

Welcome and Introductions

Laura Weatherly, Fisheries & Oceans Canada & Jason Hwang, Pacific Salmon Foundation

Weatherly welcomed the nearly 500 registered workshop participants, explaining DFO's new Habitat Restoration Centre of Expertise (COE) was established under PSSI (Pacific Salmon Strategy Initiative) to expand DFO capacity, engagement and learning opportunities for practitioners.

This is the fifth in a workshop series co-hosted with PSF. Next workshop is November 14, 2024 on Restoring Watershed Resilience.

While shorelines face increasing threats linked to climate change, this also provides opportunities to improve shoreline protection practices with nature-based solutions that also provide ecosystem benefits essential to salmon recovery.

Hwang invited participants to complete a quick Slido survey to help participants get acquainted with each other, before briefly reviewing the agenda and meeting protocols.

Shoreline Armour: Direct and Indirect Impacts for Fish and Habitat

Morgan Tidd, Coastal Geomorphologist, DFO Salmon Habitat Restoration Center of Expertise

Presentation highlights included (See PowerPoint for details):

- Critical importance of the nearshore habitat for juvenile salmon's early life stage success.
 - Provides safe refuges for juveniles to hide and rest during migration (e.g. eel grass beds), mild salinity to adapt to ocean and important food sources for both juveniles and adults.
 - Features of healthy nearshore habitat.
- Coastal processes explained: a littoral cell primer. Landforms, wave action and sediment transport.
- Shoreline armour protects against coastal erosion. Climate change will increase pressures on certain coastal areas, e.g. inundation of low-lying areas, bluff erosion, loss of salt marshes.
 - Developed shorelines are already fairly heavily armoured (e.g. sea walls and rip rap).
- Erosion can be part of the normal geomorphological cycle. Erosion to a system that was previously stable is usually linked to a change in transport or a change in supply (e. protecting bluffs reduces supply of sediment, armouring can interfere with along-shore movement of sediment.)
- Coastal flooding typically occurs during high tides, coupled with storm surge and onshore wind/waves. Dikes, jetties and breakwaters are typically used for protection.

- Impacts of armour to habitat: Hard armour vs. Green Shores.
 - Loss of riparian habitat: loss of complexity, shade and food sources.
 - Loss of upland habitat, fragmentation.
 - Indirect changes due of loss of sediment supply (loss of shelter, forage species).
 - Loss of filtration to screen out pollutants.

Discussion

- As we cut off the land from the shoreline, how will we ensure future supply of sediment?
 - Remove the blocks — just as in rivers, we're seeing removal of dams and other obstacles to restore both fish passage and movement of sediment.
- What is the impact of forestry-sourced logs on beaches — is it helpful or not?
 - Forestry is a significant source of large woody debris — we've seen it smothering certain areas (salt marshes, sediment sinks) while providing valuable complexity elsewhere. It's a complex topic that could benefit from more research, especially on using large woody debris for shoreline stabilization in more active areas.
- We often talk about the values of estuaries and marshes — what do we know about the values of other coastal areas?
 - A recent workshop looked at the importance of estuaries and marshes, which are very important for Chinook. It would be useful to look more closely at how different species use different areas to fill any knowledge gaps.

Resilient Coasts for Salmon

Kyla Sheehan, Resilient Coasts for Salmon, Pacific Salmon Foundation

Presentation highlights included:

- Resilient Coasts for Salmon is a 5-year collaborative partnership led by PSF to raise awareness of impacts of climate change on coastlines and natural-based solutions.
 - Project focus is East coast of Vancouver Island, with current focus on North Island (Comox to Port Hardy).
- Shoreline mapping initiative: focus is on coastal modifications (seawalls, rip rap), log accumulation on beaches and overwater structures.
 - Boat-based mapping using 360 degree and high-resolution imagery, which is reviewed to pull out key features and digitize results for the database.
 - All data is uploaded to the SOG MRG (Strait of Georgia Marine Reference Guide) collaborative platform, which merges data from PSF and other sources.
 - Short video explains the program.

- Data will be summarized in community reports, with key findings, analyses.
- Overview of Oak Bay community report.
- Work includes annual shoreline mapping workshops; project Field Guide, Website and other resources, including educational primer and free Green Shores training at resilientcoasts.ca.

Discussion

- Are there examples of how to apply these resources to support foreshore restoration?
 - MRG includes many valuable data layers that can help inform projects, e.g. results of local citizen science on forage fish, which can be overlaid with project data on beaches with high log accumulation to identify priorities for log removal.
- Q/A: This project has a finer focus than Shore Zone but the information can be used together. Ability to view both side by side to understand historical changes is a good idea.
- Any plans to do the same for the Mainland side?
 - We are very interested in continuing this work if time and funding permit.
- Is similar work being done elsewhere?
 - Not sure about similar mapping work on the East Coast, although there is East Coast work being done through the Green Shores program. On the West Coast, similar work is also being done by Capital Regional District (Victoria).
- Q/A: The program is always looking for feedback and interest in potentially expanding this work. Given expected climate change impacts, we want this kind of work to be a priority.
- Q/A: The driftwood issue is a complex one, and we definitely need to work with the forestry industry to improve practices.
- What are the targets uses and users?
 - Data on sensitivity to sea level rise is from Parks Canada. Communities can work with engineers to create local models to inform development planning.
- Q/A: Time is our most limited resource — the more we learn, the more we identify topics we want to learn more about, e.g. considerations for using large woody debris in shoreline restoration.
 - We can start work on these things, but it highlights the importance of continuing and building on the work we're starting through the program.
- Q/A: This program is funded by Environment Canada and Climate Change Canada. Core partners include the Stewardship Centre for BC (which runs the Green Shores programs), WWF Canada, Peninsula Streams and Shorelines and a number of local partners for the demonstration sites.

Building Nearshore Resilience and Avoiding Armour

Andrea MacLennan, Coastal Geomorphologist, Herrera Inc

Presentation highlights included:

- Recent focus of her work in the US is sea level rise hazard mapping and response.
- Coastal processes in the Salish Sea: area is heavily shaped by glacial advances/retreats.
- Salish Sea beaches are unique: typically narrow, with a mix of sand and gravel, mostly from coastal bluff erosion, and limited exposure to ocean swells.
- Limited data compared to other regions.
- Toolbox for increasing resilience and avoiding armour.
 - Site-specific information, including goals and management time-frame, should inform planning.
- Different responses expected to sea level rise: rocky shores, coastal bluffs, barrier beaches.
- Reasons to avoid armour: not effective for all climate change hazards, unintended consequences/reduced resilience.
- Need to understand the broader context and coastal processes to plan effective responses.
 - Net shore-drift cells: each cell has a sediment budget that reflects the system's health and resilience.
 - Evaluating the appropriate solution: Consider shore type + hazard exposure + local conditions.
- Benefits and limitations of:
 - Enhancing native vegetation.
 - Drainage/drainage management, especially runoff from impervious surfaces.
 - Re-sloping and re-vegetating — particularly useful for low banks where there is adequate space.
 - Beach nourishment: different approaches.
 - Elevating/relocating structures for areas vulnerable to flooding.

Discussion

- How can local governments preserve sediment supplies like bluffs?
 - One of the most important things is having adequate setback distances. Also to shift away from the perspective of having to be right at the shoreline, recognizing that shorelines are not static, so we need to allow space for them to move.

- Are drift and barrier berm beaches a desired remediation or are these not possible with armoured shores?
 - Adding elevation to storm berms — in many cases the beaches have narrowed and lowered over time, so nourishing the beach will provide more resilience.
- Q/A: Sediment for our projects largely comes from gravel quarries, as it needs to be coarse to replicate native sediment (dredged material is often too fine but it depends on the beach, as it will just be washed away by larger waves).
- Q/A: Our shorelines are so diverse, so it's very difficult to make generalizations about what will work best in any situation.

Naturalizing Shorelines in the Salish Sea - Paths to Restoration

Lisa Kaufman, Program Manager, Northwest Straits Foundation

Presentation highlights included:

- About the Northwest Straits Foundation.
 - Much of their work in the US focuses on armour removal and restoration to reconnect fragmented processes and habitats.
- Much of the area's coastline is owned privately, so they need many options.
- Most of the challenges are human-driven.
- Negative effects of armoured shorelines, implications for habitat, ecosystems and species, including salmon.
- Coastal bluffs provide important opportunities for coastal restoration.
 - Natural and human drivers of coastal bluff erosion.
- Program focus is on smart land development that includes sufficient setbacks, native vegetation buffers and proper drainage.
 - How development affects runoff: impervious surfaces vs natural ground cover.
 - Shoreline armour impacts: creates a cycle that gets worse over time.
- Shore Friendly program: regional social marketing program: non-regulatory approach to encourage natural alternatives on private property.
- Vital signs indicator chart: shows a trend in the right direction re armoring, but many un-permitted repairs and installation are still happening.
 - Program seeks to reduce the number of un-permitted actions by home-owners and to increase understanding of better alternatives.

- Key barriers to change: social/cultural and psychological.
 - Program seeks to prioritize relocation of structures as a primary considerations, not a last resort.
- Program objectives: how it helps home-owners.
 - Activities include educational workshops about shore friendly living and coastal processes to begin to shift perspectives.
 - Now offering more specific workshops offering a deeper dive on implementation of solutions.
 - Your Marine Waterfront: guide to protecting property while promoting healthy shorelines.
 - Short videos on Shore Friendly Living topics (available on Northwest Foundation website).
 - Site visits and community beach walks.
 - Also look for opportunities for armour removal — often it requires moving homes back (which is not as difficult as people think).
- Examples of solutions, including offering support to home-owners for designing solutions and navigating permitting.
- Next steps for the program; focus on phased approach and policy reforms to avoid putting up more obstacles to shoreline armour removal.

Discussion

- Which plants are most effective for re-vegetation?
 - We try to mimic native vegetation as much as possible, with a focus on trees, especially Douglas firs, Sitka spruce or shore pine, along with dune grass, shrubs and ground covers. We are not encouraging cedars (though they are native and culturally significant) as they are less drought tolerant and struggling on our shorelines with climate change.
- Are there situations where regulations encourage armour vs nature-based solutions?
 - In the past, it may have been easier to repair armour than to adopt natural solutions, but regulations have become stricter, so the home-owner now needs to prove the house is at risk and that there is no other solution. In some cases (e.g. protecting septic fields), armour is still required. It's also becoming more expensive to build armour.

Panel Discussion

While the role of riparian vegetation is well understood in freshwater, how important is the ecosystem function of such in the marine foreshore, relative to the vast size of the ocean?

- That nearshore zone is small but integral to rearing juveniles and to maximizing their subsequent success at sea and vegetation is a critical part of that.
 - Shading, microclimate effects, and input of large woody debris from eroding bluffs all provide important benefits. Insects in marine riparian areas have also been documented as an important food source for migrating juvenile salmon.
 - Chinook in particular are heavily dependent on insects falling from terrestrial vegetation. Leaf litter as well provides critical nutrients to that narrow zone.
 - The water absorption/stabilizing function of trees is also important.
- Are there better alternatives to rip rap to protect essential features like bridges, roads and railways?
 - We can build roads in smarter ways, e.g. with rain gardens around them to filter contaminants.
 - Beach nourishment is viable in many locations and you can contain the sediment with structures like groins without habitat loss for juvenile salmon. Beach nourishment can also be used water-ward of armour to mitigate negative impacts.
 - Often, bridges are under-engineered to save money, but a wider span requires less armoring. In many cases, the shoreline is already very developed and armoured, so you need to look at the full context for such decisions: is it an urban bridge or one over a natural river that can be designed to minimize the need for rip rap?
- Jurisdictional issues in BC have been a major barrier to better solutions in the past. What can we do to address this?
 - Some of these technologies have not been used here in Canada as long as in the US, so there is currently a focus on piloting and raising awareness to demonstrate their effectiveness. We will also talk later about what the Fisheries Act can do.
 - We are definitely seeing local governments adopting nature-based solutions and new policies that do not allow new armour without a definite need. West Coast Law and CPAWS are doing good work on this.
- Are there cost-benefit analyses that can help advance the necessary policy/regulatory progress?
 - There has been some work. Blue Coast Engineering did a comparison in (Island?) County but that was a very small, specific perspective. Washington has seen a significant change in permitting policy, with more scrutiny (e.g. use of a mitigation calculator) and higher costs for non-nature based solutions. More analysis is being done, but we are also looking at the longer costs, with nature-based solutions being more self-sustaining over the long term.
 - Q/A: Lisa to provide links to the mitigation calculator and cost/benefit studies:
 - https://wdfw.wa.gov/sites/default/files/2019-03/shorefriendly_finalreport.pdf

- <https://www.fisheries.noaa.gov/resource/tool-app/puget-sound-nearshore-conservation-calculator>
- When armour fails, it fails catastrophically and is expensive to repair. Nature based solutions tend to be easier to fix/mitigate.
- How do we get buy-in from property owners concerned about costs and loss of land?
 - This is the focus of the Shore Friendly program. We rely on outreach and providing home-owner resources for free (free site visits, design support, assistance with permitting). If it's a large enough project, we can help them apply for grants. And we also act as project managers to manage contractors and implementation. On smaller projects, we can provide small grants, e.g. \$5,000 for vegetation and drainage, or even to help moving the house. Outside of cost incentives, we do site visits and invite landowners to talk to others who have already done it to appreciate the benefits.
 - The Shore Friendly program is uses a social marketing approach aimed at behavioural change, so it's important to understand audience demographics, attitudes and barriers to change, with targeted outreach to support educational messages and incentives.
 - The Shore Friendly program provides a poster for permitting agencies to help them walk landowners through alternatives to armoring.
- Is there habitat restoration value, in high energy environments where restoration is not possible without hybrid measures, or is it better to just stick with hard armour?
 - It doesn't have to be all or nothing. There are many easier/more affordable actions that people can take in any situation, so we try to share information about options.
 - In places where it's not possible to remove armour, we will have to mitigate for future sea level rise, especially if it's important habitat, so using beach nourishment is a great option even in those situations. The no-action alternative is habitat loss.
- How do you work with tribes on projects in culturally important locations?
 - It's complex. In addition to habitat, there are cultural considerations and treaty/indigenous fishing rights. We try to engage with tribes as early as possible and we undertake archeological reviews for every project. In some cases, we didn't excavate to the extent we wanted to avoid negatively impacting cultural resources.
 - In one project to remove a coastal road, fill and shoreline armour, excavation was overseen by the tribes to avoid negative impacts. It's important to have the tribes being respectfully included in the process.
 - In some vegetation projects, instead of digging in, we brought in top soil and planted up to avoid the risk of impacting any cultural materials below.

Using Green Shores to Incentivize Hard Armour Removal, Nature-Based Solutions

DG Blair, Stewardship Centre for BC

Presentation highlights included:

- About Green Shores: A framework for helping communities adapt to climate change and promote resilience by adopting nature-based approaches to shoreline management.
- Green Shores projects have a \$7:1 net benefit to cost ratio: ecological, cultural and economic values.
- Benefits of Green Shores: poster highlighting benefits for homes, for improving beach access and for the environment.
- Green Shores guiding principles: all projects must respect all four guiding principles.
- Credit and ratings guides: tools to develop properties in a “shore friendly” way (similar to LEED ratings system).
- Shore protection design: soft to hard hierarchy of preferences.
- Principles at work: Green Shores for Shorelines:
 - Riverbend Business Park: hybrid solution required for flood protection.
 - Esquimalt Gorge Park: Project design to remove rip rap and enhance tidal marsh and add beach nourishment. Access will be maintained with a path through native vegetation.
 - Dyke Road Park on Vancouver Island: Opportunities and challenges. The restoration design adds new habitat for salmon, rain gardens (upland practices), improved shoreline access and restricted impervious surfaces (parking lot).
- Principles at work: Green Shores for Homes:
 - Examples on Vancouver Island, including Qualicum Beach hybrid approach: cobbled clusters to support continuity in sediment flow.
 - Such successful examples serve as a valuable model for neighbours.
- Why Green Shores? Efficient and cost effective; the Green Shores label also demonstrates compliance with a standard and promotes broader awareness.
- Post-secondary training: Green Shores training/professional accreditation courses at UVic, BCIT and St Mary’s in Nova Scotia.
- Green Shores Local Government Working Group: Supports local governments in BC and Nova Scotia with demonstration projects and peer to peer learning. Group meets monthly, and offers training.
- Green Shores: Summary of key ideas.

Discussion

- What regulatory requirements were there for projects like Esquimalt?
 - Requirements are very site specific. The Esquimalt project was primarily working above the natural boundary. We are working with local First Nations and within the fisheries boundary. In many cases, we're working with local governments, which already have tenure. The Qualicum Beach residential project had to apply to BC for tenure. There is expedited permitting and reduced fees under a pilot project for the East Coast of Vancouver Island.
- Are contaminants ever a major issue? Can Green Shores approaches help address this?
 - The Green Shores program does have a contaminated site credit, which requires best practices for removal of contaminated soils, creosote pilings, etc.
- What monitoring is done to track project performance over time (ecosystem values, protection)?
 - The program recently produced a Green Shores Monitoring Guide and has established protocols for ongoing monitoring. Home-owners can get extra credits for granting permission for us to do ongoing inspections and monitoring. For larger projects, monitoring is usually part of the project design. So we have a foundation now to build on over time.
- Who pays for monitoring of private projects?
 - For private projects, the owners pay construction costs, so the opportunity is always greatest when construction is needed anyway. We are seeking longer-term funding for monitoring that is not in place yet.
- Q/A: The Dyke Road project is happening simultaneously with and adjacent to the larger Comox sewer upgrade project.

Working with Citizen Scientists: a Study of Shoreline Restoration Effectiveness in the Salish Sea

Jason Morgan, Northwest Straits Foundation

Presentation highlights included:

- Goals of the Foundation's monitoring program: assessing pre-project conditions, project implementation, long-term results, status and trends; and then using results for awareness and education.
- Shoreline Monitoring database.
- Decision tree for selecting protocols in the Shoreline Monitoring Toolbox.
 - Example of protocol for monitoring logs and riparian vegetation: provides an overview of resources needed, costs and effort required, and methods.

- Recruitment: Set out to build the necessary capacity, leveraging established relationships with local Marine Resources Committees (volunteer groups).
 - Key success factors included making it fun, providing clearly defined roles for volunteers and partnering with local media.
 - Training designed to suit the audience (many potential volunteers are retirees).
- Doing the work: important to establish clear leadership on site, explain roles and tasks ahead of time, and suit tasks to individual interests. Quality control is very similar to working with non-volunteers.
- Volunteer engagement: important to make it fun, build personal relationships, ensure people feel needed, build a sense of community and share data/results in a fun way.
- Results: 10 years, 9,500 hours of volunteer work.
 - Volunteer contribution has allowed us to expand what we can do (now monitoring 28 restoration sites across Puget Sound).
 - Work covers forage fish spawning, beach profiles, beach seining, surface epifauna and algae, logs.
- Cornet Bay restoration actions: removal of contaminated fill/materials, beach nourishment, expanded tidal marshes, native planting and bulkhead removal.
 - Results - Site Utilization: Found improved site utilization by Chinook juveniles.
 - For pinks and chum, they saw direct correlation with Skagit River juvenile output; for Chinook, they saw increasing site usage despite decreasing Skagit River outputs.
 - Results highlights juvenile salmon preference for natural shorelines with overhanging vegetation.
- More info available in detailed report on NW Straits Foundation Website.

Discussion

- How important is riparian vegetation in marine foreshores?
 - It's very important for bank stabilization. Terrestrial insects that fall from overhanging vegetation are also an important part of juvenile salmonid diets. Shading is another factor. But it would be a useful study to do.
- Are there lessons learned about things you would do differently?
 - Vegetation is one thing, as we were limited by the Parks mandate to maintain views from the parking lot. We've also steered away a bit from installing large woody debris.
- What are the demographics of your volunteers? Are there ways to attract more youths?

- Because our work is mostly Monday to Friday, that's challenging, but we do partner with other organizations that emphasize youth programs — so we rely on those who are already doing it.
- In Canada we're seeing some uncertainty around government's role in promoting such volunteer participation. What is the US experience?
 - US government entities are definitely engaged, at the State and local level, especially our county governments, which host the Marine Resources Committees.
- Are there indigenous/tribal permissions and engagement requirements for this work?
 - Of course: there are requirements for site permissions, indigenous partnerships, and archaeological assessments.

Shoreline Restoration and Regulatory Review under the Fisheries Act

Andrew MacInnis, Fish and Fish Habitat Protection Program, DFO

Presentation highlights included:

- Fish and Fish Habitat Protection Program overview.
- Program mandate: ensuring compliance of projects taking place in and around fish habitat.
- Prohibitions:
 - Harmful alteration, disruption or destruction of fish habitat.
 - Killing fish by any means other than fishing.
- Regulatory review continuum: from avoiding work in fish habitat to mitigation measures where this is not possible.
- Projects Near Water website: Provides an overview of the regulatory process, steps, measures, codes of practice, and Species at Risk Act requirements.
- Shoreline restoration: When to request a project review.
 - Program staff can provide advice. They also work with DFO colleagues, such as those from the Restoration Centre of Expertise.
 - Request for Review forms and guidance available from the program Website.
 - Requests should be submitted at least 60 days in advance. Larger projects requiring the authorization process will need more lead time.
- Overview of the regulatory review process:
 - Staff want to see enough information to understand the project and its impacts, along with plans for any mitigation work.

- Examples of project reviews and key considerations. FFHPP conducts risk based assessment of likely impacts to fish/habitat and appropriate instruments to manage that risk.
- Some general tips:
 - Avoid use of geo-textile in shoreline restoration projects.
 - Careful attention to elevations and slopes is important to success.
 - Beach nourishment: design/materials need to be appropriate to project goals.
 - Woody debris function on a beach is very different from freshwater. Natural logs with root balls are very different from those that escape from log booms. The latter have very low value and can damage plantings, etc.

Discussion

- Is there consideration of projects that remove sources of sediment supply?
 - We are certainly thinking about this and other impacts to fish habitat and can reject plans that will create impacts without offsetting. The decisions are project specific so there are no set rules.
- The challenge for engineers is the lack of standards for nature-based and hybrid solutions, so it requires a lot of time/effort to try different solutions.
 - We encourage engineers to work with their biologists, and ensure there is a good understanding of coastal processes at the site in designing solutions.
- Can projects proposing nature-based solutions be fast tracked? What's the incentive if going with armour is faster?
 - Nature-based and hybrid approaches may not always be appropriate, so it depends on the site, but well-planned solutions are always welcomed.
- Q/A: DFO staff does have engineering expertise on staff, and can reach out to consultants if necessary.
- Can staff work with proponents to steer them towards nature-based solutions?
 - We certainly can encourage, but not force property owners to consider better approaches.
- Is DFO working with BC to update diking guidelines?
 - DFO is working with the Province in various ways to update flood response.

Panel Discussion

- How do you consider liability for the after-effects of armour removal?
 - NW Straits Foundation works with engineers and contractors on all projects.

- Stewardship Centre for BC relies on project professionals who sign off on projects to cover liability questions.
- As a consultant geomorphologist, we do hold some liability for designs, but home owners will tend to go after everyone if something goes wrong.
- Are codes of practice being developed for foreshore restoration projects?
 - It's a gap on a regional basis, but as a national program it's challenging for FFHPP to develop standards that would work nationally.
 - The US Army Corps of Engineers has extensive guidance, as does the Canadian Safety Association (CSA). Canadian Standards Council is also working on standards. There is ongoing work to improve guidance, including at the Centre for Expertise.
- Is encroachment into the tidal zone generally accepted for a nature-based solution?
 - Yes, FFHPP has authorized such projects.
 - One source of frustration we hear from proponents is the lack of synergy between requirements from various levels of government. We are now seeing work to synchronize these requirements and that will help to move these projects forward. BC is a little ahead of the curve, and we would like to see such work nation-wide. We need to make it easier for people to do the right thing, not the wrong thing.
 - FFHPP tries to be consistent nationally, but we are dealing with different species and situations regionally. Canada and the Provinces also have different responsibilities, so they will need different information to address those.
 - The Province's draft Coastal Marine Strategy has a great vision, but consistency across Canada will be challenging.
- Are there frameworks for assessing the relative value and effectiveness of different approaches for increasing coastal resilience?
 - NW Straits Foundation recently published a paper using data from its work summarizing the results of different restoration actions on different shore forms.
- Is there a recipe to decide what actions to undertake at different sites?
 - Yes there is a recipe, but it also relies a lot on professional knowledge.
 - Green Shores provides a sort of framework, with its four principles to guide decisions about what's appropriate for that site.
- Is the NW Straits Foundation time series of volunteer catch data standardized to permit estimation of CPUE?
 - It was standardized. More details are available in this report <https://nwstraitsfoundation.org/download/cornet-bay-final-report/>

- If sediment supply is cut off by infrastructure, how would FFHPP view a sediment supplementation project?
 - We have had beach nourishment projects. We would consider it if that was a major deficit at the site.
- What are some of the main barriers or opportunities?
 - In terms of barriers, Canada is behind in implementing nature-based solutions, so more examples, awareness and a more streamlined regulatory approach would help.
 - Coastal squeeze. We have many properties close to the shore with no room to move or people don't want to give up the space they have. Also, trying to do a nature based solution on just one property may not work in examples like Qualicum Beach.
 - Getting information to home owners about hybrid designs would help.
 - In Puget Sound 60% of shoreline is privately owned, so a big barrier is fear and people not being aware of alternatives. Until recently, most of our work was on public property. Sharing landowner success stories about the benefits can definitely help.
 - One complaint I've heard is not enough qualified coastal engineers for this work, especially in smaller communities. It's costly to rely on big firms who need to travel from larger cities. There is potentially a big opportunity to provide designs for larger neighborhood scale projects, with local governments establishing local service areas and advancing funding for such projects, which home-owners then repay over time. There is an existing mechanism in BC that could be used for such projects.
- How much are we doing for salmon ecosystem health with these small individual projects?
 - NW Straits showed that even small projects produced results. We got here via "death by a thousand cuts", so the solution can be advanced one Band-aid at a time.
 - Having successful individual projects can also make a big difference in supporting broader buy-in from other home-owners.

Closing Comments

Co-hosts thanked everyone for sharing their knowledge and expertise, noting that session recordings, presentations and other links would all be shared via the Web, along with resources from the earlier workshops.

Participants were invited to complete an online survey and to save the date for the next workshop November 14, 2024.