



CEDAR COAST FIELD STATION

"To preserve ecological health through place-based research and education that celebrates the cultural and biological diversity of Clayoquot Sound."

ANNUAL REPORT **2018**

www.cedarcoastfieldstation.org





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Introduction

What an incredible season 2018 has been! As our first full operating season, it has been a great period of learning, development, and accomplishment at CCFS. From youth education to marine and terrestrial research, the 2018 season has seen a diverse array of students, educators, researchers, and volunteers from around the world.

Youth education groups at the primary and secondary levels have explored Vargas Island and Clayoquot Sound, while studying marine mammals, surveying micro-plastics, and examining microorganisms. In-house and visiting summer camps have explored the coastline in kayaks, studied with whale biologists, and honed their outdoor skills. Courses from the secondary and post-secondary levels have also visited CCFS, discussing some of the larger challenges our planet faces in the fields of sustainability, anthropogenic stress, and climate change.

Through the generous support of community members, local organizations, and visiting groups, we have also been able to launch a range of in-house research initiatives. Our juvenile salmon monitoring program has had a successful preliminary season, and we are charged to undertake our first full season of a more substantive and comprehensive program. This season also saw the addition of research initiatives in the fields of micro-plastics, forest ecology, and biodiversity assessment. In addition to our in-house activities, we are looking forward to working with many new partners, including The Hakai Institute, BC Parks, and Nuu-Chah-Nulth Fisheries.

This season would not have been possible without the many volunteers who have helped keep the station running smoothly. Volunteers have been a key part of the CCFS team, contributing to our research initiatives, assisting our visiting

groups, and maintaining a clean and healthy environment at the station. We look forward to having many of them return for the 2019 season.

Looking to the future, we are excited to announce that in 2019 we will be operating out of a newly repurposed state-of-the-art facility, custom built to the needs of our education and research community. While the Vargas Inn has been a vital part of our first two seasons in Clayoquot Sound, we are eager to move in to our new home—a facility that will be better equipped to help achieve our goals.

We are eagerly looking forward to another great season of research and education in Clayoquot Sound. Thank you for your support, we couldn't do this without you.



Mission

The mission of the Cedar Coast Field Station is to preserve ecological health through place-based research and education that celebrates the cultural and biological diversity of Clayoquot Sound.

The Station

Cedar Coast Field Station provides researchers, educators, and students with resources to explore, study, and learn from the ecology of Clayoquot Sound. By working with a diverse set of partnering organizations and individuals, the field station is an interdisciplinary learning environment that is collaborative in nature and widely accessible.

Research and Education

By weaving a thread of ecological awareness through each of our education programs, we aim to create a cohesive, accessible, and interdisciplinary learning environment. While much of the research that takes place at CCFS is directly related to ecological studies, the station doors are open to a broad spectrum of disciplines so that a more diverse demographic can enjoy the benefits of place-based learning in Clayoquot Sound.



Education

The 2018 season has seen a diverse collection of visiting education groups to CCFS. From primary schools to university courses, students and educators have used our facilities to explore the ecology of the Clayoquot Sound and to achieve their learning objectives.

As our first group of the season, Carihi Secondary from Campbell River spent five days on Vargas Island. In their final month of high school, this visit allowed students to reflect on their year's coursework, while exploring these concepts firsthand. With the guidance of CCFS staff, these students went beach seining for juvenile salmon, conducted a microscopic analysis of marine invertebrates, learned to conduct micro-plastics and biodiversity surveys, and learned about off-grid and environmental design. Our feedback from both educators and students was inspiring, and we look forward to welcoming them back next year.

Groups from both Outward-Bound Canada and Broadreach brought students from as near as Victoria and as far away as India. These students assisted us with forest surveys, explored the intertidal, participated in marine mammal surveys, and held classroom discussions focused on earth systems science and the health of our local ecosystems.

Later in the season, our in-house educator – Andrew Wood – designed and led our Youth Empowerment Camp, a 5-day journey of self-discovery and adventure. Students were challenged and pushed out of their comfort zones, learning about outdoor leadership skills, self-identity, and the importance of community and creativity. Next year we will run three 5-day summer camps, each with a unique theme that relates to the Cedar Coast mission.

As one of our final groups of the season, we were excited to welcome local students from The Wickanninsh Community School. This was an enthusiastic group of students, already well versed in life on the west coast. During their time, they explored the old growth bog forests, hiked to an intertidal lagoon, and swam with bioluminescent plankton. During this off-season we are working hard to bring more public schools and youth groups to CCFS, especially those from the local area.

This season has also seen visiting education groups from Royal Roads University, Coast Mountain Academy, The Rain-coast Educational Society, and Surge Narrows School.

Adult Education

Next year we are excited to be adding a variety of adult education workshops to our schedule. While we are still confirming dates, we will be offering programs in the fields of permaculture, woodworking, foraging, wildlife photography, yoga, and ecology. Please stay tuned to our website and social media accounts for more details.



Research: 2018 Season in Review

Juvenile Salmon and Sea Lice Monitoring 2018/2019

Summary

Wild Pacific Salmon in Clayoquot Sound, BC face significant threats from industry, land use, and changing biological and environmental conditions. This spring, juvenile salmon migrating from Clayoquot Sound were exposed to an unprecedented abundance of sea lice, as the finfish aquaculture industry failed to control and mitigate sea lice infestations on farms. This year, we assessed the sea lice load and external health of juvenile salmon during a portion of their out-migration in Clayoquot Sound. Our focus was on the migration corridor from the Cypre River in Cypress Harbour, through Father Charles Channel, and out to the Pacific Ocean. We initiated this sampling program in April 2018, as louse covered juvenile salmon were apparent in the bays around Vargas Island while farms were concurrently reporting some of the highest louse counts on record for the region. This year was a preliminary assessment of sea lice and juvenile salmon health in Clayoquot Sound. A program capturing the entire out-migration season of juvenile salmon in the region will start in early spring 2019.

Link to report: <http://www.cedarcoastfieldstation.org/wp-content/uploads/2018/10/2018-10-Juvenile-Salmon-and-Sea-Lice-Monitoring-in-Clayoquot-Sound-October-26-2018.pdf>

Click for link 

Publicity/outreach

Presentations of this research were given at the Clayoquot Salmon Festival at a DFO-Sport Fishing Association meeting and at a What's Brewing in the Biosphere evening put on by the Clayoquot Biosphere Trust. Data was provided to, and our research was featured in, The Living Oceans Society/Raincoast Research Report, and was subsequently covered by: CBC, Vancouver Sun, Toronto Star, APTN, Global News, Times Colonist, Digital Journal, Business in Vancouver, and Seafoodsource among other media outlets. Our project directly involved 4 volunteers, 2 visiting researchers, 2 station staff and one visiting secondary school group. We had support and technical assistance from approximately 14 other individuals.

Grants

We received funding specifically for this project from The Clayoquot Biosphere Trust Research and Environment Grant, The Tofino Saltwater Classic, The Keen Critical Coastline Grant Program, and from a private donor.

Herring Die Off: Hot Springs Cove

Summary

This summer, multiple die offs of juvenile herring were reported in Hot Springs Cove. We responded to two of the die offs in coordination with the NTC fisheries department. The herring were found to be covered in Caligus species sea lice. Samples were collected and sent off for analysis at the Pacific Biological Station. The tested herring were found to have a herring virus (VHSV) that causes disease when they are under stress. This virus is transferrable to other fish species, including wild and farmed salmon, yet only causes disease in herring. We will continue offering our services in the collection and analysis of diseased fishes in Clayoquot sound.

Link to report: <http://www.cedarcoastfieldstation.org/wp-content/uploads/2018/10/2018-07-Hot-Springs-Cove-Juvenile-Pacific-Herring-die-off-June-20-2018.pdf>

Click for link 

Publicity

The collection and analysis spurred a CFIA report and bulletin posting as VHSV is a virus that must be reported when detected. <http://inspection.gc.ca/animals/aquatic-animals/diseases/reportable/2018/eng/1339174937153/1339175227861>

This incident received a great amount of attention in social media and our findings were reported in the living oceans report, during our presentations at the Clayoquot Salmon Festival and What's Brewing in the Biosphere.

Microplastics

Summary

In conjunction with the Ucluelet aquarium, we have been working to help expand their micro-plastics and marine debris monitoring initiative. We have conducted sampling on various Vargas Island beaches, and two Secondary School groups have taken part in our assessments in 2018. We are expanding our sampling effort throughout the year to include more beaches and a greater amount of sample transects from each beach. A large component of this initiative is to help bring a greater awareness to ocean pollution and how our own actions can impact the environment.

Outreach

This year we have involved approximately 40 individuals in the program so far.

Grants

We received a building healthier communities fund grant from Coastal Community Credit Union to cover the costs of our sampling equipment.

Biodiversity Assessments

Summary

This season, various biodiversity monitoring and assessment programs have been developed on the CCFS campus. These programs include intertidal and terrestrial biodiversity assessments, bog forest plot assessments, recording cetacean sightings, photography for identification, deployment of wildlife cameras, and ultrasonic bat identification monitors. Through these assessments, we are developing a baseline of species and their abundance on Vargas Island. This is done to both assess the current state of species diversity and to evaluate and understand any changes in species composition over time. With this project we are leveraging citizen science programs such as iNaturalist, e-birds, and the Cetacean Sightings Network, as the real power of citizen science is in the sheer abundance of sightings and anecdotes that observers can provide. These tools and skillsets are easily transferable to any students or participants that visit the station, allowing them to take on their own assessments within their communities.

Outreach

8 volunteers aided in the development of these programs. We were also able to involve 4 primary and secondary school classes, and 6 summer camp classes for a total of 148 participants.

Salmon Genetics Program

Summary

The amount of genetic information from salmon runs in British Columbia is limited. Without this information, both researchers and the federal government cannot make informed decisions to effectively manage local salmon stocks. With this program we will contribute to the collection of salmon fin clips from small and remote salmon runs throughout coastal BC, in order to grow the genetic database. Enhanced genetic knowledge will allow for a clearer understanding and more effective management of local salmon stocks and their environment.

Through this work we are aiding in the development and democratizing of genetic tools that allow small local groups and governments to employ the same management techniques previously only available to large-scale projects and DFO. We have a diverse host of partners on this project, including Salmon Coast Field Station, Nimmo Bay Resort, Blackfish Lodge, Kitasoo/Xai'xais, the Reynolds Research Group, DFO and Sea to Cedar. We are continuing this effort annually and we are always working to add new sampling partners.

New Research Programs 2019

1.

Assessing early marine survival of salmon smolts in Clayoquot Sound

Soon we will be preparing for a coast wide juvenile salmon, habitat use, genetics, and mixed stock fishery program that will be running in several locations throughout BC, starting in the spring of 2020. Our component of the program will be in purse seining salmon smolts to collect DNA and small tissue samples to analyze their disease signatures as they move from the estuary, past industrial activities or undeveloped habitats, and out to the ocean. In 2019 we will be developing and testing our sampling protocols and locations throughout Clayoquot Sound. We will be collaborating with the NTC fisheries for the sampling program. This program will require the acquisition of new equipment including a purse seine net, haulers, and plankton nets.

2.

Monitoring biodiversity and salmon with UAV's

Next year we will be working to develop a large scale, drone-based assessments of biodiversity, habitat, and salmon run enumerations. Unmanned aerial vehicles (UAVs) or drones are a relatively cost-effective way to both map large regions in detail, and identify and count various species. Drone assessments can be conducted seasonally or annually as a means to track ecosystem wide changes over time.

Due to funding limitations, the Department of Fisheries has decreased the available resources dedicated to enumerating salmon in-river and monitoring their population. Currently, funding is only available for monitoring specific salmon populations in Clayoquot Sound and for runs located on "indicator streams," leaving many distinct salmon populations and geographic areas unobserved. Having continuous long term monitoring of salmon populations is integral for preserving ecosystems and communities that depend on them. UAV enumeration surveys can offer an efficient and cost-effective way of augmenting traditional enumeration methods and filling in knowledge gaps of returning salmon populations in Clayoquot Sound.

3.

Integrated Coastal Observatory Program

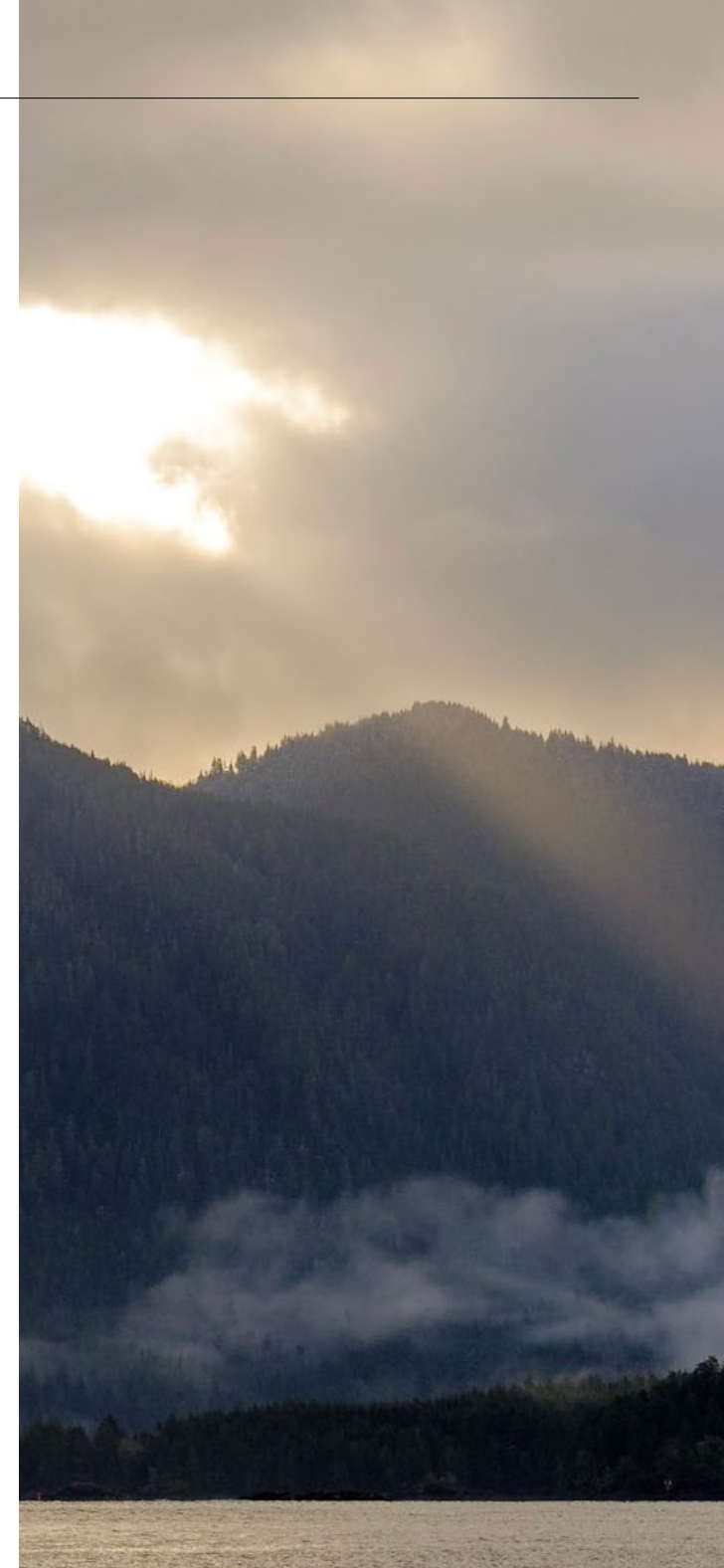
The Hakai Institute is currently developing the Integrated Coastal Observatory (ICO) program. The goal of the ICO is to create a unified system for the collection of ocean-related observations across British Columbia. CCFS will first contribute by monitoring the diversity of fish species at a number of locations in Clayoquot Sound by collecting water samples and using eDNA (environmental DNA) to detect the fish species that are present. The Pacific coast of Canada faces cyclic changes in temperature regimes, making it an ideal location to monitor changes in biodiversity at high spatial and temporal scales. As fish respond rather quickly to environmental changes, analysis of fish eDNA will be a useful tool to help us monitor the health of the environment and impacts of climate change. Eventually, we would also like to include measurements of temperature, salinity, dissolved organic carbon, ocean pH, and microbes.

4.**Salmon Roundtable**

CCFS is now a member of the Area 24 Salmon Roundtable. The Salmon Roundtable is a diverse meeting of local organizations, First Nations, government bodies, and stakeholders, all with the intention of building partnerships to better manage and plan for the recovery of wild salmon stocks in Clayoquot Sound. Becoming a member of the round table allows us to take part in the localized management of salmon in the region and to connect with local nations, organizations, visiting researchers, and DFO.

6.**Park License**

Vargas Island Provincial Park resides on the western shore of Vargas Island, encompassing Ahous Bay and its lagoon. The park contains a rich ecosystem and a diverse network of habitats not seen on the eastern shore of the island. We have recently received a permit to conduct research and educational activities within the park. We look forward to working with visiting groups, members of the Ahousaht First Nation, and BC Parks to address interesting ecological questions within the park.



Community

We are proud to say that we have made great progress this season while trying to establish new relationships and partnerships within the community of Clayoquot Sound. Community involvement is a key component to a successful future for CCFS, and we are grateful to have been welcomed by many local community members and organizations.

We are excited to be working on a range of different projects with the Nuu-Chah-Nulth Tribal Council Fisheries (NTC), as well as the many members of the Area 24 Salmon Roundtable. We were also lucky enough to be invited to give presentations during both the Tofino Salmon Festival and at networking events hosted by the Clayoquot Biosphere Trust. In addition, we have enjoyed being a part of many exciting events this season, including the Tofino Saltwater Classic, the Tla-o-qui-aht Totem Raising Ceremony, Ocean Fair, and the Surfrider Youth Environmental Stewardship Program.

Next year will certainly include a great deal more as we look forward to collaborating with new partners who are also working towards creating a healthy future for the Clayoquot Sound. We hope that the community will continue to support and embrace our work for many years to come.



Our New Facility

We are very excited to be opening the doors of our new research and education facility in April 2019! This past season has been a busy one on Vargas Island: The diligent Cedar Coast staff were conducting research and hosting education groups in our original facility (the old Vargas Island Inn). Meanwhile, Cedar Coast Director Simon Nessman and his brother Jake Nessman were working with a talented crew of hardworking men and women to renovate and complete the society's new home for 2019.

The new site for CCFS will be centered around a large timber frame building. Having been originally constructed as a wartime museum in 1994, we have repurposed and redesigned the building to suit our needs. It is often said that the most ecologically sustainable building is the one that already exists, so rather than starting over, we have decided to work with what was already here. We have since replaced the roof, added 33 skylights to utilize natural light, and changed the interior layout to include a field lab, large multi-purpose room, living room, dining hall, large kitchen, conference room, library, and staff room. We have also added a large front deck with bleacher seating, allowing for outdoor classroom sessions and meetings. The main building is accompanied by 6 canvas sleeping tents, 5 tenting platforms, and an outdoor shower house. All of these buildings were constructed using locally salvaged cedar, and the old roof of the main building.

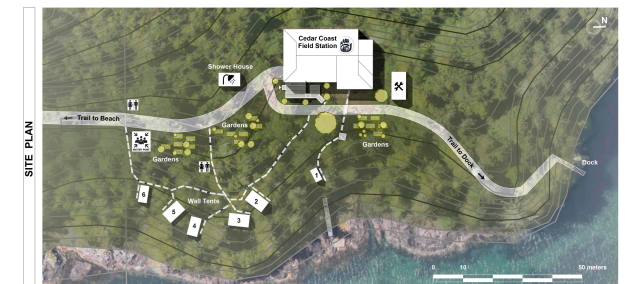
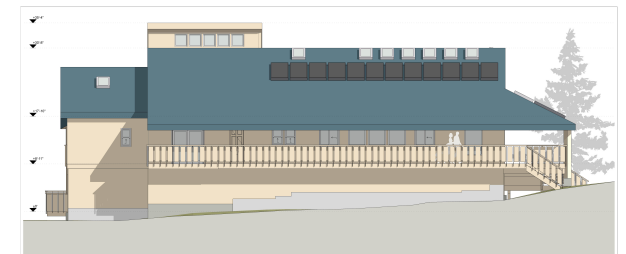
The new facility is located on 45 acres of forested land adjacent to our original location, on the southeast shoreline of Vargas Island. With the help of a mini excavator and a tractor, this summer we were able to build a corduroy driveway connecting the beach, the dock, and the main building. We have also cleared and landscaped the areas around the building to make room for food gardens.

orchards, and rainwater storage. We have added 36 solar panels to the roof, which along with the battery bank and 12KW inverter will supply all of the station's electricity needs. All drinking and washing water at the station will come from a 22,400-gallon rainwater collection system installed on the north lawn. Water for gardens and toilets will be gravity fed from a pond located approximately 150 feet uphill from the main building. Heat for the main building and hot water for showers and washing will be generated by a GARN 1500 wood-fired boiler. We are selectively thinning the dense second growth forests on the property to provide for all of the station's heating needs. We are also grateful for the recent donation of a small band saw mill. This, in conjunction with an Alaskan chainsaw mill has allowed us to reclaim fallen timbers for cedar furniture, countertops, siding, and decking.

Access to the new facility is via a short driveway from the newly constructed aluminum dock and gangway. This dock is anchored at the base of an old growth cedar tree, and using a series of ropes and pulleys we are able to lift the dock and ramp out of the water during stormy weather conditions. Upon arrival, visitors walk through a wind-blown old growth forest, through the station food gardens, and up the front steps to the newly constructed outdoor classroom. We look forward to sharing all of this and more with you next season!

This development project would not have been possible without the many hardworking folks that have worked on it. These include Project Manager Jake Nessman, Architects Maris MacDonald and Marta Maryniak, forestry workers Coady Webb, Mike Gniadowski, and Ryan Millar, builders Stephen Lindsey, Ryan Taron, Alex Turner, Chris Ozz, and Leigh Burley, and helpers Liza Ireland, Kevin

Cherry, Dal Rai, Henry Jokela and many more that poured their blood, sweat, and (on occasion) tears into making this new dream facility, a reality.



Board & Staff Members

Simon Nessman

Director/Board Member

Raised on a forested acreage on Hornby Island, B.C., Simon developed a strong connection to the ecology of the west coast from a young age. At age 17 he moved to New York City to pursue a career in advertising, while attending interdisciplinary classes at Hunter College. After 5 years in NYC Simon moved to an off-grid boat access property on Vargas Island, where he developed the idea for an ecological field station in Clayoquot Sound. Refining this idea became the focus of his education at Quest University Canada, where he earned a Bachelor of Arts and Science in 2017.

Zephyr Polk

Director/Board Member

Zephyr holds an undergraduate honours degree in Biology and Aquatic Resources from St. F.X. University. From 2011-2016, she and her partner served as Station Coordinators for Salmon Coast Field Station in the Broughton Archipelago of BC. Zephyr feels strongly about conducting high quality science to facilitate better management of coastal ecosystems, and about helping connect people to these amazing places. She is excited to continue supporting research and education as a board member of Cedar Coast Field Station.

Dave Ratcliffe

Director/Board Member

Born in Kingston Ontario Dave earned a Bsc in geology and engineering from UBC. He worked in geological exploration of northern Canada before returning to school and earning an MD from McMaster with a residency at Dalhousie. Dave's first full time practise was in Tofino, which led to a consuming interest in the ocean and involvement in commercial fishing. He continued the practice of medicine and commercial fishing operations concurrently until 2010, before retiring on Vargas Island with his wife, Una. Together they have two children, a grandson and a dog.

Colin Bates

Director/Board Member

Colin has a strong interest in understanding human relationships with the natural world, through research, teaching, documenting, exploring, and communicating. He has studied coastal ecology from the west coast of Vancouver Island to the Bay of Fundy. Primarily, he researches the causes and consequences of anthropogenic impacts on marine biodiversity. He has biology degrees from Simon Fraser University (B.Sc. 1996), the University of New Brunswick (M.Sc., 2002), and the University of British Columbia (Ph.D., 2007).

Julia Simmerling

Station Coordinator

Julia completed her undergraduate degree at Quest University in Squamish, BC where she focused her studies on ocean conservation, marine resource management, and the benefits of small scale community projects. She has gained much of her hospitality and adventure tourism experience through her work as an assistant hotel manager and guide both in the Canadian Arctic and Antarctic. You'll often find Julia gardening, playing the fiddle, and spending time in the intertidal zone with squishy marine invertebrates!

Mack Bartlett

Research Coordinator

Mack was raised in West Vancouver, BC and spent most of his time growing up playing in tidal pools and glacial streams throughout BC. He completed a biology degree at Dalhousie University and a Master's degree in Ecology and Evolution at the University of Toronto. Mack has been working in fisheries, and community based conservation and management on both the East and West Coast of Canada. He brings his love of all things wild, photography, cooking and foraging to the Cedar Coast team.

Adam Ftaya

Facilities & Safety Coordinator

Adam was raised in West Vancouver, spending much of his time skiing and hiking on the North Shore Mountains. After studying Physical Geography at Queen's University, he went on to complete a Master's degree in Land and Water Systems at the University of British Columbia. Having worked in a range of positions, Adam brings a skillset that he has developed while working in northern BC, the lower mainland, and abroad. Adam is excited to be a part of the Cedar Coast Team and looks forward to helping build a rich learning environment at the Cedar Coast Field Station.

Andrew Wood

Education Coordinator

Andrew Wood is an educator, writer and snowboarder from the Comox Valley. As a former BC Wildfire Fighter and back-country enthusiast, Andrew's passion for the outdoors and approach to working/playing safely translate into the camp. From teaching hands-on science experiments as Program Coordinator for Lets' Talk Science, to designing and implementing programming for the Squamish Youth and Resource Center Andrew brings his characteristic passion to all of his projects. In July 2018, Andrew will graduate from UBC's Bachelors in Education with an emphasis on Rural Education. Andrew completed his undergraduate degree at an innovative Liberal Arts & Sciences school: Quest University Canada in Squamish, BC. For his undergraduate thesis Andrew characterized student engagement and quality of experience across different educational contexts in a classroom setting— knowledge he now applies to his outdoor education approach.

Ahousaht First Nation

Board Member

In recognition that we are located in the traditional and unceded territory of the Ahousaht First Nation, the CCFS has reserved a place on its board for a member of the Ahousaht Nation.

Donors & Supporters

Thank you to our supporters

Thank you to all of the following donors and supporters for their contribution to CCFS and for making our work possible. We sincerely appreciate the time and resources you have provided us with and we look forward to working with you in the future.

Donors

- Tiziano Di Paolo
- Rose Ftaya
- Akram Ftaya
- Jason Kanner
- Simon Nessman
- Wolfgang

