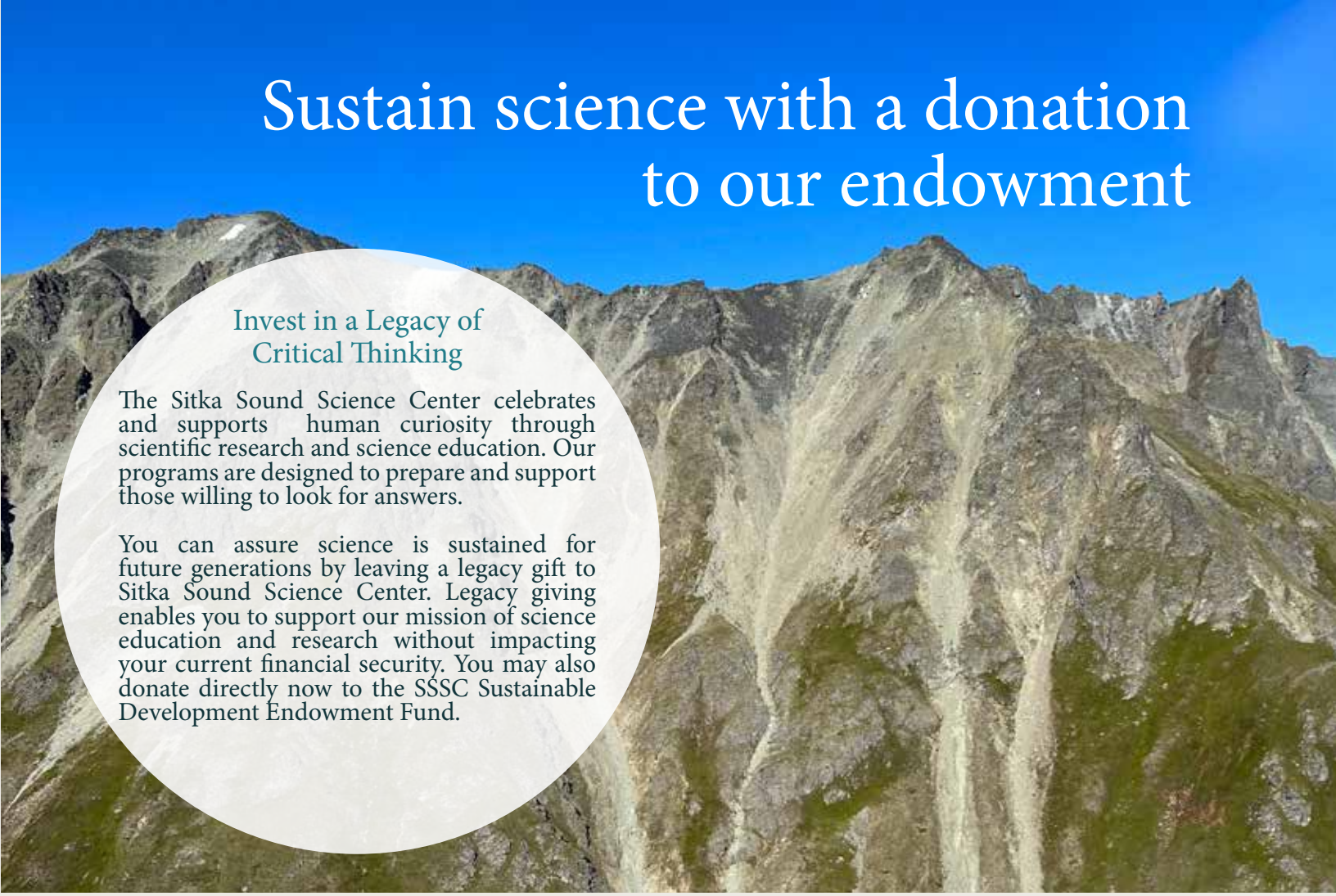
$200
Humpback
Unlimited admission for 8 people for 1 year, SSSC water bottle, & 25% discount on summer camp registration.

AMPLIFY YOUR SUPPORT

Join the Donor Circle

Want to take your Sitka Sound Science Center membership to the next level? Become a member of our Donor Circle. Your support helps maintain our facilities and programs, such as the aquarium, hatchery, Sprouts, WhaleFest, and much more.

Sustain science with a donation to our endowment



Invest in a Legacy of Critical Thinking

The Sitka Sound Science Center celebrates and supports human curiosity through scientific research and science education. Our programs are designed to prepare and support those willing to look for answers.

You can assure science is sustained for future generations by leaving a legacy gift to Sitka Sound Science Center. Legacy giving enables you to support our mission of science education and research without impacting your current financial security. You may also donate directly now to the SSSC Sustainable Development Endowment Fund.

How to Ignite Future Generations

A will that includes the Sitka Sound Science Center as a charitable beneficiary includes simple bequest language to benefit SSSC. The bequest can be structured in a variety of ways. Some donors elect to leave a specific dollar amount or a percentage of their estate. Others choose to designate a particular asset such as a real or personal property. After providing for friends and family, you can elect to give a portion of your remainging estate to SSSC. In this way, the donor's specific distributions are handled first, and whatever is left sustains science education and research into the future. Your contribution will go into SSSC Sustainable Development Endowment Fund which is managed by the Juneau Community Foundation.

Let's begin with a conversation.

You can contact us any time to discuss your ideas or to answer questions. We are here to work with you through the details of how your gift will be used and what options are available.

Lisa Busch, Executive Director
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Thank you to our lifetime members

Robert Allen
Chris Balovich
Marilyn Blanck
Murray Bodine
Iris Busch
Jordan Busch
Larry Calvin
Valerie Edwards
Barbara Hames
Roger Hames
Martha & Bruce Karsh
Rose Manning
Hunter McIntosh
Rachel Myron
Bob Purvis
Sam Skaggs
David & Margaret Steward
John Tisdale
Trish & Dirk White
Russ Wilson
Nancy Yaw Davis

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