



# Floodplains by Design

• REDUCING RISK, RESTORING RIVERS •

# Newsletter

December 2023

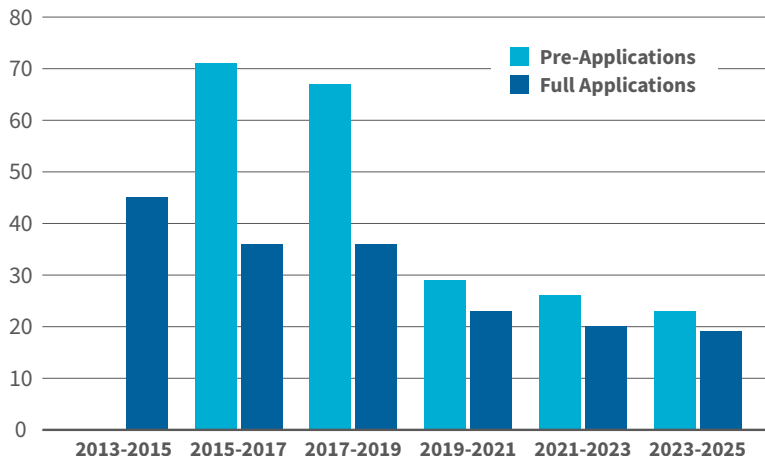


Photo Credit: Lower Columbia Estuary Partnership

## By the Numbers: The 2025-27 FbD Grant Round Highlights

With Floodplains by Design (FbD) pre-applications for the 2025-27 grant round due January 12, we wanted to highlight some key numbers related to prior grant rounds throughout the lifespan of the FbD program.

### Number of Applications Received 2013-2025



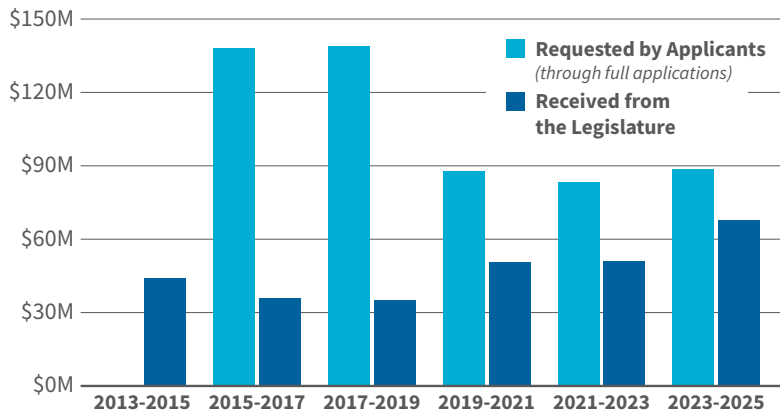
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# 35

Total FbD grants awarded since 2013

### Total Amount of Funding Each Biennium 2013-2025



### Current Total FbD Program Metrics

*\*including projects funded for the 2023-25 biennium*

# 7,184

Jobs created

# 34

Recreation areas improved or established

# 131.69

River miles restored, protected, or with improved habitat

# 20,367

Acres of improved working lands

# 85

Communities with reduced risk

# 7,778

Acres of land protected from development (includes working lands)

# 11,374

Acres of floodplain reconnected

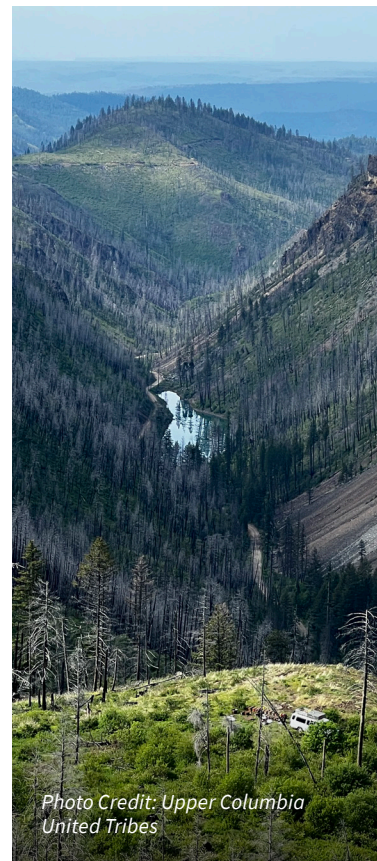


Photo Credit: Upper Columbia United Tribes

# Eligibility and Competitiveness of FbD Projects

BY AMELIA PETERSEN

With Floodplains by Design (FbD) grant pre-applications due January 12, we wanted to highlight the various features that make for an ideal proposal. Eligibility is the main threshold to cross for moving from the pre-application to full application stage with competitiveness being more of a consideration during the full application stage.

Determining if a project is eligible is typically straightforward, and is dependent on if the applicant is an eligible entity and on what activities are being proposed, and this can be referenced in Chapters 2 and 3 of the [FbD Funding Guidelines](#). At times, new activities – to the program – are proposed. When this occurs, program staff work together to determine if the new activity fits into the goals of FbD.

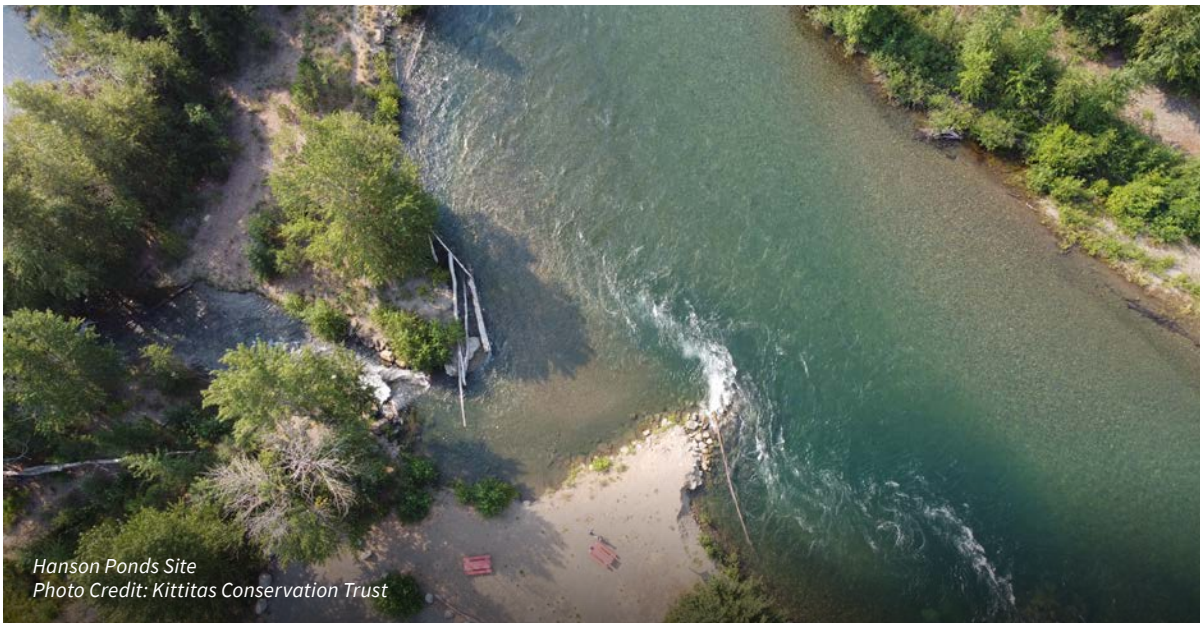
What makes a project more competitive for scoring points and ranking higher on the proposed funding list is ultimately up to the evaluation team. This team is composed of experts in the fields of floodplain management, ecosystem restoration, agricultural resilience, and/or general project management. Project

competitiveness is mainly based on how a project fits into the scoring criteria. There are many elements that can make a project application more competitive. Overall, a project is considered very competitive if it solves multiple floodplain management challenges, particularly at a reach or watershed scale, in addition to demonstrating community engagement and efforts to address other community needs.

Under the scoring criteria, the highest number of points (60 points possible) are available for Flood Hazard Risk Reduction and Floodplain Ecosystem Restoration/Protection. To sum up those two categories: proposed actions should aim to improve the resiliency of floodplains to protect local communities and the health of the environment.

## Flood Hazard Risk Reduction

For the Flood Hazard Risk Reduction category, it helps to demonstrate and quantify the flood risk, as well as to quantify the improved flood safety for an area and demonstrate no adverse impacts. The proposal should



Hanson Ponds Site  
Photo Credit: Kittitas Conservation Trust

show how there will be reduced vulnerability to flooding for communities, commerce, and/or agriculture, both on a short-term and long-term basis. Some examples of this include moving people and infrastructure away from the river, reducing impediments to flow, and providing more floodplain area for flood water conveyance and storage.

### **Floodplain Ecosystem Restoration/Protection**

The proposal should also demonstrate that the project will conserve and restore habitat for fish and wildlife. It should aim to maintain or re-establish natural processes and functions, considering future conditions. If in a salmon-centric area, your proposal must address recovery priorities for salmon species that are listed on the Endangered Species Act or that are the preferred prey of orcas. Evaluators like to see proposals that build on previous restoration work and consider a broad variety of ecological functions, values, and benefits to the affected human communities.

The next four highest scoring criteria categories with the most points available (each have 30 points possible) are:

- Collaboration/Partnerships
- Integration
- Other Relevant Benefits
- Readiness to Proceed

### **Collaboration/Partnerships**

Competitive proposals should describe the outreach to, and specific involvement of, interests related to

the project. If the applicant is not a Tribal entity, the proposal should demonstrate engagement directly with Tribes in the project area on the planning effort. Applicants should also describe the locally driven effort to develop this proposal, the history of the project area and the history of collaboration with partners. Letters of support should be provided if possible and the proposal should show how collaboration will continue going forward and lay the groundwork for future efforts.

### **Integration**

Competitive proposals describe integration with other plans and bodies of work. Highlight how the proposal aligns with other plans and work, such as salmon and/or watershed recovery efforts. Proposed actions should draw from multiple recent planning efforts representing varied interests and should describe how technical studies have led to integrated actions and sequencing.

### **Other Relevant Benefits**

For the Other Relevant Benefits category, a competitive proposal would describe additional benefits provided by the project, such as water quality improvement, jobs, education and public involvement, or new and/or improved recreational areas.

### **Readiness to Proceed**

A competitive proposal also ought to describe the overall project process, including critical milestones, skills and experience of the project team, deliverables, and a long-term maintenance plan. It should also highlight any issues, such as permitting barriers. It



should describe how the proposal builds off previous investments and demonstrate that the lead organization has adequate capacity and staffing to manage the funds. If you are planning acquisitions or easements, show extensive collaboration with landowners.

The next two scoring criteria are worth 20 points each:

- Cost Effectiveness & Budget
- Outcomes & Public Benefits

### Cost Effectiveness & Budget

For the Cost Effectiveness & Budget category, competitive proposals provide a detailed budget showing a clear methodology and well-defined costs, as well as significant match and leveraged funds. Describe how the project reduces maintenance cost to show the project is cost effective. Develop a schedule, budget, and scope that completes the projects within four years.

### Outcomes & Public Benefits

Proposals should also show a clear, quantified, and substantial public benefit. Provide metrics and outcomes relevant to your proposal, for example, the number of acres of restored floodplain. This information is helpful for the FbD program to review during the funding cycle evaluation process, for communicating with partners and legislators, and to gauge success of projects when funded ones are completed.

### Agricultural Viability & Benefits

We also have a standalone category worth 30 points, Agricultural Viability & Benefits. These points are for agricultural areas only; your project does NOT have to include agricultural benefits to be eligible or to score well. However, if your project IS in an agricultural area, we want to hear how you have engaged with agricultural interests and how your project will impact those areas.

Projects with no benefits to agriculture are scored out of 280 points possible, while projects that do include benefits are scored out of 310 points possible. To normalize scores between projects with or without agricultural benefits, Ecology uses a “percentage of available score” system. For example, a project NOT located in an area where lands are in active agricultural production has scored 260 points, so they would receive a score of 92.9%. Comparatively, a project located in an area where lands ARE in active agricultural production also scored 260 points, and they would receive a score of 83.9%. So, if your project is NOT in an agricultural area, don’t try to score extra points by filling in the agricultural section in the application, as this could decrease your overall score.

### We look forward to reviewing your pre-applications!

If you have any questions, please contact [Amelia Petersen](#) or your regional FbD project manager.



Gold Basin Restoration Project, Stillaguamish Tribe of Indians  
Photo Credit: Scott Rockwell

## FbD Backbone Proposed Actions in 23-25 Biennium Relating to Permitting

Project permitting involving local, state, and federal actors is identified by many salmon recovery and agricultural voices as a significant barrier to the implementation of projects that increase community and ecosystem resilience. Proposed efficiency measures can raise concerns among local governments tasked with administering and enforcing floodplain management standards.

With Tribal Treaty Rights increasingly at risk (see NWIFC overview, [here](#)), there is urgency and legal standing to prioritize efficiency measures, which in some but not all cases could conflict with current floodplain management regimes. Potential challenges faced by counties charged with managing and enforcing floodplain regulations that would need to be understood and addressed under some permitting efficiency measures include:

1. Potential increased flood risk.
2. Uncertain and diverse impacts on flood liability.
3. Potential lowered point totals in FEMA's Community Rating System, leading to increased property insurance rates.

The Department of Ecology<sup>1</sup> and Puget Sound Partnership Ecosystem Coordination Board<sup>2</sup> have shared letters with target audiences to highlight permitting challenges. The Floodplains by Design backbone, with partners, has identified a set of actions that would be beneficial and necessary to support progress with particular attention to floodplain management concerns. These ideas are summarized in section 2. Ideas also build upon other work initiated between 2021-2023, some of which is described here:

- The [Multi Agency Review Team](#) has seen early success with project by project streamlining work.
- Puget Sound Partnership and Northwest Indian Fisheries Commission shared challenges around no rise and permitting with the Council on Environmental Quality (CEQ) in Washington DC, raising interest among the Puget Sound Federal Task Force.

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<sup>1</sup> Ecology letter: <https://drive.google.com/file/d/1JO7LrOjyEKs5M6QWl7RtPNMSCuVlVp-/view?usp=sharing>

<sup>2</sup> Puget Sound Partnership Letter: <https://drive.google.com/file/d/1eu9MCdXkZxBFFJ8AmeH7jnovqzJCbo1n/view?usp=sharing>



*Reconnected Gibbons Creek from drone  
Photo Credit: Lower Columbia Estuary Partnership*

- In the wake of large federal funding awards, a pre-permitting [project map](#) with Tulalip Tribes and other WRIA 7 partners was developed to engage with the Multi Agency Review Team, and stimulate discussion around the volume of projects coming in the years ahead and how permitting agencies will meet the need.
- Snohomish Conservation District obtained a grant to explore efficiencies for agricultural producers.
- The Nooksack and Lummi Tribes obtained a grant to address challenges with CLOMR/LOMR implementation. The MART and EPA are exploring efforts to advance batched CLOMRs and similar efforts.
- The USACE Regulatory Branch and Lower Columbia Fish Recovery Board initiated a Section 404 Permit Streamlining Effort, with a report in development.
- The Washington Department of Transportation developed numerous tools and approaches to support permitting efficiency to meet requirements of the culvert injunction.
- In 2022-2023, FbD hosted Lunch and Learns on: [The Multi Agency Review Team and Habitat Recovery Pilot Program](#); [USACE permitting and the pre-application process](#); [Section 401 Water Quality Certification](#); [Cultural Resource Review](#); and a Values Convening. A Silver Jackets project with the USACE, American Rivers, BEF and others aims to clarify information about USACE structures and Nature Based Solutions.

### President Biden has Signed an Executive Order on Reforming Federal Funding and Support for Tribal Nations

The Executive Order aims to reform how the federal government funds and supports Tribal Nations. To fulfill this goal, the Executive Order:

- Requires federal agencies to take action to ensure federal funding for Tribes is accessible, flexible, and equitable.
- Creates a one-stop-shop for federal funding available to Tribes, called the [Tribal Access to Capital Clearinghouse](#)
- Aims to evaluate trust responsibilities by assessing unmet federal obligations to support Tribal Nations.

To read more about the Executive Order, [click here](#).



King County's Riverbend Project

## PROPOSED ACTIONS

In order to proceed efficiently and effectively, permitting process changes will need to be accompanied by other efforts to share information, learn from local jurisdictions and Tribes and develop new capacity and tools. There are a number of parallel efforts proceeding and we aim to coordinate and align actions for stronger results. Feedback welcome on the following ideas:

1. Create and host a Flood Hub information portal or repository to share documents that can be used across the region to share resources to bring more ease into this work, for example:
  - Design RFPs
  - Hydraulic and Hydrologic Modeling Quality Assurance and Project Plans (QAPPs)
  - Work with local governments to identify effective local ordinances, policies and practices that are used in different jurisdictions in Region 10, as well as issues that require attention.
2. Convene a CLOMR/LOMR working group with consultant expertise to share information, practices, and brainstorm pathways for improved mapping and permit implementation. This idea has been supported by numerous Tribal government and salmon recovery organization staff, and would complement and at times potentially integrate with other agency-led efforts. Future steps may also include:
  - Provide access to additional expert legal and/or engineering capacity to nimbly advise and co-develop permitting strategies with project proponents and collaboratives.
  - Socialize and better understand needs and expectations around mapping - what is needed regarding maps, how to deal with dated maps, how to address risk? Seek to identify how information can be delivered in a more effective and efficient means.
  - Support efforts to bundle projects and advance pilot permitting efforts. Advocate for full time staffing support for MART and potential expansion of agency participant capacity.
3. Aggregate information to systematically document permitting timelines and gather information to inform the legislature. For example:  
Track along a gradient of project complexity:
  - Permitting process and duration
  - Document delays and reasons
  - Include state and local permits

This effort can complement work underway in late 2023 by Puget Sound Partnership, and expand it to include the entire state, document trends beyond CLOMR/LOMR issues, and to include those associated with many types of permits.

4. Identify policy changes needed to address permitting challenges. Work with Tribes, local partners and other key decision-makers to build a coherent understanding. This would include local governments and project proponents, including agencies as relevant.

### Effort to collect information from project proponents on FEMA requirements

The Puget Sound Partnership (PSP) has been working with salmon recovery partners over the last couple of years to address project implementation challenges arising from FEMA requirements and processes. In the coming months, the PSP will be working with Tribes, Department of Ecology, the Council on Environmental Quality, and others on a national level to push forward solutions that make it easier to implement on the ground projects. As part of that work, PSP would like to capture the extent of permitting challenges across the state. They have developed a spreadsheet to help capture information on various challenges and will use it to create a StoryMap that will be shared with federal legislators and others. If you have any situations you would like to highlight where FEMA requirements delayed, changed or otherwise negatively affected project implementation. Please reach out to [Melissa Speeg](#) if you would like to contribute information to this effort.



# September Convening Summary

SEPTEMBER 11, 2023 – PORT OF EVERETT

Being together in person was a welcome opportunity and drew over 100 people from around Washington State and a few from further afield, joining from BC and Colorado.

It was important and fun to celebrate the diverse skills, perspectives and leadership of the many individuals who advance the practice of integrated floodplain management. Integrated floodplain management in Washington is as strong as the people working to advance it and requires diverse forms of expertise and power.

The breadth of afternoon speakers underlined the many important challenges we face together, and the flawed systems we are working within. Key themes that emerged included:

- **Flood Management:** Crisis presents challenges but also opportunity, if communities include priority IFM projects in their Hazard Mitigation Plans, they can strategically prepare to move more nimbly and strategically than the permitting and funding system typically allows.
- **Agriculture:** The overarching economic system is driving family farmers out of production, which will

increase development and hurt communities and floodplains. Farmers are at the mercy of pricing systems that are driving them out of business.

- **Tribal:** Disaster planning systems can be out of alignment with tribal values and priorities because they are reductionist and only consider humans. Permitting at federal, state and local levels can be dysfunctional, discouraging actions that support quality habitat conservation and restoration. The declining status of salmon populations is a persistent and urgent hazard for many tribes.
- **Permitting:** USACE is making an effort to increase their accessibility and connections to permittees. There are numerous new staff members coming on board and the Corps expressed commitment to.

The following convening summary will share other key takeaways and reflections from attendees and speakers throughout the day. Keep reading to find links to recordings of speaker presentations, graphic notes from the convening and more!



Floodplains by Design September 2023 Convening  
Photo Credit: Carol Macilroy

## MORNING SITE VISITS

We want to extend gratitude to Snohomish Conservation District, Snohomish County and Tulalip Tribes for leading morning site visits for convening attendees.

### Chinook Marsh

#### Project Highlights

- Vision evolved over decades of assessment, planning, and investment
- Work advanced through strategic opportunism (acquisition)
- Power of collaboration - building multi-partner coalition to move project forward, leadership of tribes, county and conservation district

#### Project Challenges

- Infrastructure is mixed with project with habitat restoration in this large scale project, evolving requirements and understandings of implications and costs
- Site user expectations on this well-used levy may present challenges. Work will involve incorporating and communicating recreation opportunities so users know what will change (Spencer Island and Chinook Marsh).

### Swans Trail Slough

#### Project Highlights

- Utilized Fbd funding to support IT - this was key to get the work done and support the necessary planning and vision
- Strong landowner support and leadership
- Part of a multi-benefit project list
- Utilized different funding sources to move collective work forward (NOAA, SRFB/PSAR, ESRP, FbD)

#### Project Challenges

- Permitting will be complex and time consuming. Exploring efficiencies through the Multi Agency Review Team (MART).



Chinook Marsh Site Visit  
Photo Credit: Carol Macilroy

## AFTERNOON AT THE PORT OF EVERETT

We want to extend gratitude to The Nature Conservancy (TNC) for their continued support and partnership and support of integrated floodplain management across Washington state. While the Floodplains by Design program would not be possible without the Department of Ecology, it simply would not exist without the leadership and vision of TNC, who worked with Tribes and communities to stand up this program and set it up for success.

**We would love to see your photos from the convening!**

If you have any photos to share, please upload them to [this folder](#).



*The TNC team (from right to left: Bob Carey, Jessie Israel, Heather Cole, Justin Allegro and Chelsea Carson) at the September Convening  
Photo Credit: Carol Macilroy*

## Presentation 1

Planning, recovery, response and permitting: Joel Freudenthal, Yakima County - Crisis as Opportunity: reflections on pre-disaster planning, response, recovery, and permitting

[Link to Presentation 1 Video](#)



A huge thank you to Nitya Wakhlul of Drawbridge Innovations for supporting our convening with graphic notetaking.

## Presentation 2

Agriculture needs and stressors: Barn Lights Presentation by Dillon Honcoop, host of the Real Food Real People Podcast and Communications Director for Washington state-focused advocacy nonprofit Save Family Farming

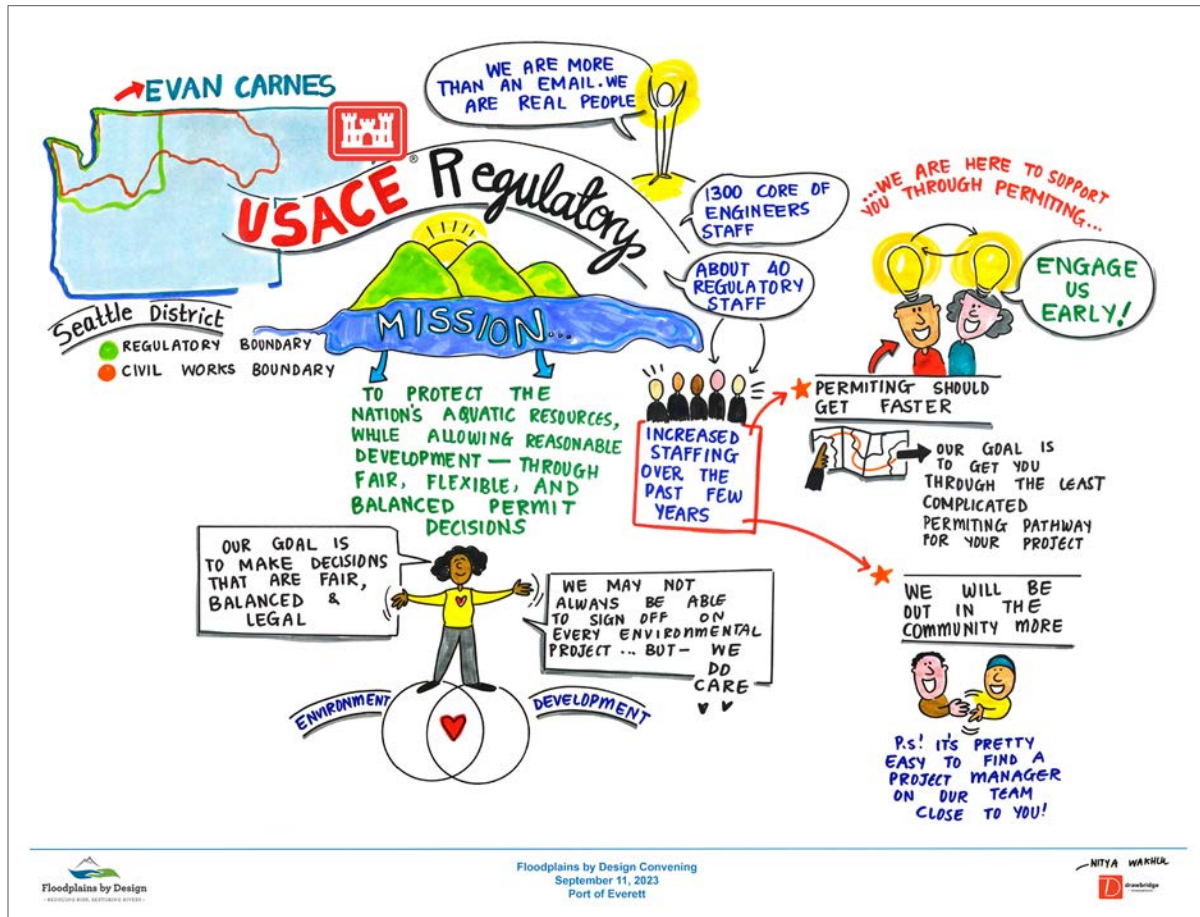
[Link to Presentation 2 Video](#)



### Presentation 3

The USACE Seattle District, Regulatory Branch: Evan Carnes, USACE Columbia Basin Section Chief, The USACE regulatory branch, project complexities vs permitting, integrated flood risk reduction projects and nature based solutions

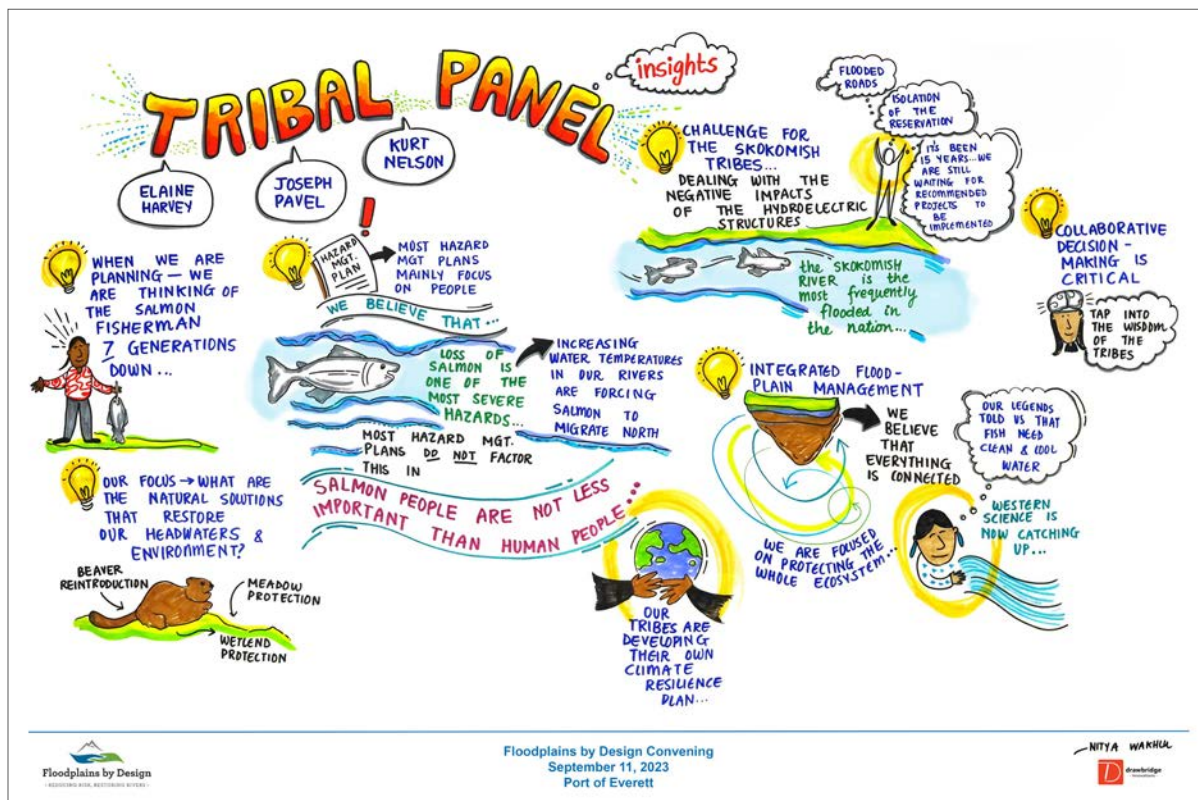
[Link to Presentation 3 Video](#)



## Tribal Panel: Reflections on Pre-Disaster Planning, Response and Permitting

- Elaine Harvey, Watershed Department Manager, Columbia River Inter-Tribal Fish Commission
- Joseph Pavel, Director of Natural Resources, Skokomish Indian Tribe
- Kurt Nelson, Environmental Department Manager, Tulalip Tribes

Link to Tribal Panel Video [Part 1](#) and [Part 2](#)



## WHITEBOARD RESPONSES FROM ATTENDEES

### What has FbD done for you that is unique and special?

- Inspired me
- Connected me to a whole group of superstars in the watershed
- Made a concerted effort to engage with our rural Eastern Washington jurisdiction in a way that many programs don't
- Connected us with legislative and potential mentors
- Provided inspiration by demonstrating what can be achieved at a watershed scale through partnership and collaboration
- Coordinated legislative outreach that helped us secure funding to restore over 1,000 Acres
- Demonstrated for the restoration community and others the potential of a broad inclusive coalition to design advocate for and implement significant multi benefit projects
- Funding for agricultural and land acquisitions
- Working to eliminate match funding reporting these big projects all have multiple grants and not enough to include match in our PRPRs is a huge grant admin lift
- Expanding capacity and funding jobs in an economically depressed area
- Help me love my work and make many wonderful connections, thank you

### How does your work support climate resilience?

- Flood risk reduction through floodplain reconnection helps us adapt to higher winter flows
- Increasing understanding about flow changes and sediment that have already happened
- Removing at restructures from the floodway
- More space
- Preventing shifting baselines in the face of climate change

- Modeling climate change conditions and incorporating into alternatives analysis and criteria for selecting preferred alternatives
- Designing coastal / tidal restoration projects that make shorelines more adaptive to sea level rise
- Building resilient ecosystems in the face of weather extremes and their impacts on flow (higher highs, lower lows)

### What metric do you wish you had?

- Number of minds changed to value restoration, fish, farms and nature-based solutions
- Number of fish produced
- Number of partnerships built or created
- Expected number of years to realize proposed project goals
- How do you quantify loss of culture and or historic homeland?
- Number of people fed due to land put back into farm production
- Number of acres of farmland saved, protected or preserved
- How long to get a permit, could use USACE table of easy to difficult projects
  - Explain each type
  - Explain duration for each
  - Explain reason for delays
  - Add to this state and local permits
- Collaboration and Trust - the power of partnerships to accelerate progress
- Less is more, form follows function, watch for bunny holes
- Sometimes you wish there were fewer metrics
- How many people you made happy with the restoration project



## MINI AWARDS

### Most Interesting Animal Interaction Award

**Chris Collins** for outstanding efforts to support lamprey at the Steigerwald project

### Valiant Grant Management Award

**Randy Johnson** for efforts after a flood took about the Olympic Discovery Trail bridge the JSKT team rapidly adjusted their FbD grant and designed, permitted and built a new bridge within a few months. Record time!

### C-3PO Award

**Guillaume Mauger** for translating climate technical information into something usable and applicable while on a wild ride.

### Outstanding Management Award

**David Hawes** for efforts to identifying talent and supporting staff

### Integrated Floodplain Management Poet Award

**Patrick Reynolds** for efforts to poetically capture what matters most

### Community Commitment Award

**Jason Hoekstra** for heroic efforts in the aftermath of the 2021 Nooksack flood event to get feed to livestock.

### Cat Herding Award

**Diane Hennessey** for persistence in efforts to bring efficiencies into permitting systems that are difficult to wrangle.

### Sunshine Award

**Kristin Williamson** for bringing energy, light, focus, and skill that has things growing everywhere!

### Direct Tribal Ecological Knowledge Award

**Joseph Pavel** for outstanding knowledge at the mouth of the Skokomish

## SPECIAL MENTIONS



### Excel Spreadsheet Extraordinaire Award

**Darcey Hughes** for effort and skill in complex information management



### Leadership in Cross Disciplinary and Agency Collaboration Award

**Morgan Ruff** for commitment and skill in bringing people together

## MINI AWARDS (CONT)

### 2023 Friend of Washington Floodplains Award

Keeping with that theme of recognizing the important roles that people in the FbD Network play, we were pleased to award our inaugural “Friend of Washington Floodplains” award to **Representative Steve Tharinger** and **Senator Mark Mullet**.

Rep. Tharinger and Sen. Mullet have been big supporters of their own local projects, going out to meet with project managers and partners on site at projects such as Clallam County’s Lower Dungeness River Floodplain Restoration Project and King County’s Riverbend Levee Setback and Restoration Project. However, as budget committee leaders, they’ve also played a vital role in helping incentivize integrated floodplain management throughout

the state. On a personal level, Rep. Tharinger even sold his home as part of a floodplain easement program to help the Lower Dungeness project move forward!

The work of creating safer, healthier, and more vibrant communities within and around floodplains is hard, complex, and truly generational work. We need champions like all of you, as well as champions within all the different layers of government to make it happen. Without the support of Rep. Tharinger and Sen. Mullet, it’s safe to say that Floodplains by Design would not be the program it is today, and for that, we are honored to award them both the inaugural “Friend of Washington Floodplains” award.



L to R: Scott Richards and Bob Carey (TNC), Rep. Tharinger and Sen. Mullet, Kas Guillozet (BEF), Allan Warren (BEF), Bobbak Talebi (Ecology), Brandon Parsons (American Rivers) and Mary Huff (Ecology)  
Photo Credit: Carol Macilroy



## Introduction to Jonathan Loos: New Ecology Floodplain Management Policy Lead

**Hannah Buehler:** Can you give a brief overview of your new role at ECY?

**Jonathon Loos:** I'll give the disclaimer that I, and my team, are still learning what my role is going to look like. We've been calling it the Flood Policy Lead position for short, within the flood team at the Washington Department of Ecology (ECY). My role is largely split between two buckets of work. The first is providing policy support for the Floodplains by Design (FbD) program. Our program manager, Amelia Peterson, who's really wonderful and knowledgeable, will be kind of at the helm with Mary Huff, and then I'll be supporting looking at the nuts and bolts of how the policy components of the program work. I'll also be doing a lot of the interfacing between our agency and other agencies and working to build and maintain support for the program. FbD is funded by legislative allocations each year, but it's not enshrined in state code anywhere. That provides a great deal of flexibility to the program, which is an asset, but it means there's a lot of legwork in engaging with our partners to elevate the need for FbD across Washington watersheds and highlighting successes. I will be work to identify and overcome policy barriers to keep those successes coming.

Through my work I aim to help keep the FbD program forward-looking and responsive to local needs within floodplain management policy. FbD is this really innovative, integrated approach to managing flood hazard areas and river corridors, but it's not a static program, it needs to keep being responsive to environmental change and social change, and the needs of Washington communities and Tribes. For instance, we need to ensure that the program is accessible to historically underserved communities and is mindful of how inequitable management approaches that were historically baked into our modern institutions have produced the distribution of flood risk and environmental degradation we see today. The FbD program is an opportunity to intervene in those institutions and patterns, and it will be an ongoing effort.

The other part of my position will be looking at the big picture related to integrated floodplain management in Washington state, beyond the FbD program. Washington's river corridors and floodplain

environments are under pressure from environmental and climate change and Washington communities and ecosystems must continue to thrive within them. I want to understand what policy and planning levers available to support that effort. For example the Growth Management Act (GMA), designates frequently flooded areas, or floodplains, as critical areas that communities must consider when planning and investing in the future. That is an increasingly important and complex endeavor and I'm going to be thinking about how the State might enhance policy and planning support for it. I'm looking forward to building relationships and working across state agencies to do this.

**HB:** What past professional and life experiences will inform your work on FbD?

**JL:** I am the kid of two geologists. Growing up I spent a lot of time outside, especially on rivers. I was very lucky to grow up overseas for a while, and no matter where we were, rivers were a space that I got to know myself and got to know my family. Those experiences really drove me to be interested in river ecosystems, and drove my studies into ecology and environmental sciences. Now, I know that floods are some of the most acute ways that communities are going to feel the impacts of climate change. That motivates my work in this area.

My whole career has been set around being an interdisciplinary worker and thinker. My master's work brought me into the economics of ecosystems and thinking about how you look at the value of floodplains and work to restore their natural capacity to mitigate floods while incorporating that value into community planning. That brought me to my work at American Rivers where I was a fellow for two years and helped to develop some of the guiding science for floodplain restoration and floodplain management while working in DC. While in DC, I was mentored by the national lead on flood policy for American Rivers. We were engaging with FEMA, the US Army Corps of Engineers as well as Congress lobbying to develop support for nature based solutions and approaches to flood mitigation.

Eventually, American Rivers moved me out to Seattle to support the community-driven restoration efforts that were driving this paradigm shift away from reliance on built and engineered flood protection, to one that

returns room to rivers to flood and adjust naturally in a way that's healthy for people, rivers and floodplain ecosystems. In this role, I learned a lot about the long legacies of colonial development in Washington and the dispossession of Tribes from lands and fisheries and the deep injustices that ensued. Engaging with communities and restoration efforts in the Green-Duwamish, the Teanaway Community Forest, and the Chehalis basins I observed the ongoing and slow process of repairing those relationships officially at the state and federal level, and the pivotal role of those relationships in salmon recovery and climate resilience efforts today.

This river restoration and flood policy experience led me to think a lot about how river restoration is driven by both physical interventions in a landscape, and also societal interventions in relationships between institutions and landscapes. I used to think that someone should study the deep changes underway in watershed restoration and policy, and eventually I decided maybe I could be that person. This led me to my PhD at Dartmouth College where I worked with river scientists, governance and policy experts. I developed my dissertation research looking at how systems of watershed governance evolve, focusing at the local level, and trying to understand what leads communities experiencing environmental or climate change to adjust how they manage their resources towards more adaptive



outcomes versus what leads other communities to double down on their historic approaches that are maladaptive in some cases. I was particularly looking at flooding and why repetitive flood losses occur in some communities and what leads them to use buyouts and get people out of harm's way while others do not. I researched watershed governance in Vermont, Colorado and Washington state. All of that knowledge and experience I plan to apply in my work in this position.

**HB: What else do you want the FbD community to know about you?**

**JL:** I want the community to know that I'm really keen on building relationships to understand and get into the nuance of what different communities need in terms of policy support and technical support in addressing their own flood and salmon recovery challenges. The FbD Program is an incredible outcome of a lot of collaborative, bottom up and grassroots efforts, and it won't be a static solution to those challenges. I am really excited to support those efforts at the state level and to be working at the forefront of this challenge. I am here to listen, learn, and elevate voices – I'd love to hear from you!

**HB: What about your interests outside of work?**

**JL:** Washington is the first place that I've ever lived where I have felt at home from the moment I arrived. I live in Seattle, and I have loved putting down deep roots and building a really strong community of friends and chosen family. Washington is an incredible place to be, period, but the community that I've built is what really keeps me here and keeps me connected to this place. I want to bring that into my work as well. I also love being outside, cooking, seeing live music and going to art shows in Seattle.

*About Jonathon: I consider myself a watershed scientist and policy wonk with a career centered on advancing the resilience of people and ecosystems. I recently completed my Ph.D. at Dartmouth College in New Hampshire where my studies focused on watershed governance and restoration. My dissertation examined the evolution of watershed governance systems in response to social and environmental change, and I'm especially interested in understanding what drives local governments to adopt new strategies for dealing with climate extremes (e.g. floods and droughts). Today my work is situated within flood governance and policy, and I have enjoyed working with communities all over the place including rural Vermont, western Colorado, South Africa, Greenland, and our very own Washington. Prior to my Ph.D. I worked for American Rivers to address federal flood policy issues in Washington, D.C. before relocating to Seattle to support community-driven river restoration efforts across Washington state. Before entering the policy world I worked as a field ecologist surveying sage grouse habitat across public lands in Wyoming and Colorado, and completed my B.S. in biology at Trinity University in San Antonio, TX in 2012.*

*Today I live in Seattle's Capitol Hill neighborhood, and you can find me hanging about town at parks, music shows, or potlucks, or escaping on weekend trips to pretty/quirky places. I'll be reporting to Ecology's Shoreline and Olympia offices regularly.*

# Deep Learning's New Role in Precise Salmon Population Monitoring

BY HANNAH BUEHLER

Wild salmon populations are critical for ecosystems, livelihoods and communities throughout the Pacific Northwest. Salmon species region-wide have experienced significant decline since the Euro-American colonization of the region in the 1800s, and face new challenges today in an era of accelerated climate change. As salmon populations continue to both struggle and persist, annual returns have become increasingly difficult to predict. There is an urgent need for dependable and timely monitoring methods to assess ecosystem health, inform sustainable fishery management practices and support salmon conservation efforts.

Counts of the population of spawning salmon have historically relied on the use of in-river video recordings or the use of sonar cameras. Currently, these methods require the manual review of vast amounts of video data to tally and count various species of salmon, usually as fish pass through weirs or other dams. This hand-count often consumes a significant amount of fisheries staff

time, and the resulting data is often only consolidated and available after the fishing season has concluded. This prevents fisheries management staff from having the most up to date data possible to make in-real-time management and conservation decisions.

A new method of data collection that uses deep learning algorithms could play a significant role in providing accurate and prompt population data for more adaptive in-season fisheries management.

Deep learning, like other artificial intelligence (AI) learning models, uses artificial neural networks that can process and analyze large quantities of data in real time. These models simulate the way the human brain processes and learns information. Vast amounts of data can be imputed and the program is able to rapidly review, analyze and learn from that data. As these new technologies forge rapid change across many industries, the fisheries and ecosystem management sectors are now looking to harness the power of deep learning in the work of restoring salmon populations.



National Park Service  
Photo Credit: Tewosret Vaughn



In collaboration with two First Nations fisheries programs in British Columbia, a group of Canadian researchers has successfully developed, trained, and tested the use of a deep learning algorithm to streamline the salmon counting process. Using what's called a "computer-vision" model, in-stream video data is fed into the algorithm, and the computer model, rather than a human counter, is able to review the data and automate the tallying of fish with rapidity and precision.

This trial deep learning algorithm was also trained to automatically recognize and classify different salmon species based on their visual characteristics. To achieve this, researchers fed the algorithm diverse representative images and video clips featuring salmon species in different lighting, environments and from different angles. These original clips provided to the algorithm were labeled with the correct corresponding species so, like a human would, the model could then use that data to learn to identify various salmon species independently, ultimately eliminating the need for manual species identification by fisheries staff and allowing for the efficient monitoring of multiple species simultaneously.

This initial research foray demonstrated a high degree of success, although challenges remain. The physical differences between individuals of different sex in the same species, as well as high degrees of variation of coloration, size and secondary sex characteristics among some salmon species all complicate automated detection. Additionally, overlapping fish, rapid passage and training the model in new environments all require the continued fine-tuning of these models.



While this study tested the deep learning model in rural streams in collaborations with First Nations fisheries programs, the application of emerging technologies are often solely scoped and developed within urban environments without considering the applications of the technologies to rural, remote or historically marginalized communities. Additional research in this field should continue to center and support Indigenous-led monitoring and assessment programs.

Deep learning and computer-vision models are likely to continue to improve society wide, potentially revolutionizing salmon monitoring efforts. The rapid and accurate review of in-stream video data holds great promise for reducing fisheries staff time spent on counting and analysis and can provide real-time insights into fisheries health and species composition. This technological innovation could become a cornerstone in enhancing the sustainability of salmon populations and supporting ecosystem management in the face of rapidly changing environmental challenges.

*Atlas, W. I., Ma, S., Chou, Y. C., Connors, K., Scurfield, D., Nam, B., Ma, X., Cleveland, M., Doire, J., Moore, J. W., Shea, R., & Liu, J. (2023). Wild salmon enumeration and monitoring using deep learning empowered detection and tracking. *Frontiers in Marine Science*, 10. <https://doi.org/10.3389/fmars.2023.1200408>*

## Events, Opportunities & Resources

### Grant application period opening soon for Coastal Protection Fund

The Department of Ecology is pleased to announce that grant applications for the Terry Husseman Account (THA) for Coastal Protection Fund will soon be accepted. THA grants support locally sponsored projects that restore or enhance natural habitat that is in or adjacent to streams, lakes, wetlands, or the ocean. To be considered, projects must provide primary benefits to public resources (land or water stewardship) and affiliated infrastructure.

**Application Opens:**

Jan. 2, 2024, at 8 a.m.

**Application Closes:**

Feb. 6, 2024, at 5 p.m.

[Click here to learn more.](#)

### Washington's Floodplain Management Featured at Climate COP 28

Washington's nature-based approach to floodplain management elevated at global climate conference.

At the global climate conference (COP28) in Dubai, Washington's Floodplains by Design (FbD) partnership is elevated as a leading nature-based approach to climate and community resilience in the face of rising sea levels and increased flood risk. On December 2nd, Daniel Morchain, TNC's Global Climate Adaptation Director highlighted FbD during a panel discussion about bringing nature-based climate solutions to scale, noting its collaborative and multi-benefit approach to watershed-scale climate resilience.

Recognition at COP28 comes on the heels of a record-breaking year for Floodplains by Design, after receiving Washington's Climate Commitment Act funding to advance floodplain management along the Quillayute River. A project that will increase climate resilience for the Quileute Tribe in the face of rising sea levels and riverine flooding.