

Rewetting Our Waterways: Floodplain Restoration in an Occupied Landscape

Knowledge Exchange Workshop November 18th, 2025 ~ 9:00am – 3:30pm PST

Workshop Summary Report

Introduction and Welcome

Moderators Laura Weatherly (DFO, Jason Hwang (PSF) and Greer Maier (GSRO)

Laura welcomed everyone, noting online attendance exceeds 1,500, a record for the series, and provided introductory context, including details about the co-hosts, the workshop series and resources from past events available online. Jason reviewed the day's objectives and agenda and noted the partnership with the Washington State Governor's Salmon Recovery Office, introducing Greer, who stressed the importance of floodplains to salmon recovery and touched on the challenges and opportunities of restoring them.

(Note: For more details of the proceedings summarized below (workshop presentations, video and recording), visit: <https://psf.ca/knowledge-exchange-rewetting-our-waterways/>)

Let's undrain some land: History, theory and practice of floodplain connectivity in the Anthropocene

Brian Cluer, Resilient Rivers & NOAA Fisheries

Highlights of this video/PowerPoint presentation included:

- Growing interest in re-wetting riverscapes, given clear science that slowing down water so it resides longer on land allows essential biochemical processes to reactivate.
- History of European ideas around taming rivers imported to the New World.
 - Example: Straightening of the Rhine to protect floodplain for farmlands.
 - Such solutions now recognized as a problem: dried up wetlands, lower water table and increased flood losses — damage for wildlife and humans.
- Recent realization that river ecosystem functions are essential for people and wildlife to live sustainably, with emergent views of functional floodplains and their rivers.
 - Studies have shown that river-wetland corridors were wet, widespread and ecologically productive in the geologic, prehistoric and recent past.
- Largest riverine wetlands typically occur in lowlands, in occupied valleys where agriculture, private lands, etc dominate — making floodplain restoration challenging.
 - Recent paper highlighted ecological importance of floodplains of glaciated landscapes for gravel bed rivers in mountain landscapes — noting the most important processes, supporting the entire valley ecosystem, are linked to connection of surface and subsurface waters.

- Common valley land uses in mid/upper watershed commonly consist of at least one road, with branching rivers confined to one channel, diminishing biophysical process and the resulting bottom up trophic cascade (from microbes to apex predators).
- Historical land reclamation is typically not well documented — exceptions include California's Central Valley (95% of floodplain disconnected), British Columbia's Fraser Valley (similarly transformed), and Grande Ronde floodplain disconnection history (loss of 95% of wetlands). Restoration work in all three will be covered today, along with restoration in the Snohomish and Nooksack.
- Less known about similar impacts in remote headwaters, e.g. Clearwater tributary in north Idaho.
 - Significant and widespread historic impacts from logging and extensive rail line construction, which typically followed rivers — not previously identified as a stressor in salmon recovery plans.
 - Robertson's valley restoration project.
- Useful to consider past land use effects at the scale of the watershed and dominant processes: headwaters sediment source, mid-zone transport and deposition zone or response reach. Past modifications effectively converted deposition zones to transport zones, because society wanted to drain wetlands and create uplands.
- With few remaining undisturbed streams to learn from, Thorne and Cluer created the conceptual Stream Evolution Model (SEM) to help people set more effective restoration goals. This SEM expands on earlier Channel Evolution Model (CEM) by including the valley and coupling ecological functions to fluvial stages.
 - Overview of CEM concepts, its five phases of channel evolution, and model uses.
 - SEM modified this by adding more phases (renamed stages). Stage 0 and 8 are similar except Stage 8 is at lower elevation and occupies less space.
 - SEM reflects the evolution of a cycle (not linear process) as the cycle can repeat.
 - Example illustrating that achieving process based restoration in depositional valleys requires the restoration of deposition processes.
 - SEM shows that ecosystem function is directly related to degree of floodplain connectivity, with Stage 0 and 8 as the most productive stages, with prolonged inundation of slow moving water.
- Examples of how to use SEM to evaluate a river: Upper Salmon River and Mash Creek in Idaho.
 - Evaluation of Entiat River valley using SEM and GGL tools.
- Recent restoration approaches for achieving target conditions of Stage 0 or 8, can be categorized as process led (accelerating channel evolution), process reset (to jump start valley evolution), and hybrid approaches.
 - Examples of process reset projects: Whychus Creek, Oregon — raised water table, rapid vegetation response, 10-fold increase in Chinook rearing habitat, with consistent rearing benefits for juveniles from year to year.

- Restoration in an occupied landscape: Rancho Canada 200-acre golf course in lower Carmel River valley, California — private lands, expensive real estate, with water scarcity. Used SEM for goal setting and concept design. Stage 0 was not feasible (housing upstream and downstream) so the goal was Stage 8. Benefits include reduced flood risk upstream. Benefits of long-range planning to seize such strategic opportunities when they arise.
- Russian River example in California wine country: transformed a former open pit mine site to a restored floodplain while contained potential contaminants and supporting juvenile salmonids (1-mile floodplain increased habitat of the 8-mile reach 10X). This illustrated potential benefits of revising mine reclamation policy to achieve stage 8 floodplains.
- Extensive regional/global opportunities in restoring gravel pits.
- Examples of floodplain reconnection opportunities in occupied lands, especially public lands, trust lands, ruined lands, private lands of marginal economic value, wetlands used for agriculture and remnant wetlands

Q & A

- Would aiming for Stage 5 and above still apply in BC systems that have been significantly degraded?
 - Consider the expected effects of sea level rise and resetting the shoreline boundary. You can create stage 0-like conditions (Willow Creek example in Washington).
- What are options to arrest incision if we don't have the width?
 - Stage 0 and 8 both require enough width to restore the depositional domain. These are conditions, so the question is how to achieve them (e.g. lowering or raising the stream bed)
 - You need width to restore processes in Stage 0 and 8 so the first question is whether the former flood plain surface is accessible. If so, low tech solutions may work. If it's highly elevated, it takes a lot of work. Or else aim for stage 8
- Did slowing the water flows result in any negative impact to spawning areas?
 - Whychus Creek shows it creates lots of new spawning patches, but it looks a lot different, so you need to be prepared for that.
- We found resistance to the idea of restoring to a wetland fan with less of a fluvial river signature.
 - There's always resistance initially, given generations of practice focused on creating more dry land. We've also trenched alluvial fans (easier to have one bridge). So yes it's controversial initially but there are enormous benefits to slowing the slow.
- How does stage 8 look different from Stage 0 from a design perspective?
 - The end result will look the same except for lower elevation with Stage 8.

Cultivating ecological solutions on agricultural lands by mimicking natural processes at landscape scale

Jacob Katz, California Trout

Presentation highlights included:

- This is all about working to approximate and mimic natural processes.
- The pivot to process and process-based reconciliation: similar pivot seen throughout other natural resources management domains (e.g. wildfire).
- Sacramento Valley overview. Highly diverse ecosystem, home to highly diverse Chinook populations.
 - Former mosaic of different wetland habitats.
 - Fluvial processes and how those shaped the landscape, with elevated channels and ephemeral wetland basins.
 - Thousands of miles of levees built to support development — Humanity abhors a puddle — with 95% of Central Valley wetlands drained.
- We need to understand a river isn't just a thin blue line but much more — including wider area and processes.
 - Study showed far more rapid development of salmon juveniles with access to floodplains in the Cosumnes River.
- Realize we were never going back. But by looking back, maybe we can reconcile the world we've inherited to the one we desire.
- Rice fields occupy much of the former floodplains. Post harvest burning was banned due to air quality concerns, so the next best solution was to flood them.
 - An unexpected benefit of approximating natural flood patterns at the landscape level was the return of abundant waterfowl, which inspired the idea of mimicking natural floodplain processes, using post-harvest rice floodplains:
 - Pilot using 5-acre rice field found significantly improved juvenile growth.
 - The food is on the floodplain: Follow-up comparative study raising juveniles in cages in the river, canal and floodplain found 700% faster growth and 149X greater bug density in the floodplain water.
- Model explaining bio-productivity of floodplain water and the benefits of slowing and spreading water.
 - Harnessing puddle power: Spread it—Slow it—Sink it—Grow it).
 - Growth benefits also relate to residence time.
- What parts of the landscape leads to differential success?
 - Study of Fall run Chinook showed that despite these “floodplain fatties” being a small proportion of outmigrants, those that had access to floodplain rearing represented a significant majority of returning fish.

- Time series showing sudden collapse of most Chinook populations except one small Butte Creek run, where restoration of headwaters led to a rapid, dramatic population response.
 - Butte Creek fish moved out via connected floodplains — “floodplain fatties.”
- Floodplain Forward partnership to mimic natural landscape processes, advance floodplain reactivation.
 - 31-partner collaboration representing a broad range of private, public and non-profit interests
- Project examples:
 - Wet side. Reactivating floodplains in the Sacramento River Basin, Nigiri Project, Yolo Bypass (project to restore flooding and access to floodplains).
 - “String of Pearls” — restoring landscape resilience for Sacramento River salmon.
 - On the dry side (not accessible by fish) some things can also be done, e.g. flooding the landscape to support juvenile rearing, then draining it back to the river.
 - Landscape scale: Floodplain-derived food web subsidy to river channel habitats.
- The mathematics of recovery: Each system is different. You may not have rice fields to flood but it’s fundamentally about slowing and spreading water and how that captures energy to produce salmonid biomass. This “puddle power” is also about having enough residence time in these favorable environments.
- Restoring access to the necessary conditions at each life stage as essential to population level recovery.

Q & A

- Q/A: This doesn’t just work with rice fields. It’s not about rice fields but about puddles. Any time water sits in a puddle, it will produce a wetland type environment within 3 weeks so it’s about inundation duration and residence time. Mimic long duration inundation and shallow depth. You can do it anywhere else. Examples include sloughs, oxbows or Sumas prairie. Restore it from steep to shallow slopes. Flood gate redesign in the Lower Fraser is another example.
- Q/A: Such restoration opportunities usually arise at a small field scale, and they can be as simple as mimicking beaver dams. Many such small scale projects can achieve a population level effect.

Evolution of fish habitat and floodplain restoration in the Grande Ronde basin

Allen Childs, Confederated Tribes of the Umatilla Indian Reservation

- Upper Grande Ronde identified as a model watershed in the 1990s and targeted for restoration in a partnership led by First Nations.
 - Important habitat for Chinook, Steelhead and other aquatic species.
 - Grande Ronde Basin history: logging, mining, railroads, roads, agriculture; impacts include river channelization and loss of wetlands.
 - NW Power Council Fish and Wildlife program:
- Initially started with simplistic restoration projects, evolved towards more sophisticated channel and floodplain restoration and then shifted from an opportunistic to a more strategic approach.
 - Co-developed an atlas with partners and many years of research: identified habitat limiting factors, biologically significant reaches and best places to focus resources.
- Examples of prioritized projects:
 - Catherine Creek floodplain restoration (2015-16) — Mile-long reach: Saw a rapid vegetation response, beaver colonization, complex new habitat with large pools and off-channel habitat and 65 acres of reconnected floodplain. Resulted in more moderate river temperatures.
 - Bird Track Springs (2018-19) — Channelized system right next to a highway. Restored island braided channel morphology. 135 acre site; results not as productive yet.
 - Middle Grande Ronde River helicopter wood augmentation and future gravel augmentation — Tier 1 reach in upper watershed starved for natural gravel accumulation. Saw significant uplift and activation just from wood augmentation. Next phase: consider natural gravel augmentation after this settles for a few years.
 - Upper Grande Ronde Mine Tailings Reach: First phase in 2000. Considering full valley reset to Stage 0/8.
 - Lookingglass Conservation Property: Considering hybrid approach, with focus on reconnecting the middle channelized section.
 - McCoy Meadows Conservation Property: Initial single channel not successful, considering a Stage 0 demonstration project.
- Valley reset Stage Zero: Looking for such opportunities.
- Key takeaways from this work:
 - Importance of a prioritization framework and getting all basin partners on the same page, addressing common themes.
 - Evolution of design goals
 - Habitat complexity and complexity matter.

- Importance of water temperatures (summer and winter) as limiting factors.
- Be patient, let the project develop and monitor to inform future efforts.

Q & A

- Q/A: Early on, the projects were very focused on structures but were not getting the full benefits of floodplain reconnection. Projects were also more opportunistic instead of strategic and focused on prioritizing fish habitat.
- How can we prioritize given the lack of prioritization frameworks in BC?
 - Prior to the atlas, there were efforts to develop sub-basin plans and to bring all the experts together. The timing of the atlas was good for incorporating historic research, plus the ability to do hydraulic modelling. The first step is to compile the history of what's going on, limiting factors, etc, and then pulling it all together to prioritize where and when to do the work, with process based restoration as the primary strategy.
 - Importance noted of having such a baseline when funding is focused on action projects.
- Q/A: The typical approach with the hydraulic modelling is to run multiple flows, but it's also important to model in relation to life history windows (e.g. winter medians for juvenile overwintering habitat), or impact of higher flood events on infrastructure. So it's useful to look at multiple scenarios, both from depth and velocity perspectives.
- Q/A: Re fish response, Catherine Creek is seeing good response from both juveniles and adults. We're seeing good response in the summer reaches, both spawning and rearing, with larger juveniles. But when they get to the valley we're still seeing upwards of 60% mortality, so we know we need to adapt our strategic plan.
- Q/A: The most beneficial actions include flood plain reconnection and off-channel habitat to support post-emergence of juveniles, slow water habitat and deep water with lots of cover.
 - It depends on the life histories.

Putting back the river: restoring floodplains in the Syilx Okanagan territory

Natasha Lukey, Okanagan Nation Alliance

Presentation highlights included:

- This work involves many partners, and relies entirely on public funding.
- About the Okanagan Nation Alliance (ONA) and its Fisheries Department.
- The work is informed by traditional ecological knowledge and western science.
- Guiding concepts: Focus on restoring fish passage to historic ranges.
 - Key relationships between Chinook, Cottonwoods and sediment.

- Alluvial river form and process theory:
 - Patterns in river form typically shaped by river processes.
 - Natural width to depth ratios
 - Belt width analysis: formula provides unique results for each river.
- Aligning hydraulics: re-engaging un-perched floodplain.
 - Mission Creek example: set back dikes, added woody debris; native Cottonwood naturally colonized — dream project.
- Second approach: re-engaging perched floodplain, i.e. bringing the land down to the water.
 - Orri dike setback: Had to revisit original design and dig a little deeper, add notches to improve inundation.
 - Penticton floodplain: Went a little deeper and experimented with bank slopes to restore historic umbrella of stream bank vegetation.
- Re-engaging perched with riffle to elevate surface water at 2-year flood level.
 - Newbury riffle to elevate SWE.
 - Orri side channel reconnection to create off channel habitat for Chinook.
 - Trout Creek project: widened channel and back watered pool from riffle to create new spawning habitat.
- Floodplains are a vital part of the river, typically inundated at 2-year flood levels or above.
 - Key considerations in designing floodplain reconnection projects.

Q & A

- Q/A: There's not much we can do about flashy stormwater so we avoided some areas which serve as major stormwater catchment and filtering.
- Q/A: Black cottonwood foster other understory species that in turn support Chinook. They also pull water up and distribute it across the land, which supports other species relationships.

Morning Panel Discussion

- Jacob: “Floodplain Fatty” video showing Sacramento Valley salmon juveniles doubling in size with access to floodplains. We can’t expect recovery unless we change the world the fish are swimming through. It takes landscape-level changes to achieve population level responses. We often don’t have the luxury of Stage 0 restoration in occupied landscapes, but if we understand and provide the biophysical conditions that they need at each life stage, we can get a population level response. We often only get access to small spaces, but you get what you can and connect it to the next one, creating a string of pearls to rebuild abundance. Butte Creek is the only place you still have puddles and you still get a population level response. It can be any place where water spreads and slows. We can learn from the successes of restoring wetland habitat for birds.
- How do we address legacy contaminants in floodplain restoration?
 - Brian: Most contaminants readily oxidize so it’s about creating conditions for that.
 - Jacob: We don’t see significant physiological effects of exposure to agricultural chemicals in the Sacramento Valley.
 - Natasha: ONA tests for and avoids releasing contaminants.
- Q: Different species prefer different habitats so how do you plan projects to meet the needs of different species?
 - Allen: Promoting diversity and complexity provides a variety of habitats to support fish at different life stages and to provide different options to meet different needs.
 - Brian: Gentle slopes provide stage resilient habitat for juveniles, so they don’t have to move far.
 - Jacob: By approximating historical patterns, we provide habitat for all the native critters and plants that are related and inter-connected.
- Q: What are the most important considerations for selecting sites for floodplain reconnection?
 - Allen: Most watersheds alternate between confined and unconfined. We typically prioritize response reaches as having more potential than confined reaches, which are a little more risky in terms of structural improvements.
 - Natasha: We are always working in constrained areas so we take what we can get but if we can choose, we look for where can we achieve belt width and dial back the energy of the river flow. If you get the energy right, the river will start to heal itself.
 - We have also heard the message of focussing on the beads or pearls on the string.
- Q: How do you consider the archaeological potential in restoration activities?
 - Natasha: We do archaeological assessments as part of our planning process. Often the results will inform our floodplain design. We always have archaeological monitors on site, especially during excavation.
- Q: Comment on relative elevation and modelling in site selection.

- Brian: Priority sites are those, using the hydrography, where we can engage the land most easily. Another considerations for getting water out of the channel and into other features is duration. If you can't keep it out for 30+ days, it won't be helpful. If you're not producing food on these flood lands, you're not benefitting recovery.
- Jacob: So it's not just about the juveniles accessing floodplains but keeping them there long enough to accrue benefits. It needs to be long enough for the food web to mature and for the fish to eat it. It's difficult to approximate the biological functions with postage stamp sites.
- Natasha: We also look at minimum 6-week timing, so we don't necessarily cut right at the 2-year flood line.

Floodplains by design: collaborative resilience in Washington state

Allan Warren, Bonneville Environmental Foundation

Presentation highlights included:

- Context: Costs of flood disasters exceed those for all others in Washington state.
- FBD program overview:
 - Funding eligibility — offers flexible funding to help bring people together.
 - Capital grants focussed on integrated floodplain management.
 - Last year, funded half of all requests; lots of work to leverage and attract funding
 - Learning program to connect practitioners and build capacity.
- Snapshot of accomplishments since 2013.
 - For every dollar invested, 7 dollars are saved.
- Role of the State Department of Ecology and the NGO team.
- Integrated floodplain management starts with bringing people together to develop collaborative approaches.
 - Iterative cycles of success build trust, generate greater benefits for more interests.
 - Focus is on supporting multi-generational change.
- Examples of successful projects: Programs helps to connect people across the network.
- Summing up: In the past, flood management solutions were out of synch with other objectives. Floodplain management is very complex, with additional challenges linked to ongoing populations growth, and more complexity expected in future, so integrated floodplain management is key to tackling all the inter-related challenges effectively.

Q & A

- How long does it take from gathering people to shovels in the ground and how much does it cost?
 - It takes years. Getting people around the table takes time, so we're talking 10-20 year timelines. But it builds momentum once you build trust and achieve initial successes. We do need to speed up the pace, so we're looking at how we can help provide capacity to speed up these processes. We funded \$75 million for 11 projects in the last round, with a cap of \$10 million per grant to ensure it's spread out, although these grants often attract significant matching funding. We also have smaller \$2 million projects or \$0.5 million pilots.
- Apart from land acquisitions, what are successful approaches to getting land owners on board?

- Planners are happy to have agricultural land zoning in the floodplains, because that means it won't be developed. So moving levees where the farm still has access to the land near the river. Or providing long-term funding to maintain riparian habitat. Having farmers at the table to explain what they need/want is valuable.
- How are future climate projections incorporated in project design?
 - It's been an interesting evolution in the past 6 years, in terms of getting more useful climate info for planning at the local scale, thanks to several local studies, including on the expected intrusion of saltwater into groundwater and/or changes that will make land un-farmable.
- Can you provide details re the report of increased productivity of 1,996 acres of working land?
 - This is from Whatcom County. That funding can be used to improve drainage;. There are also studies to improve efficiency of water use, and use of robotics to improve efficiency, etc.
- Comment further on the preparedness payoffs of these investments.
 - The 7/1 savings on investment figure was based on a study for FEMA. New insurance industry studies are also trying to quantify future costs and benefits. The number jumped from 13/1 to 25/1 in the latest 2025 study.

Snohomish case study: Community floodplain solutions

Jessica Hamill, Snohomish County

Presentation highlights included:

- The CFS program is essentially a microcosm of the Floodplains by Design program.
- Overview of today's key floodplain challenges
 - By 2050, 100-year floods are expected to occur 4 times more often in Stillaguamish reaches and twice as often Snohomish and Skykomish reaches.
- The purpose of the program is to mitigate the risks to farms and homes while increasing salmon habitat by giving the river more room.
 - Geographic overview: Focus of this work is in the lower river and estuary areas.
- Salmon Recovery Plan: Progress so far relative to 10 year goals set in 2005.
- CFS launched in 2019, with Phase 1 now complete: Summary of accomplishments.
- Strategies and actions are driven by data and science, and led by the Snohomish Implementation Team Collaborative.
- Project proponents/partners.
- Four funding rounds completed so far; growing scale of work, with leveraging of other funds/partnerships.

- CFS implementation process: Enable > Design > Implement > Evaluate cycle with projects funded to support all 4 stages in the cycle.
- Web map: Decision support tool to identify priority areas with overlapping priorities (farm, flood, fish).
- Schematic showing how the program supports work at various stages for projects funded by multiple sources.
- Recently conserved lands in the Snohomish Basin: Variety of sources used to acquire lands, relocate displaced users.
- Examples: Tualco Valley connectivity project.
 - Roth Farm project: piloting an innovative financial model to sell the tillable land to a farm trust, and to lease land to the displaced farmer while restoration is being done.
 - Agriculture technology improvements program: includes soil sensors to minimize waste (water, fertilizer, labour) while improving soil health.

Q & A

- How would these projects differ if the FBD program didn't exist?
 - You'd have a more silo'd approach, more delays in securing funding for the overall program. Some of the projects wouldn't even have gotten started. It's not just about the capital funding but the support to bring people together, and to demonstrate progress on the ground to build trust.
- For the Roth Farm, did you consider restoring the entire site?
 - That wider reach has been prioritized so this was in part a feasibility pilot.
- What modifications did you make on the go, or would have made, in retrospect?
 - We are always evaluating our projects, including landowner willingness, which can shift over time. A key lesson from our early projects is that you need to engage early at the community level, where you can often find community champions who will make a big difference.
- How do you juggle multiple municipal governments, First Nations and others, as well as all the other interests?
 - The Tulalip Tribes are key partners and play a key role bringing people together, but there is a lot of herding cats and getting people to understand the tradeoffs — i.e. being realistic that you need to give up something to gain the benefits.
- How can we use leases and easements to allow flood waters on land?
 - Snohomish County developed an easements white paper and we are piloting that — i.e. it's about compensating landowner for not putting in armouring. These tools can be important in starting those relationships.

Fighting nature on the Fraser River

Tamsin Lyle, Ebbwater Consulting

Presentation highlights included:

- Background/context: Fraser River as the pivotal force that shaped the Lower Mainland of BC, now home to over 2 million people.
- Following major past floods, the focus was on dike reconstruction “to restore the faith in the diking system.”
 - The draining of Sumas Prairie illustrates the arrogance of these engineering solutions. It created a “safe development paradox” that encourages more development based on assumptions that the infrastructure can keep everyone safe, and ultimately more losses when it fails.
- The illusion of safety was disproved by the 2021 atmospheric river and this can be a catalyst for change going forward.
 - Climate change is affecting our hazard: we’re at the point where we simply can’t build the dikes high or strong enough to meet the rising waters.
 - And at a time of fiscal austerity, there is a large and growing funding gap to just maintain existing dikes.
- The international UNDRIP and Sendai frameworks recently informed a new BC document “*From Flood Risk to Resilience: A BC Flood Strategy to 2035.*” While there is no funding, it presents an opportunity to break from this path.
 - These documents emphasize that water is not the problem — putting vulnerable things in the way of water is the problem.
 - And multiple factors (climate change, further development) are growing these risks, so the challenge is how to reduce that.
 - Using the Hazard, Exposure and Vulnerability triangle to prioritize actions.
- Lower Fraser Floodplains Coalition: Bringing partners together to address the challenge of fragmented governance.
 - We need to have conversations with farmers, First Nations and others to identify common goals and get out of our silos.
 - Initial efforts to address planning gaps, including new database going live shortly.
 - Key message: We need to get out of the silos and have that dialogue while we’re waiting for funding.

Q & A

- The 2021 disaster happened, we spent significant money on engineering fixes and now we’re back waiting for the next one. How do we break this cycle?
 - This is our moment to do it. We have no money for more costly engineering. After the 1948 flood we built all these dikes, and then we did the same after 2021. But now we

don't have the money to respond reactively, so it's an opportunity for a different approach. It's better to go slow and make fewer mistakes.

- Q/A: Canada doesn't have a national flood insurance program because we recognized that it's not fiscally prudent to insure in this space. So there will be spots of land across the country that won't be insurable and that will give us a reason to retreat in a managed way.
- Given the costs of dikes and hard engineering, is the case being made forcefully enough that other approaches can be both more effective and more cost effective.
 - We haven't done a good enough job at communicating this to legislators and decision makers, who are more focussed on short term funding cycles, and explaining the 7/1 payoff.
- Q/A: There are similar floodplains everywhere in BC, so we need to ensure it's clear that building houses in flood zones is not fiscally prudent. We do have examples in the Okanagan and smaller watersheds in Vancouver Island, but we need to spend more time in BC on that first phase of outreach.

Afternoon Panel

- Tamsin: Using that triangle of risk, there are so many options for reducing vulnerability (e.g. putting raincoats on houses) and addressing infrastructure so that we're ready for flooding, e.g. changes to building codes, or changing to flood resilient crops and allowing some portions of the landscape to be wet all the time.
- We need to link floodplain restoration to flood risk. Are there many studies to support that?
 - Allan: There are studies that we cite; the core message is about the economic benefits/savings. There are billions of dollars of infrastructure at risk. FBD started as a \$500K pilot. They had the partners to show why this works and why it was worth investing in. It takes perseverance and the right message.
 - Jessica: It's important to share these messages with communities that are seeing the change that the studies show.
 - We'll probably never get all the flood storage we need but every project will reduce the risk.
 - We do have the studies and the media have picked them up, but the public is so saturated with doomsday messaging that we haven't been able to translate that into action yet. So you do need to keep at it.
 - Every crisis creates an opportunity so that's when you need to really convey it, sensitively.
- How to deal with BC's Agricultural Land Reserve and reluctant farmers?
 - There is benefit to discussing the value of maintaining the ALR, as farmland that is less vulnerable to flooding than houses. There has been some trepidation about approaching farmers with alternative solutions since the 2021 event, but there is opportunity to share some of these successful US solutions with them.

- There may be more than one channel for such conversations (example of the Agricultural Land Commission's reluctance to accept the Cowichan proposal because of their mandate, and how that's an opportunity to consider the mandate more broadly).
- It's not always about the farming community. They're not a monolith. It can be about finding that first farmer who becomes a champion, speaking to the benefits and encouraging others to follow suit.
- The contentious lawsuit approach is not effective. Find the champion. Work locally to find the farmer with a collaborative mindset. They have a lot in common with the tribes as both have a "seven generations" mindset. The more opportunities to talk, the more chance of finding common ground.
- Many people would find alignment on this narrative. A key challenge is that resources are locked up in the traditional ways of doing things, with very little available to do things differently.
- What would be the strategy for a very constrained state?
 - You need a bigger canvas. The City of Portland bought smaller homes to reduce flood risk for more expensive homes downstream. The EU Water Framework Directive is dealing with all these issues. Humans don't like to plan, but we're at a tipping point where we need to plan to stay here.
 - We all want to win but we need to be willing to make the tradeoffs to make it happen.
 - It's an interesting twist that the insurance company actuaries are doing the work that our urban planners failed to do.
 - Progress is being made in some parts of the US, where communities are making the necessary changes and getting insurance savings. But we need to convince people to do the investment upfront.
- Are there other models like Floodplain by Design?
 - There is an earlier project in Nevada that informed this program. American Rivers is helping other states replicate the Floodplain by Design program. It's a very effective model in terms of getting bipartisan legislative support and community successes.
 - We're seeing other key players like real estate investment trusts divesting, so it's an opportunity to manage to ensure these areas don't get used as cheap land for social housing.
 - We're trying to fix 150 years of bad development practices while also trying to avoid the next 150 years of bad development practices. The many overlapping complexities call for greater planning integration. So we need programs that improve integration of all aspects of planning while not making it difficult for people like Jessica to get projects off the ground. For Washington, the top priority right now is housing, and floodplains are a cheap place to build housing. So how can we align our work with the big challenge of the moment and help to get people into safe places.

- One of the reasons people don't like planning is we haven't made it easy for people to do it. So we need to incentivize people to plan, by giving them priority for when funding is available.
- Another big obstacle is permitting. If you have the pre-planning, it creates opportunities because you are ready to go when you have the next flood.
- Comment on the idea of using erosion as opportunity.
 - NOAA was spending a lot on bank stabilization, which is counterproductive to providing good habitat. We should not spend on ecosystem projects that block the natural evolution of river systems.
 - It's a people problem. It's not just a technical question, it's a social question. So it's about having the flexibility to address landowners' concerns in return for building a partnership that can achieve greater benefits.
 - There is opportunity to take a layered approach, with a toolkit of incentives, so maybe a channel easement here, and something else there. It's about getting them to understand how rivers work and communicate that you can give up this to get that.
- Closing thoughts:
 - We know that our disasters are human caused, so we need to have some humility and recognize the need to work together on solutions.
 - The goal this afternoon was to identify different ways of working in occupied landscapes. So we have a lot of good examples. A lot is possible. Thanks to all the speakers.

Adjourned