

Puget Sound National Estuary Program

# SYNTHESIS OF INTEGRATED FLOODPLAIN MANAGEMENT IN SELECTED PUGET SOUND RIVER DELTAS

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## EXECUTIVE SUMMARY

The goal of the [Floodplains and Estuaries Implementation Strategy](#) (Habitat Strategic Initiative Lead 2021) is to accelerate regional progress towards the Floodplains and Estuaries Vital Sign Indicators – increasing functional acreage of the 17 largest Puget Sound floodplains and 16 associated river delta estuaries. Progress toward the targets will help to restore critical ecosystem services in support of human well-being (cultural, economic, and flood safety) and ecological productivity and diversity. The Floodplains and Estuaries Implementation Strategy emphasizes the importance of developing and implementing a system that supports integrated floodplain management (IFM) approaches within and across Puget Sound river basins, simultaneously considering needs related to flood safety, salmon habitat, and agricultural viability.

The purpose of this synthesis is to support the Habitat Strategic Initiative Lead with future adaptive management of the Floodplains and Estuaries Implementation Strategy and to serve as a resource for integrated floodplain management practitioners in Puget Sound. The synthesis is a comparative analysis of the integrated floodplain planning process approaches of a select group of IFM groups but should not be considered an endorsement of any one approach.

The Puget Sound Institute at the University of Washington Tacoma was tasked by the Habitat Strategic Initiative Lead to explore and characterize the integrated floodplain management groups, organizations and processes operating within selected river deltas in Puget Sound – the Nooksack, Samish, Skagit, Stillaguamish, Snoqualmie, and Snohomish.

The IFM groups include:

- Floodplain Integrated Planning (FLIP) – operating in Whatcom County and focusing on the Nooksack River and tributaries
- The Farm, Fish and Flood Initiative (3FI) – operating in Skagit County and focusing on the Skagit River and Samish River watershed
- Sustainable Land Strategy (SLS) – operating primarily in Snohomish County and focusing on the Snohomish and Stillaguamish Rivers
- Fish, Farm and Flood – operating in King County and focusing on the Snoqualmie River and tributaries

While the synthesis is primarily focused on selected groups operating in Puget Sound river deltas, additional examples of groups utilizing whole watershed approaches to integrated floodplain management are included for comparison. These include Floodplains for the Future, operating in the Puyallup watershed, and the Yakima River Basin Integrated Plan operating in the Yakima River watershed.

Each of the IFM groups detailed above are at different stages in their progression, funding and momentum levels as well as differing levels of institutional structures and support. They operate within their own unique “ecosystem” – an ecosystem defined by their respective communities, histories, resources, needs and partners. Comparative analysis of the multi-benefit planning process of each IFM group can be a resource for floodplain practitioners. By comparing the where, what, how and why of the IFM groups through understanding their background, stakeholders and partners, mission and vision, goals and objectives, funding and current projects floodplain practitioners and all those in the Puget Sound recovery community can integrate their floodplain management strategies more effectively.

This synthesis seeks to support adaptive management of the Floodplains and Estuaries Implementation Strategy. It is intended to be a resource to inform and encourage further dialogue among integrated floodplain management practitioners in order to improve the development and implementation of integrated floodplain management approaches throughout Puget Sound.

The appendix includes a summary table of the groups compared in this document for a quick glance at the details of their respective efforts and achievements.

## ACRONYMS AND ABBREVIATIONS

Commerce	Washington State Department of Commerce
CD	Conservation District
DNR	Washington State Department of Natural Resources
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
FbD	Floodplains by Design
3FI	Farm, Fish, and Flood Initiative (3FI)
FCZD	Flood Control Zone District
FEMA	Federal Emergency Management Agency
FFF	Fish, Farm and Flood
FFTF	Floodplains for the Future
FLIP	Floodplain Integrated Planning (FLIP)
IFM	Integrated Floodplain Management
IOC	Implementation Oversight Committee
IS	Implementation Strategy (under the Puget Sound Action Agenda)
LO	Lead Organization (under NEP)
NEP	National Estuary Program
NFIP	National Flood Insurance Program
NFWF	National Fish and Wildlife Foundation
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NTA	Near-Term Action
PSP	Puget Sound Partnership
PSWC	Puget Sound Watershed Characterization
SFRB	Washington State Salmon Recovery Funding Board
SLS	Sustainable Lands Strategy
SWM	Surface Water Management
TNC	The Nature Conservancy
WDFW	Washington Department of Fish and Wildlife
WID	Watershed improvement district
WSDA	Washington State Department of Agriculture

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\*The reader will notice that not every section contains identical sub-headers. This is due to the uniqueness of each organization and that some may have required a background section while others may not, or that some have not published goals and objectives, or mission and vision statements. For all intents and purposes, the sections are organized as similarly as possible with the information available.\*

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### 1. Background to Puget Sound Recovery

The National Estuary Program (NEP), administered by the U.S. Environmental Protection Agency (EPA), was established to protect and restore the water quality and ecological integrity of estuaries of national significance. The [Action Agenda for Puget Sound](#) is a comprehensive plan that helps to efficiently allocate federal, state, and local recovery investments based on a science-driven, prioritized system.

The Action Agenda for Puget Sound focuses recovery efforts on 25 [Vital Signs](#) that track progress toward Puget Sound recovery goals. These Vital Signs represent overarching measures used to communicate the health of Puget Sound and gauge improvements or declines. Each Vital Sign has one or more specific and measurable metric, known as indicators, which have associated recovery targets that align with regional recovery goals. These indicator targets include quantitative milestones that reflect the region's commitments to and expectations for significantly improving the condition of Puget Sound.

[Implementation Strategies](#) describe outcomes necessary to accelerate progress towards one or multiple Vital Sign indicator targets. They are intended to serve as a road map for aligning opportunities across agencies and programs, provide priorities for the Action Agenda, and guide funding decisions. These strategies are developed collaboratively with technical, professional, and policy experts and with local and regional input.

The goal of the [Floodplains and Estuaries Implementation Strategy](#) (Habitat Strategic Initiative 2021) is to accelerate regional progress towards the Floodplains and Estuaries Vital Sign Indicators – increasing functional acreage of the 17 largest Puget Sound floodplains and 16 associated river delta estuaries. Progress toward the targets will help to restore critical ecosystem services in support of human well-being (cultural, economic, and flood safety) and ecological productivity and diversity. The Implementation Strategy emphasizes the importance of developing and implementing a system that supports integrated management approaches within and across Puget Sound river basins, simultaneously considering needs related to flood safety, salmon habitat, and agricultural viability.

The purpose of this synthesis is to support the future adaptive management of the Floodplains and Estuaries Implementation Strategy<sup>1</sup> and to serve as a resource for integrated floodplain management practitioners in Puget Sound.

### 2. Integrated Floodplain Management

Integrated floodplain management (IFM) seeks to address the disjointed, sporadic and silo-ed approach to floodplain management that generally describes how agencies respond to both flood disasters and flood preparation. Integrated floodplain (or flood) management seeks to bring a multi-disciplinary perspective to flood management planning and decision-making by replacing

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<sup>1</sup> <https://pspwa.box.com/s/c4vjba1kffsbfb87b157c00btkfvz8tz>



traditional flood management strategies that are “reactive and mono-disciplinary” with a multi-disciplinary, integrated “paradigm shift” in flood control policies.<sup>2</sup>

In 2002, the Associated Programme on Flood Management (APFM)<sup>3</sup> developed and articulated the concept of IFM as “a new approach in dealing and living with floods” that aims to “maximize the benefits from floodplains...and addresses flood vulnerability and risks through preventive measures while preserving ecosystems and their associated biodiversity”.<sup>45</sup> The concept of IFM was revised in 2004, with the latest paper released in 2009.<sup>6</sup>

According to APFM, IFM contains the following elements:

- Managing the water cycle as a whole
- Integrating land and water management
- Adopting a best mix of strategies
- Ensuring a participatory approach
- Adopting integrated hazard management

IFM advocates for:

- Adopting a “basin-as-a-unit approach” or “basin” approach to flood management – including managing water in upper catchments for the benefit of downstream water users/dwellers. The basin approach seeks to reduce flood risk downstream.
- Adopting a multi-disciplinary approach in flood management – including requiring input from multiple sectors, disciplines and stakeholders.
- Reducing vulnerability to and risks from flooding – in particular addressing the “vulnerability of flood-prone population groups” by improving on resource accessibility, participation in decision-making processes, incorporation of ecosystem services, and “building organizational capacities”<sup>7</sup>.
- Enabling community participation – including building in participation to decentralize the management process and recognize and negotiate trade-offs. Community participation seeks to involve communities in flood preparedness and resilience decisions, not just agencies.

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<sup>2</sup> <https://www.floodmanagement.info/apfm-concept-paper/>

<sup>3</sup> The World Meteorological Association (WMO), a specialized intergovernmental organization comprised of 193 Member States is the agency of the United Nations dealing with weather and climate. In 2001, WMO working alongside the Global Water Partnership, a “global action network” comprised of “3,000 partner organizations in 179 countries”, formed the Associated Programme on Flood Management (APFM).

<sup>4</sup> Grabs, W., Tyagi, A.C., Hyodo, M. 2007. *Integrated flood management Associated Programme on Flood Management*. Water Science Technology 56. 97–103. <https://iwaponline.com/wst/article/56/4/97/13609/Integrated-flood-management>

<sup>5</sup> The origins of the term ‘integrated floodplain management’ are debatable. National and international organizations, coalitions and groups may have been practicing a form of integrated floodplain/flood management prior to the articulation of the term by creating planning projects that were benefit-maximizing and non-siloed.

<sup>6</sup> <https://www.floodmanagement.info/apfm-concept-paper/>

<sup>7</sup> Grabs, W., Tyagi, A.C., Hyodo, M. 2007. *Integrated flood management Associated Programme on Flood Management*. Water Science Technology 56. 97–103. <https://iwaponline.com/wst/article/56/4/97/13609/Integrated-flood-management>

- Preserving ecosystems – including “addressing the negative consequences of flood-protection measure on the environment” and recognizing the essential services that ecosystems provide in accordance with the “main principles of the ecosystem approach” (according to the United Nations Convention on Biological Diversity<sup>8</sup>).

The APFM describes several challenges that IFM can help to address, including assessing flood management to ensure “livelihood opportunities for populations at risk”, the changes that increasing urbanization causes to floodplains, managing for infrastructure failure, climate change and heavy precipitation events and addressing ecosystem services. IFM uses risk management to identify, assess and minimize risk using region-appropriate flood hazard maps and zoning that are adaptable to the region’s specific flood characteristics. IFM also acknowledges the positive benefits of flooding, including supporting large flora and fauna in riverine ecosystems, recharging groundwater and alleviating droughts (as well as associated social and economic benefits detailed below).

IFM acknowledges the importance of a bottom-up approach to management — incorporating community-based institutions into decisions. According to the literature, water management at the basin scale is “difficult in the absence of an institutional framework” and may require the “involvement of a river basin organization” to ensure cooperation. The APFM warns against “establishing new institutions” that have “authority over” existing institutions but using a “river basin approach” to incorporate downstream stakeholders via “mechanisms for consensus-building and conflict management”. These mechanisms should capture diverse values and opinions through public participation. Lastly, IFM relies on an adaptive management approach to monitor, evaluate and change management plans as needed using transparent gathering, exchange and sharing of information and data with planners and the public.<sup>9</sup>

## 2.1 Literature on Integrated Floodplain Management

Juarez Lucas et al. in their 2016 article “*Integrated Flood Management in developing countries: balancing flood risk, sustainable livelihoods, and ecosystem services*”<sup>10</sup> approach IFM in developing countries with several conclusions that may be helpful in Puget Sound and Washington State.

First, embodying the IFM philosophy involves aiming for diverse objectives in managing flood lands including restoring wetlands to allow for “natural flood attenuation”, engineering flexible embankments and “re-establishing hydrological, ecological and geomorphologic processes of rivers” by re-connecting rivers with floodplains.

Second, IFM may “eliminate direct human use of floodplains in favor of benefits compatible to conservation” because “direct use of flood-prone land is associated with loss of lives and/or

<sup>8</sup> World Meteorological Organization. 2009. *Integrated Flood Management Concept Paper*. <https://public.wmo.int/en/resources/library/integrated-flood-management-concept-paper>

<sup>9</sup> World Meteorological Organization. 2009. *Integrated Flood Management Concept Paper*. <https://public.wmo.int/en/resources/library/integrated-flood-management-concept-paper>

<sup>10</sup> Juarez Lucas A.M., Kibler, L., Kelly M. (2016) *Integrated Flood Management in developing countries: balancing flood risk, sustainable livelihoods, and ecosystem services*. International Journal of River Basin Management, 14:1, 19-31, DOI: [10.1080/15715124.2015.1068180](https://doi.org/10.1080/15715124.2015.1068180)

economic value”.<sup>11</sup> In certain developing countries, flooding exposure is “expected and anticipated because it provides “good and services to communities...that are considered beneficial for agriculture and fisheries” including that “people have developed livelihoods...tied to seasonal flood pulses”.

Adopting models that don’t infringe on the usage of the flood-prone land will require incorporation of “early warning systems, flood risk maps and risk education” to ensure multiple benefits are delivered while flood risk is minimized. To achieve this, Juarez Lucas et al. state that the “key to crafting [multi-benefit] projects that provide benefits to multiple sectors (economic, ecosystem, flood risk reduction) may lie in articulating very clearly where risk and benefits occur in order to design strategies that derive the maximum benefit for the minimum risk.”<sup>12 13</sup>

#### *Literature Related to Puget Sound and Integrated Floodplain Management*

Cereghino et al.’s “Recommendations for Accelerating Estuary Restoration in Puget Sound”<sup>14</sup> report provides recommendations that should be, and are, being incorporated into Puget Sound integrated floodplain management processes. Briefly, Cereghino recommends that agencies and officials:

- Coordinate agency policy and be transparent in identifying actions and responsible actors
- Create and sustain local estuary teams that can engage the right stakeholders in a variety of situations and communicate across stakeholder divides, particularly across technical divides to build consensus
- Acquire priority land now for future restoration efforts
- Attempt to incorporate ecosystem services values into the purchase price of acquisitions, leveraging private interests to assist in those purchases
- Use multi-benefit planning to broaden funding options and expand stakeholders
- Communicate proactively and broadly with community stakeholders (particularly focusing on agricultural and ecological stakeholders)
- Create multi-benefit projects so that land can simultaneously incorporate restoration efforts while preserving agricultural interests (such as meeting future diking and drainage needs).
- Coordinate agency administration to reduce redundancies, delays and resources when applying for funding (particularly grants); preserve “project manager capacity”; combine funding in single contracts; fund administrative staff adequately
- Adjust policy to assist in the creation of consumers for restoration credits (i.e. creating markets for ecosystems services)

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<sup>11</sup> *ibid*

<sup>12</sup> *ibid*

<sup>13</sup> Risk can be perceived differently by different stakeholders. Agencies may assess risk based on statistical analysis (such as VSL, or the value of statistical life) but, according to Juarez Lucas et al., this may result in “sub-optimal decision-making if perceived or acceptable risk is significantly different from managers’ assumptions”. Risk assessment must be beneficial at all levels while also making sure that incorporating “local preferences” into risk “doesn’t introduce subjectivity” into assessments, although certain subjective measures are inevitable depending on local context.

<sup>14</sup> [https://salishseare restoration.org/images/9/9c/Cereghino\\_2015\\_accelerating\\_estuary\\_restoration.pdf](https://salishseare restoration.org/images/9/9c/Cereghino_2015_accelerating_estuary_restoration.pdf)

- Create a mechanism to produce revolving loan funds for acquisition (like those occurring for shoreline restoration in Puget Sound)
- Use science-based decision-making; use regional and local experts, to provide input

According to the *Toward a New Paradigm in Integrated Floodplain Management Status Report*<sup>15</sup> “integrated floodplain management holds promise for addressing current challenges and seizing new opportunities, allowing progress to be made while providing a superior return on financial investments. Integrated floodplain management means using collaborative, integrated processes and practices...that can achieve multiple benefits.”<sup>16</sup> These include:

- Reduced flood risks for communities and commerce
- Healthy habitats for fish and increased prey for Orcas
- Resilient communities and ecosystems
- Minimized flood damage
- Productive, viable agriculture
- Sustainable development
- Jobs and sustainable livelihoods
- Recreation and other opportunities to connect people and nature

Additional research into IFM in Puget Sound has been conducted by the Army Corps of Engineers-supported [Washington Silver Jackets](#), a state led inter-agency team that seeks to reduce natural disasters, including flooding, and enhance response and recovery efforts in Washington (with chapters nation-wide). The Army Corps of Engineers’ (USACE) Institute for Water Resources was awarded pilot project funding to the Silver Jackets in July 2013 to “advance a new integrated approach to flood risk management and habitat restoration planning in the Puget Sound region of Washington.”<sup>17</sup> The project sought to rank Puget Sound “floodplain areas with greatest opportunity for improvement” to “support decision makers as they prioritize floodplain improvement demands.” That project was followed up by a 2016 study to identify and prioritize the “multi-benefit opportunities” of floodplain units on the basin scale. This project included the collection of applications to multi-benefit programs state-wide and incorporation of those programs into a geospatial tool.

## 2.2 Local Development and Adoption of Integrated Floodplain Management

In Washington and Puget Sound, several agencies and inter- and non-governmental organizations have adopted IFM at different times. Several of these efforts have coalesced into large, multi-disciplinary partnerships, coalitions and groups that are advancing integrated floodplain management to address the challenges of balancing floodplain management focused on reducing

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<sup>15</sup> Funded through a \$500,000 Near-Term Action (2016 NTA #0019) to fund several Floodplains by Design-related actions. These include the production of two reports, the aforementioned ‘Toward a New Paradigm: Integrated Floodplain Management Status Report’ and ‘A 5-Year Strategy for Washington’s Floodplains.’ NTA 2016 #0019 additionally convened a storytelling workshop in 2018 to floodplain leaders from eight watersheds in order to train them on “how to craft and share compelling stories about their work”.

<sup>16</sup> [http://www.floodplainsbydesign.org/wp-content/uploads/2018/08/Toward-a-New-Paradigm\\_IFM-Status-Report\\_Final\\_highlights\\_compiled.pdf](http://www.floodplainsbydesign.org/wp-content/uploads/2018/08/Toward-a-New-Paradigm_IFM-Status-Report_Final_highlights_compiled.pdf)

<sup>17</sup> <https://silverjackets.nfrmp.us/Home/About-the-Silver-Jackets-Program>

the effects of flooding, recovering and conserving agricultural and farmland, and restoring and improving fish habitat in estuaries and floodplains.

Floodplains by Design<sup>18</sup>, in their [5-Year Strategy for Washington's Floodplains](#) analysis, includes a diagram that asks “How Integrated is our Floodplain Management”? This diagram includes the following categories:

- Shared Vision
- Goals
- Institutional Structures
- Collaboration
- Participants
- Technical Studies
- Actions
- Scale
- Climate Impacts
- Measuring Success

Insights into many of these categories may be gathered through the synthesis of documents related to the IFM groups and their efforts and achievements.

## 2.3 Focus of this Synthesis

The goal of this synthesis is to explore, analyze and learn from the IFM groups, organizations and processes operating within selected river deltas in Puget Sound – the Nooksack, Samish, Skagit, Stillaguamish, Snoqualmie, and Snohomish. The Habitat Strategic Initiative Lead selected these river basins as the focus of this synthesis because of their potential to make progress towards the Floodplains and Estuaries Vital Sign indicator targets due to their large area of historic contiguous habitat and their significance to local salmon recovery plans.

The IFM groups include (presented in geographical order, north to south):

- Floodplain Integrated Planning (FLIP) – operating in Whatcom County and focusing on the Nooksack River and tributaries
- The Farm, Fish and Flood Initiative (3FI) – operating in Skagit County and focusing on the Skagit River and Samish River watershed
- Sustainable Lands Strategy (SLS) – operating primarily in Snohomish County and focusing on the Snohomish and Stillaguamish Rivers
- Fish, Farm and Flood (FFF) – operating in King County and focusing on the Snoqualmie River and tributaries

While the synthesis is primarily focused on selected groups operating in Puget Sound river basins, additional examples of groups utilizing whole watershed approaches to integrated

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<sup>18</sup> Floodplains by Design is a public-private partnership that strives to “develop and disseminate the principles of IFM” while strengthening “local community engagement in IFM” throughout Washington State. It is described in detail in Section 3.



floodplain management are included for comparison. These groups include Floodplains for the Future, operating in Pierce County and in the Puyallup River watershed including in the Carbon and White Rivers, and the Yakima River Basin Integrated Plan, operating in the Yakima River Basin in Yakima and Kittitas Counties. These organizations a) exhibit the IFM qualities as defined by the Associated Programme on Flood Management in their collaborative farm, fish and flood efforts and b) have a balanced mix of multi-benefit fish, farm and flood collaborative efforts that have been recognized regionally and internationally for their success.

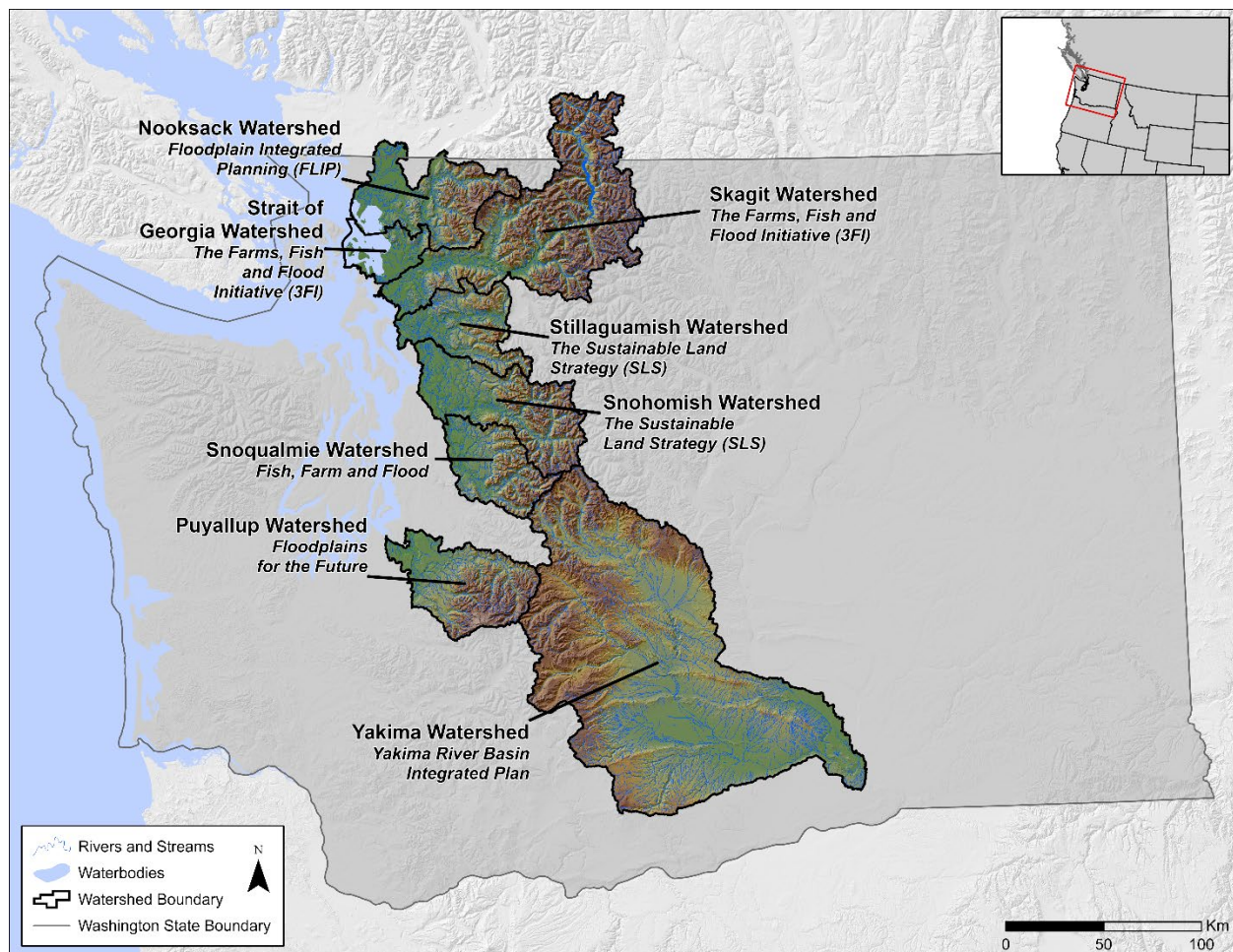


Image 1. Map of integrated floodplain management efforts included in this synthesis by watershed, Puget Sound Institute

### 2.3.1 Methodology of this Synthesis

This synthesis compares the above-mentioned integrated floodplain management organizations, groups and processes operating at the river-basin and watershed level within and out of Puget Sound. The analysis of the groups consisted of document analysis of the following: work plans, progress and financial reports, presentations and published and unpublished papers, meeting notes, agreements/memorandums of understanding, Washington State administrative code documentation and legislative bills and policies. The analysis was supplemented with extensive

interviews and conversations with group representatives to identify critical knowledge gaps in documentation and synthesis efforts.

Initial interviewees and points of contact were suggested to the author by the Habitat Strategic Initiative Lead. Following initial interviews, the interviewees were asked for additional contacts to confirm their statements and provide further details. This recruitment technique is called “snowball sampling” wherein a research participant is asked to assist the researcher by identifying potential other subjects.<sup>19</sup> At least one representative from each IFM organization, group or process was interviewed via telephone for at least 60 minutes. Several representatives were interviewed multiple times and provided direct feedback via email. Suggested contacts were also interviewed or provided with a written section of the synthesis for review via email. Interviewees were not conducted on record and any statements during the interviews were corroborated with published documentation or written confirmation via email from interviewees.

It should be noted the “snowball sampling” is a nonrandom sampling method and thus not without sampling bias. Subsequent interviewees, i.e. those recommended by initial interviewees, were not randomly chosen and are thus not representative of every individual or organization that is working on integrated floodplain management in the selected river basin in Puget Sound. Several important partners were not interviewed as they were not recommended by initial interviewees, including, except in rare circumstances, representatives from tribes. A more in-depth study is recommended as a next step to be more inclusive and include underrepresented voices and perspectives, particularly from tribal members who have extensive traditional ecological knowledge which may not be portrayed in this analysis.

### 2.3.2 Contents of this Synthesis

This synthesis compares the above-mentioned integrated floodplain management organizations, groups and processes operating within and out of Puget Sound by several categories.

Each group has its own section in the document and is analyzed by the categories in the table below. These categories were chosen because they provide a snapshot of the current state of integrated floodplain management operations in the region. The table below describes the subject/category of each sub-header, what question(s) the category seeks to answer, the rationale for including that category in this synthesis and the related category (if applicable) of the Floodplains by Design “How Integrated is our Floodplain Management?” guidance.

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<sup>19</sup> <https://methods.sagepub.com/foundations/snowball-sampling>

Subject/category	Description	Rationale	Related FbD Category
Defining features; geographic focus and background	Describes the organizational structure, leadership, area and extent of operating geography	This characteristic explains whether an organization, group or process is led by a single entity, agency or individual — providing the reader with insight as to how leadership, or lack thereof, may define said organization, group or process. Geographic focus defines where the organization works.	Shared Vision Goals Institutional - Structures Scale
Lead, Consultants, Stakeholders, Partners	Describes who the major players are	This characteristic builds on the previous characteristic by providing more detail on the stakeholders, consultants and partners that work with, or are paid by, an organization or group. This provides the reader with an idea of how many voices are ‘at the table’ and who may influence, or be influenced by, organizational decisions.	Participants Collaboration
Funding	Describes the primary sources of funding <sup>20</sup>	Funding sources provide information on what types of projects or processes groups or organizations are involved with	Inst. Structures Actions
Mission and Vision	Describes the organizations’ mission and vision statements	Mission and vision statements provide readers with information on what priorities and values an organization or group ascribes to	Goals
Goals and Objectives	Describes organizations’ IFM philosophy, stated objectives, goals and principles	The presence of organizations’ stated goals and principles builds on their mission and vision statements	Goals
How Organization Approaches IFM	Describes how the organization approaches integrated floodplain management to demonstrate levels of adoption, familiarity and advancement of IFM principles	This category demonstrates how certain groups may be wholly, partially, or not adopting IFM principles, why this may occur, and how this influences their work	Shared Vision Goals Inst. Structures Collaboration Actions Measuring Success

<sup>20</sup> Funding information is accurate as of August 2021. Funding information was provided by organization and group representatives or if publically available, pulled from federal, state and organization websites.



Projects	Describes previously completed and ongoing projects that the organization or group has been involved with. Projects are often led by flood control districts, agencies, and municipalities. Project partners include state and local municipalities, stormwater management agencies, flood control districts, tribes, irrigation districts, salmon recovery groups, non-profits and IFM organizations and groups.	This category demonstrates the variety and scale of projects that each organization or group has supported, or has been directly involved with.	Technical Studies Actions
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Additional categories that are not included in this synthesis are described below. Through scoping conversations with project stakeholders, it was determined that these additional categories could merit analysis outside of this report – perhaps through a critical analysis or similar follow-up manuscript. The categories include:

- Climate change — If and how the organizations, groups and processes are mitigating and adapting to climate change. For some of the groups included in this analysis, such as the Yakima River Basin Integrated Plan, climate change considerations are impacting how they approach integrated floodplain management, particularly in managing for drought. For others, climate change planning, including adaptation and mitigation, will determine how they may incorporate losses to agriculture, homes/infrastructure and habitat caused by more severe and more frequent flood events into work planning. For example, a 2017 EPA assessment<sup>21</sup> identified and prioritized “climate change adaptation strategies or recovery actions for the South Fork [of the Nooksack River] that explicitly include climate change as a risk”, providing information for the Floodplain Integrated Planning (FLIP) process. Additional aspects of climate change to consider include how best to incorporate the social and economic justice impacts of climate change in the region. Analyzing how the selected organizations, groups and processes are planning to adapt to, and potentially mitigate, climate impacts is a recommended next step for this synthesis.
- Development of quantitative methods to measure implementation of an IFM approach — this category considers if and how groups have developed and might implement success metrics or performance indicators to measure implementing an IFM approach. An additional consideration would be to determine if the organizations are finding that

<sup>21</sup> Klein, S., H. Herron, AND J. Butcher. *EPA Region 10 Climate Change and TMDL Pilot – South Fork Nooksack River, Washington Final Report*. U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-17/281, 2017. [https://cfpub.epa.gov/si/si\\_public\\_record\\_report.cfm?Lab=NHEERL&dirEntryId=338494](https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NHEERL&dirEntryId=338494)

metrics and measurement adds value to their work, or is a burden on administrative capacity.

### 3. Floodplains by Design

#### 3.1 Approach to IFM and Philosophy

Floodplains by Design is a public-private partnership that strives to “develop and disseminate the principles of IFM” while strengthening “local community engagement in IFM” throughout Washington State. The Floodplains by Design program supports capital restoration projects and funds the majority of the work of the IFM groups detailed below. Floodplains by Design seeks to support effective engagement of “the agricultural community, tribal communities and the private sector in local IFM efforts” with “all communities effectively engaged in IFM process”.

Floodplains by Design also convenes a network of IFM practitioners to coordinate and support a collective vision of IFM. Intended outcomes of the Floodplains by Design partnership are strongly aligned with the IFM strategies emphasized in the Floodplains and Estuaries Implementation Strategy. These include that:

- a “strong cohort of highly skilled floodplain leaders and facilitators exists in each major river system with significant flood issues and salmon runs”
- organizations have the “capacity...to monitor and measure progress towards resilience and adaptively manage integrated floodplain management efforts”
- administrators are supportive of IFM
- grants programs are more efficient and coordinated
- floodplain management culture becomes “more nimble and effective”<sup>22</sup>

As part of the Floodplains by Designs’ five year Priority Actions identified in the [5-Year Strategy for Washington’s Floodplains](#), lending “strategic and technical support to integrated floodplain management efforts in at least four watersheds (Snohomish, Stillaguamish, Nooksack, Puyallup, Skagit)” is given high priority.

#### 3.2 Capital Grant Funding

The Department of Ecology administers the Floodplains by Design competitive grant program launched in 2013 to “achieve improved outcomes for river floodplains. Local and tribal governments and nonprofit organizations use Floodplains by Design grants to complete multi-benefit projects that help reduce community flood risks, restore natural floodplain functions, and recover aquatic habitat.”<sup>23</sup>

Since 2013, the Washington State legislature has appropriated \$215.9 million to fund Floodplains by Design.<sup>24</sup> Grant awards per biennium are below. It is estimated that since December 2020, Floodplains by Designs has 45+ funded IFM projects that have “reconnected over 7,200 acres of floodplains, permanently protected more than 1,330 acres of farmland,

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<sup>22</sup> [http://www.floodplainsbydesign.org/wp-content/uploads/2018/08/Toward-a-New-Paradigm\\_IFM-Status-Report\\_Final\\_highlights\\_compiled.pdf](http://www.floodplainsbydesign.org/wp-content/uploads/2018/08/Toward-a-New-Paradigm_IFM-Status-Report_Final_highlights_compiled.pdf)

<sup>23</sup> <https://apps.ecology.wa.gov/publications/documents/2006021.pdf>

<sup>24</sup> <https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Hazards/Floods-floodplain-planning/Floodplains-by-design>

restored over 49 miles of salmon habitat, and reduced flood risks to over 2,200 homes and structures in 59 Washington communities. In addition, for every \$1 million invested in restoration programs such as Floodplains by Design, almost 17 new jobs are created.”<sup>25</sup>

All but one of the IFM organizations, groups and processes described below have received Floodplains by Design grants, often over several funding cycles. The exception is the Farm, Fish and Flood Initiative (3FI) in Skagit County. Floodplain by Design grants are described in each of the organizations’ individual sections in *Funding*.

Biennium	Grant Amount
2013-15 Biennium Proviso Grants	\$32.7 million
2013-15 Biennium Competitive Grants	\$11.3 million
2015-17 Biennium Competitive Grants	\$35.6 million
2017-19 Biennium Competitive Grants	\$35 million
2019-21 Biennium Competitive Grants	\$50.4 million
2021-23 Biennium Competitive Grants	\$50.9 million
Total	\$215.9 million

### 3.3 Network

The [Floodplains by Design network](#) has established a “working framework to make integrated floodplain management the norm in Washington State”.<sup>26</sup> The network includes more than 700 floodplain practitioners in Washington and several work groups, such as the Culture and Capacity Action Group.<sup>27</sup> This group has developed a work plan for fiscal years 2019 to 2021 with three main goals: 1) to “cultivate collaborative leadership and foster strong social ties” 2) to create “relevant, quality opportunities to participate in learning events, ensuring peer-to-peer support, technical guidance and coaching to strengthen IFM practices” and 3) to “provide technical assistance and to disseminate learning content.”<sup>28</sup> The Culture and Capacity Action Group’s activities include recruiting floodplain practitioners to join the Action Group, hosting multiple Action Group meetings, developing member communications, identifying priority audience members, and more.

The Floodplains by Design network includes the Policy and Funding Action Group, the Steering Committee and Operations Group and has a Communications outlet that disseminates related materials.

<sup>25</sup> <https://apps.ecology.wa.gov/publications/SummaryPages/2006021.html>

<sup>26</sup> Harbison, C. [The Floodplains by Design Partnership Organizational Plan is Launching](#) blog entry

<sup>27</sup> [The Floodplains by Design Culture and Capacity Action Group: 2019-2021 Work Plan](#)

<sup>28</sup> *ibid*

# Analysis of Integrated Floodplain Management Groups

Sections 4 through 9 below contain the analysis of the selected IFM groups as specified in Section 2.3 in geographical order: Floodplain Integrated Planning (FLIP), The Farm, Fish and Flood Initiative (3FI), Sustainable Land Strategy (SLS), Fish, Farm and Flood (FFF), Floodplains for the Future and the Yakima River Basin Integrated Plan.

## 4. Floodplain Integrated Planning

### 4.1 Defining Features and Geographic Focus

The Floodplain Integrated Planning (FLIP) process focuses on updating and broadening the scope of the Lower Nooksack River Comprehensive Flood Hazard Management Plan (CFHMP) and is led by the Whatcom County Flood Control Zone District (WCFCZD) with the Public Works Department providing staff support to the District. While FLIP is currently focused primarily on the lower mainstem of the Nooksack River watershed the process will be expanded to include the upper forks of the Nooksack River.

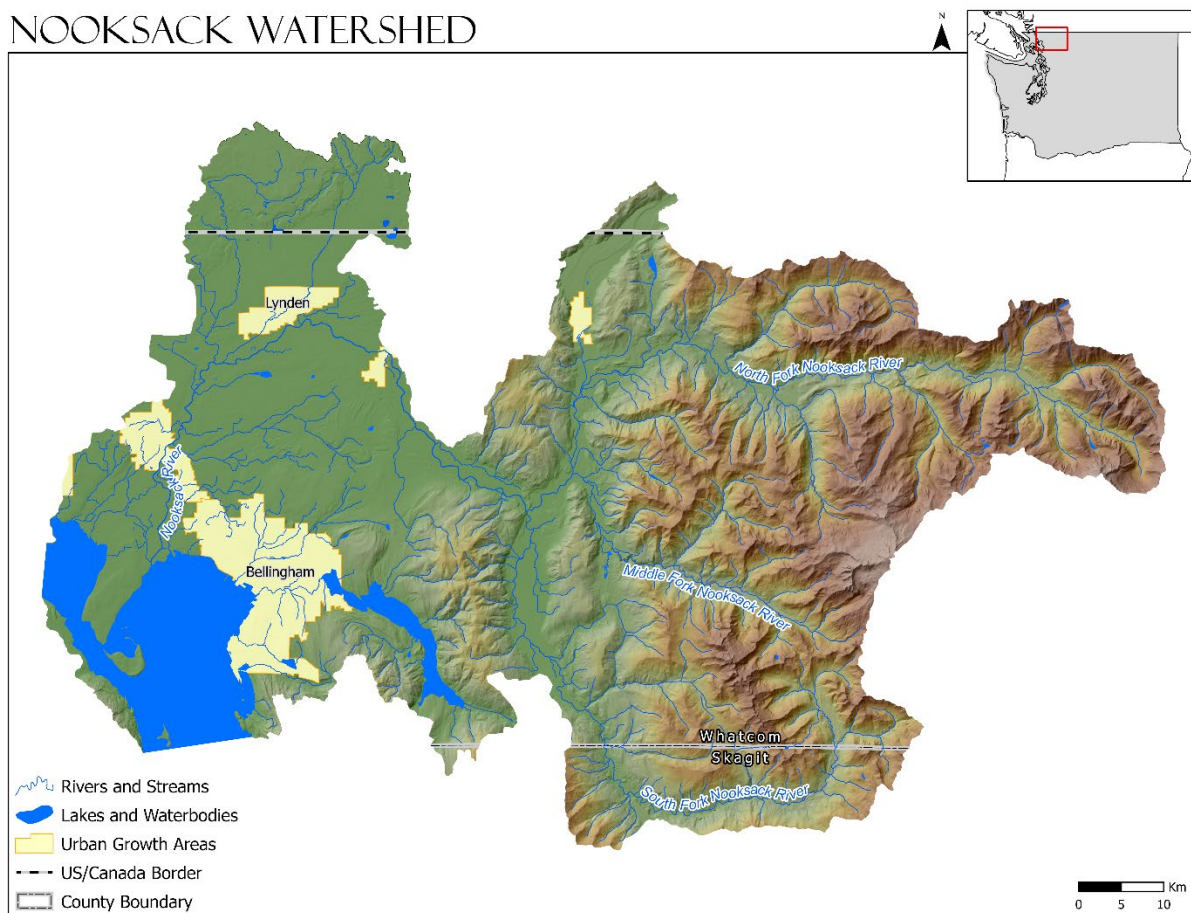


Image 2. Map of the Nooksack Watershed, Puget Sound Institute

For the lower mainstem of the Nooksack, FLIP works with five reach teams (color-coordinated in the image below), four along the river corridor and one for the Everson-Sumas overflow corridor.<sup>29</sup>

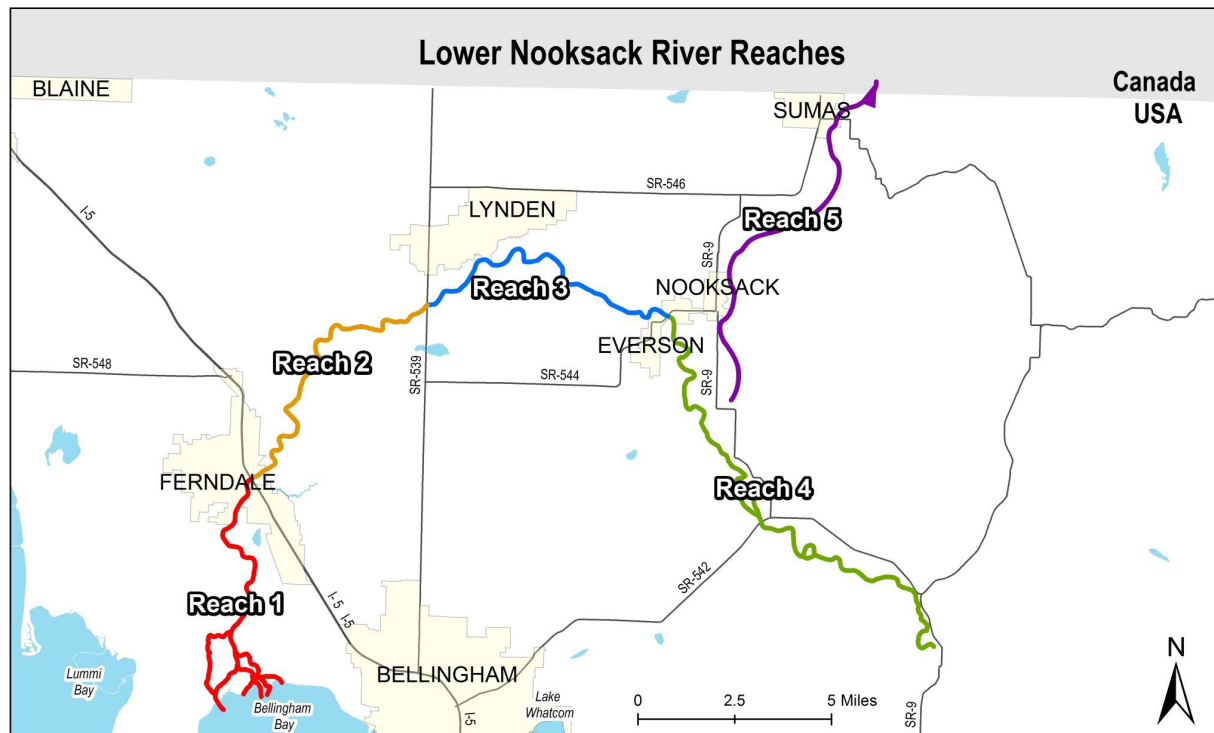


Image 3. Map of the Lower Nooksack River Reaches<sup>30</sup>

## 4.2 Background

In 1999, Whatcom County adopted the [Lower Nooksack Comprehensive Flood Hazard Management Plan](#) (CFHMP) and in 2005 the WRIA 1 Board adopted a salmon recovery plan (the [WRIA 1 Salmonid Recovery Plan](#)). Drawing from both of these plans the WCFCZD led a collaborative effort that resulted in the 2016 System-wide Improvement Framework (SWIF) to address levee deficiencies. Following the SWIF, the FLIP process began which broadened the scope of the planning process from the levee system to the entire floodplain including the upper forks. In addition to broadening the geographic scope, the FLIP process is designed to address the needs of fish, farms and other floodplain land uses through a collaborative process.

## 4.3 Lead, Consultants, Stakeholders, Partners

Whatcom County's Floodplain Integrated Planning process is led by the WCFCZD. The Flood Control District has a Board of Supervisors (comprised of members of the Council and County Executive) and an [Advisory Committee](#), comprised of fifteen members that make flood-focused recommendations to the Board of Supervisors on the Nooksack River and other watersheds within Whatcom County.

<sup>29</sup> [https://whatcomcounty.us/DocumentCenter/View/44740/2\\_FLIP-Process](https://whatcomcounty.us/DocumentCenter/View/44740/2_FLIP-Process)

<sup>30</sup> <https://whatcomcounty.us/2571/Current-Planning>



An inter-local agreement between Whatcom County and the Flood Control Zone District states that the Public Works will provide staffing and the County will provide administrative services.

The stakeholder group for the FLIP process includes over a hundred people including agency staff at local, state and federal agencies, affected tribes and special purpose districts. As the planning work advances from the basin scale to the reach scale, members of the stakeholder group are invited to participate on reach teams to assist in developing specific strategies and actions for the reach.

Stakeholders in the FLIP process include the WCFCZD and sub-zone district advisory committees, local diking districts, federal, state and local agency staff, Whatcom Conservation District, local tribes including Nooksack and Lummi Nation, technical experts from consultancies (including Cramer Fish Sciences), universities (including the UW Climate Impact Group) and science teams, representatives from agricultural communities and organizations, and the Cities of Everson, Sumas, Nooksack and Ferndale. A Steering Committee including representatives from Whatcom County with both tribes and agriculture representatives overseeing the overall planning process.

#### 4.4 Mission and Vision

The draft mission of the FLIP process is to “develop a broadly-supported integrated floodplain management plan for the Nooksack River that will reduce risk to public safety, property, and infrastructure, and support healthy ecosystems and sustainable agriculture and fisheries that lead to viable communities now and into the future.”<sup>31</sup>

#### 4.5 Goals and Objectives

The WCFCZD has stated the following goals in their Floodplains by Design grant applications regarding the FLIP process<sup>32</sup>:

- Reduce risk to public safety
- Minimize damage to public and private property and to public resources
- Provide a comprehensive understanding of the river
- Restore floodplain habitat formation processes and other environmental benefits where possible
- Build consensus around mutually beneficial outcomes
- Create a more resilient flood risk reduction system now and in the future
- Identify and prioritize a list of action items to implement

#### 4.6 Funding

FLIP is supported administratively by the WCFCZD with Public Works providing staff support. The WCFCZD supports, partners with and collaborates on a variety of projects with key stakeholders including Whatcom Conservation District, the Nooksack Tribe, Watershed Improvement Districts and others. The WCFCZD has received a Puget Sound National Estuary Program Near-Term Action grant (NTA) which has provided support for the planning process and Floodplains by Design grants to implement projects and build capacity for agriculture and

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<sup>31</sup> <https://whatcomcounty.us/DocumentCenter/View/33762>

<sup>32</sup> *ibid*

the tribes to participate in the FLIP process. Much of the technical work performed to support the FLIP process was funded through other grant programs through NOAA and the SRFB.

#### *NTAs*

The WCFCZD received \$750,000 for their project “Develop Data & Support for Floodplain Management Strategies” (NTA 2016-0113) to “perform technical analyses and facilitate the development of reach-scale floodplain management strategies and projects”.<sup>33</sup>

#### *Floodplains by Design Grants*

The WCFCZD received \$2.09 million from Floodplains by Design, as well as \$1.5 million from the State Recreation and Conservation Office for the ‘[Canyon Creek Integrated Flood-Fish](#)’ project to remove a damaged levee and construct an armored setback structure in the Canyon Creek area. This project was part of the larger Lower Canyon Creek Fish and Flood Project which began in 1999 and concluded in 2014. The project included the property acquisition, installation of 23 log jams (plus 9 more during the final phase on construction), the removal of 1,850 feet of levee, the planting of 13 native species and reconnecting of seven acres. Additional funding for the Project was provided through the Salmon Recovery Funding Board (SRFB), NOAA, FEMA, and Whatcom Land Trust.<sup>34</sup>

The WCFCZD also received approximately \$1.2 million for the Deming Levee Improvement Project in the 2017 funding cycle.

In the 2019-2021 funding cycle, Whatcom County Public Works received approximately \$6.0 million from Floodplains by Design for Phase 1 of the ‘Nooksack River: Floodplains that Work’ project<sup>35</sup>, a “multi-phase, integrated approach to floodplain management that reduces flood hazards while supporting salmon recovery, agriculture, and other land uses within the Nooksack River watershed.”<sup>36</sup> The project includes “Ferndale levee improvement design, final design and construction of the Lynden levee improvement ([City of Ferndale Treatment Plant levee improvements](#)), land acquisition for Reach 4 levee reconfiguration and Jones Creek debris flow mitigation<sup>37</sup>, Glacier-Gallup creek alluvial fan restoration design, and “building upon agricultural integration and tribal capacity” for the FLIP process.”<sup>3839</sup>

Whatcom County Public Works was awarded \$6.32 million from Floodplains by Design in the 2021-2023 grant cycle for the second phase of the ‘Nooksack River: Floodplains the Work’ project.<sup>40</sup>

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<sup>33</sup> [https://pugetsoundestuary.wa.gov/wp-content/uploads/2018/05/113\\_Factsheet.pdf](https://pugetsoundestuary.wa.gov/wp-content/uploads/2018/05/113_Factsheet.pdf)

<sup>34</sup> <https://www.whatcomcounty.us/2654/Lower-Canyon-Creek-2009-2014>

<sup>35</sup> <https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Hazards/Floods-floodplain-planning/Floodplains-by-design>

<sup>36</sup> <https://whatcomcounty.us/DocumentCenter/View/52031/FbD-Project-Fact-Sheet-Nooksack-2021-23-FINAL>

<sup>37</sup> <https://www.whatcomcounty.us/DocumentCenter/View/11552>

<sup>38</sup> *ibid*

<sup>39</sup> <https://whatcomcounty.us/DocumentCenter/View/52031/FbD-Project-Fact-Sheet-Nooksack-2021-23-FINAL>

<sup>40</sup> <https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Hazards/Floods-floodplain-planning/Floodplains-by-design>

## 4.7 How FLIP Approaches IFM

The FLIP process works to support the implementation of Whatcom County's CFHMP by building off of earlier work done through the initial development of the 1999 CFHMP, the 2005 WRIA 1 Salmonid Recovery Plan and the SWIF plan. The FLIP process is unique in its definition of customized work plans for each reach of the Nooksack River (five in total as described above), with the reach plans at various stages of initiation and development.<sup>41</sup>

In 2019, FLIP representatives presented on past reach strategies identified through the CFHMP and SWIF and identified preliminary Floodplains by Design reach strategies to apply within each reach. According to FLIP team meeting notes, many of the past strategies and associated recommendations are "still appropriate today".<sup>42</sup> For example, Reach 1's projects include land acquisition, levee realignments, infrastructure improvements, restoration of salmon habitat connectivity, diversity and complexity, and the restoration of riparian function. Each reach has additionally been rated in accordance with how much it has been "modified" (developed, etc.). The ratings are "modify, maintain, improve and protect"<sup>43</sup>.

A qualitative study<sup>44</sup> prepared for FLIP in 2019 examined concerns of the local floodplain communities and the results have informed the reach-scale planning process. Interviewees in the study included representatives from cities, tribes, watershed improvement districts (WIDs) and the agriculture extension agency in the Nooksack watershed. Interviewees in the study suggested that there are:

- Concerns from municipal representatives about flooding in the watershed and its impact to residential, commercial and industrial infrastructure (including transportation infrastructure and wastewater treatment plants) in and surrounding the Cities of Everson, Lynden, Ferndale and Sumas
- Concerns from the Lummi Tribe regarding flooding and its impact to the Lummi Nation's residential, commercial and industrial infrastructure and its impact on cultural resources and its effects on salmon and natural habitat and water quality degradation. In particular, the threats to "fish trapped on the floodplain...reduced salmon survival [and] threats to shellfish" and the "loss of or damage to culturally important plants."<sup>45</sup>
- Concerns presented by the Nooksack Tribe including residential area flooding, fish survival, water quality and low instream flows and "loss of side channels", lack of fishing access and loss of cultural resources.
- Concerns presented by the agricultural community include drainage, shorter growing seasons and flooded growing seasons, erosion of farmland caused by migrating river channels, and water rights for agricultural land owners

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<sup>41</sup> FLIP's prescribed strategy of river basin reach-scale restoration is identified as one of three strategies in the updated Floodplains and Estuaries Implementation Strategy (access required).

<sup>42</sup> [Reach Strategies from Past Plans: A Place to Start FLIP Team Meeting October 29, 2019](#)

<sup>43</sup> *ibid*

<sup>44</sup> [Floodplain Community Characteristics and Concerns](#). Herrera Consulting, 2019

<sup>45</sup> [Floodplain Community Characteristics and Concerns](#). Herrera Consulting, 2019



According to a FLIP process representative, the biggest issue currently facing the success of the FLIP process is the uncertainties stemming from water rights adjudication in the Nooksack basin by the Department of Ecology. The legal case concerns challenges from permitting and enforcing water rights as, according to Ecology, “water availability is limited through the watershed”.<sup>46</sup> While Whatcom County has initiated a drainage-based management approach to provide some of the technical work needed to support an adjudication, the County’s efforts to maintain the collaborative approach to FLIP reach-scale planning are being delayed as the agricultural community comes to terms with what an adjudication will mean to their operations and future. Ecology is currently doing pre-adjudication work in “2021-2022, leading to the filing of a court action in 2023 with an estimate of 10-20 years for final resolution of all rights.”<sup>47</sup>

#### 4.8 Projects

The below projects are examples of the depth and breadth of work that the WCFCZD, through the FLIP and earlier processes, has completed as well as what is on-going through 2020 and 2021.

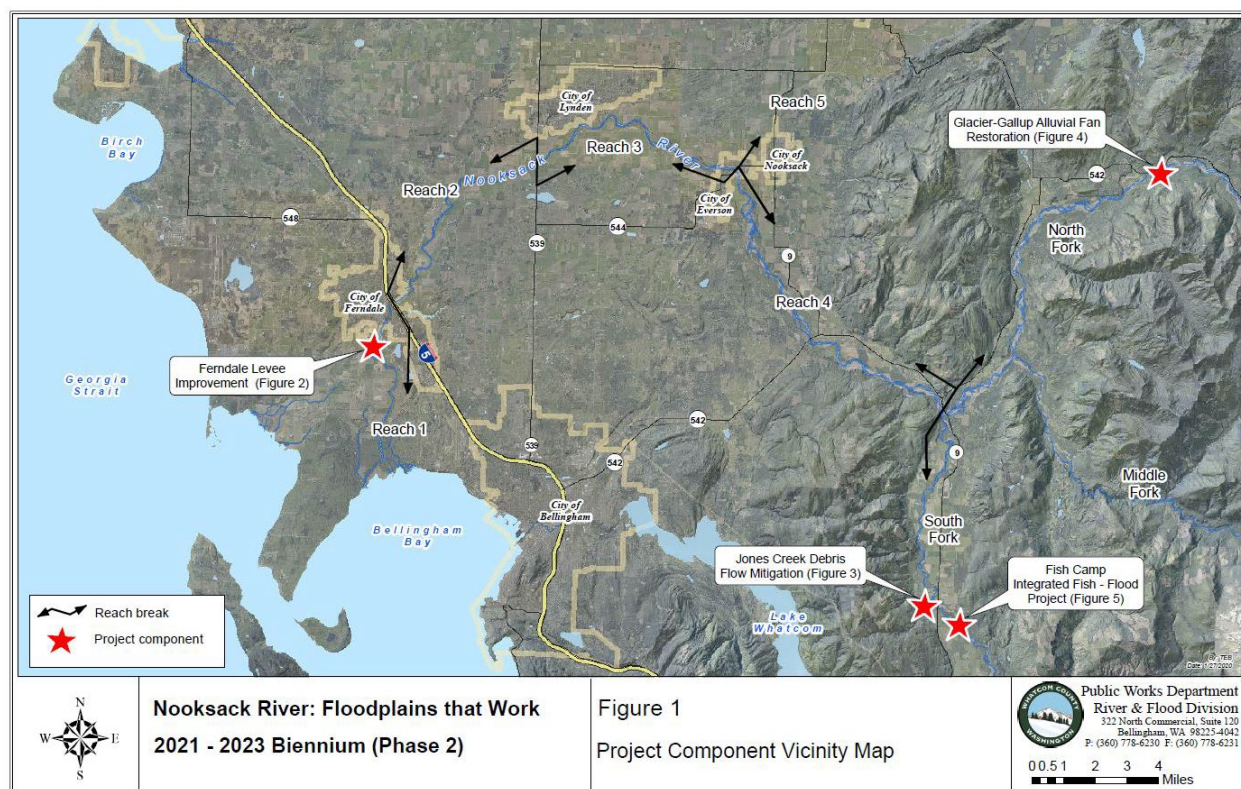


Image 4. Map of Floodplains that Work Project Components, Whatcom County<sup>48</sup>

<sup>46</sup> <https://apps.ecology.wa.gov/publications/SummaryPages/2011095.html>

<sup>47</sup> *ibid*

<sup>48</sup> <https://whatcomcounty.us/DocumentCenter/View/52031/FbD-Project-Fact-Sheet-Nooksack-2021-23-FINAL>

The [Ferndale Levee Improvement Project](#) came out of the 1999 CFHMP, and was included in the 2016 SWIF plan (and is part of the Reach 1 [strategy](#). The project is intended to improve the “levee system south of downtown Ferndale.”<sup>49</sup> Work began in 2020 and is being funded primarily by a Floodplains by Design grant. The goal of the project is to “provide 100-year flood protection for critical water and wastewater facilities, over 200 residences, project 1,900 acres of farmland, roads, and parks, re-establish riparian vegetation and improve recreational opportunities.”<sup>50</sup>

The [Reach 2](#) team identified the Cougar Creek tributary as a pilot basin to test an approach to developing a suite of integrated projects as part of FLIP planning process. The approach involved using a fish-focus group to review habitat deficiencies and identify options to improve habitat, meeting with affected property owners to select preferred options and identify measures to improve their farming operations and identifying and filling in data gaps. Planned restoration opportunities include floodgate replacement, levee setbacks, riparian planting, culvert removal and more. Maps and habitat assessments have been produced for the area.<sup>51</sup>

The Glacier-Gallup Creeks Alluvial Fan Restoration Project seeks to “improve life and safety in the Glacier community, reduce flood hazards and maintenance to Highway 542 bridges and restore salmon habitat” and natural alluvial fan processes. As WSDOT prepares to replace the “highway bridge of Glacier Creek” in 2026, they are collaborating with Whatcom County Flood Control Zone District to relocate the existing levee upstream of the highway that impedes channel migration on the alluvial fan. The project will continue in 2021.<sup>52</sup>

Additional projects include the [Jones Creek Debris Flow Risk Reduction Project](#) (included in the Phase 2 of the Floodplains by Design grant) and the [Fish Camp \(Ts’eq\) Integrated Fish-Flood Project](#). The Fish Camp project, a collaboration between the Nooksack Tribe and Whatcom County, seeks to reduce flood risk in the Acme area (on the South Fork Nooksack) and improve critical salmon habitat and implement a collaborative reach-scale integrated project. [Virtual community meetings](#) were held in January 2021 to share the three draft design alternatives.

### *Technical Analyses*

Whatcom County has completed several technical studies including a USGS-led sediment study in the Nooksack River Basin for the Flood Control Zone District, hydraulic modeling, geomorphic assessments, habitat assessments, flood damage analyses and examination of floodplain issues.<sup>53</sup> A 2019 Cramer Fish Sciences report prepared for Whatcom County conducted a salmon habitat assessment of the Lower Mainstem Nooksack<sup>54</sup> as part of a “larger collaborative effort to develop an IFM plan for the Nooksack River to restore habitat while reducing flood risk...and supporting existing land uses.”<sup>55</sup>

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<sup>49</sup> [Ferndale Levee Improvement Project](#)

<sup>50</sup> P. Harris, personal communication, December 2020.

<sup>51</sup> [https://whatcomcounty.us/DocumentCenter/View/49971/FLIP-Hab-Poster-Reach-2\\_FINAL](https://whatcomcounty.us/DocumentCenter/View/49971/FLIP-Hab-Poster-Reach-2_FINAL)

<sup>52</sup> <https://www.whatcomcounty.us/3096/Glacier-Gallup-Alluvial-Fan-Restoration->

<sup>53</sup> <https://www.whatcomcounty.us/2971/FLIP-Reports>

<sup>54</sup> Lower Nooksack Habitat Assessment Version 2.5 was funded by the County and the Salmon Recovery Board #16-2048-P and is available here: [https://www.whatcomcounty.us/DocumentCenter/View/44743/5\\_Nooksack-Habitat-Assessment](https://www.whatcomcounty.us/DocumentCenter/View/44743/5_Nooksack-Habitat-Assessment)

<sup>55</sup> Lower Nooksack Habitat Assessment Version 2.5

## 5. Skagit Delta Farms, Fish, and Flood Initiative (3FI)

### 5.1 Defining Features and Geographic Focus

The Farms, Fish, and Flood Initiative (3FI) was formed to “create and advance mutually beneficial strategies that support the long-term viability of agriculture and salmon while reducing the risks of destructive floods.” The group works in the Skagit River basin and along the Samish River in Skagit County. The Skagit River is the only river in Washington that supports all five species of Pacific salmon and is the source of more than one third of the fresh water entering Puget Sound.<sup>56</sup> The Skagit delta is one of the largest agricultural areas in Washington with over 100,000 acres of Skagit County’s floodplain cultivated for some form of agriculture, producing approximately \$300 million annually worth of agricultural products.<sup>57</sup> The Skagit River basin watershed covers 3,100 square miles.<sup>58</sup>

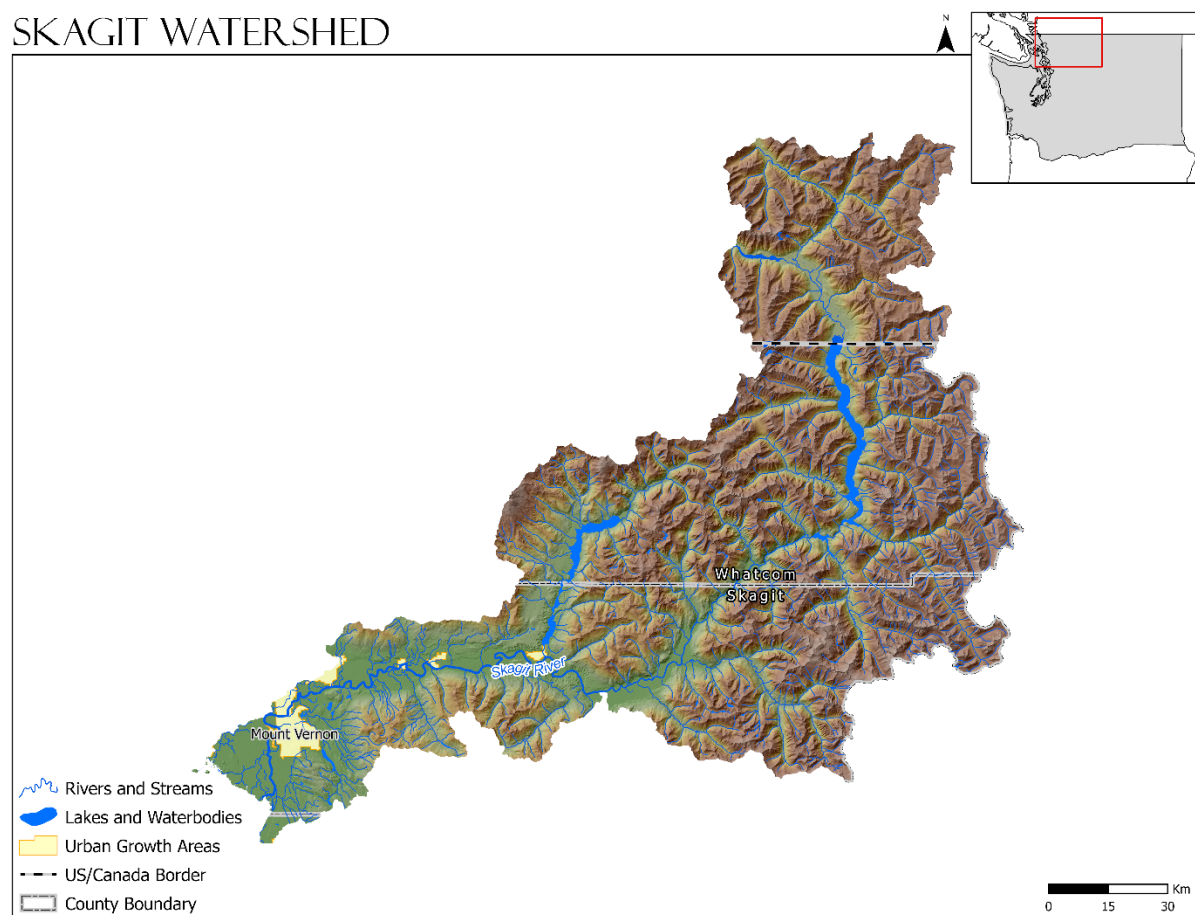


Image 5. Map of the Skagit River Watershed, Puget Sound Institute

<sup>56</sup> <https://www.skagitcounty.net/Departments/PlanningAndPermit/salmonheritage.htm>

<sup>57</sup> [The Nature Conservancy. Collaborative Conservation Case Studies from Farming for Wildlife and Fisher Slough. Request Access.](#)

<sup>58</sup> [https://www.fs.usda.gov/detail/mbs/landmanagement/resourcemanagement?cid=fsbdev7\\_001631](https://www.fs.usda.gov/detail/mbs/landmanagement/resourcemanagement?cid=fsbdev7_001631)

## STRAIT OF GEORGIA WATERSHED

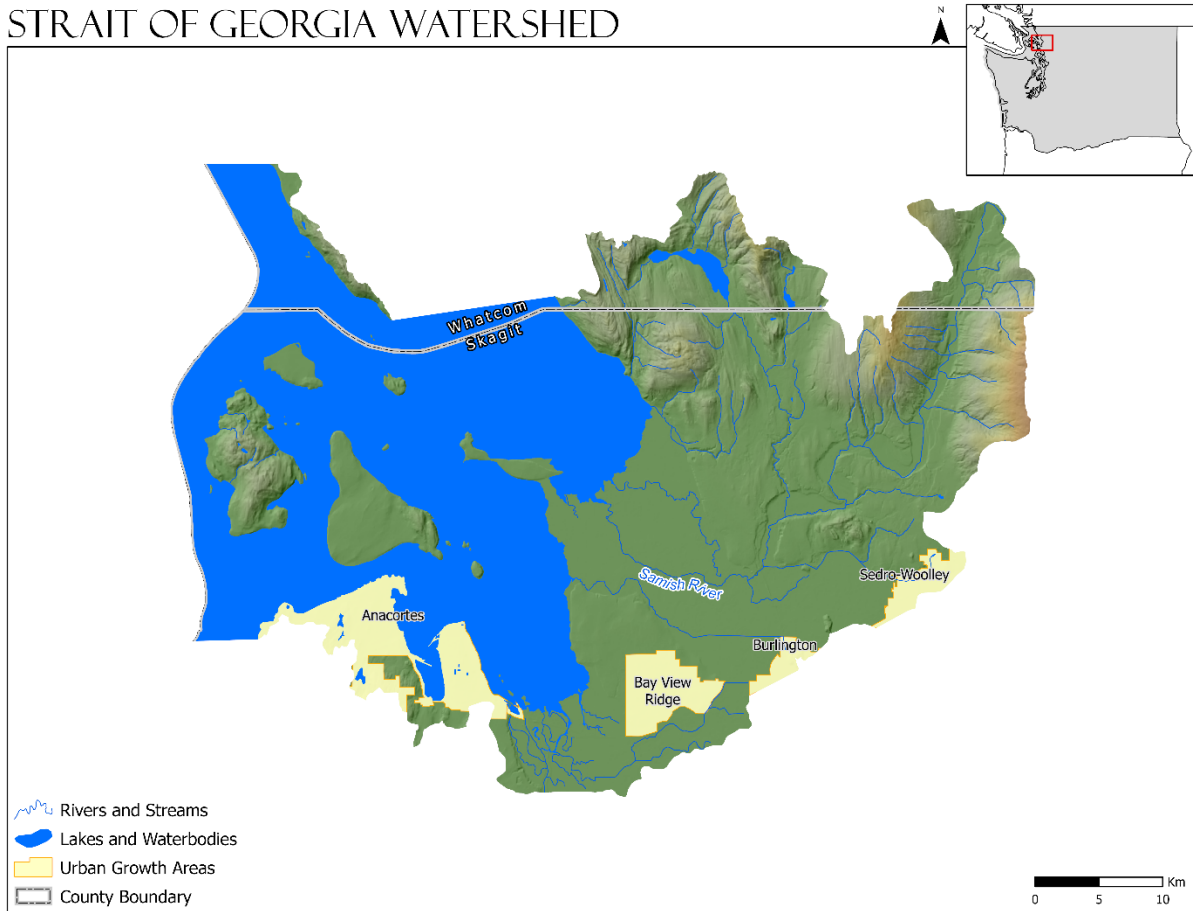


Image 6. Map of the Strait of Georgia Watershed (which includes the Samish River), Puget Sound Institute

### 5.2 Background

According to TNC’s Collaborative Conservation: Case Studies from Farming for Wildlife and Fisher Slough<sup>59</sup>, “farmers have been going to battle for decades to preserve farmland in the Skagit Delta” because of factors including the listing of Chinook salmon on the ESA list and the identification of estuary habitat as the limiting factor for Chinook recovery in the Skagit. This led to “decades of conflict” between agricultural, tribal, fisheries and conservation stakeholders.<sup>60</sup>

House Bill 1418 was passed in 2003 exempting “drainage infrastructure from certain environmental requirements” in particular exempting drainage infrastructure from fish passage requirements with certain provisions.<sup>61</sup> Through the collaborative efforts of dike and drainage districts and WDFW, plans were created to maintain drainage infrastructure “in a way that would

<sup>59</sup> The Nature Conservancy. 2014. 3FI Final Project Summary Report for Grant Agreement #G1200526. Request Access.

<sup>60</sup> *ibid*

<sup>61</sup> <https://www.washingtonvotes.org/2003-HB-1418>



reduce impacts on salmon and advance habitat restoration.”<sup>62</sup> These efforts led to the Skagit Tribal-Agriculture Accord<sup>63</sup> and the [Skagit Tidegates and Fish Initiative \(TFI\)](#).

The Skagit County Drainage and Irrigation Districts are signatories to TFI and the entities have “agreed to work with the restoration community to make the landowner contacts necessary to secure permissions, easements, or ownerships to implement restoration projects and to work with landowners to understand habitat restoration goals.”<sup>64</sup>

In 2012, TNC and Western Washington Agricultural Association, Skagitians to Preserve Farmland, NOAA, Skagit County, and WDFW established The Farms, Fish and Flood Initiative (3FI) in the Skagit Valley.<sup>65</sup> 3FI efforts grew from the 2005 Skagit Chinook Recovery Plan and the success of the Drainage and Fish Initiative. 3FI is the “first landscape scale effort in the Skagit Delta” to work on “estuary restoration, flood risk reduction and farmland protection”.<sup>66</sup>

### 5.3 Lead, Consultants, Stakeholders, Partners

3FI Participants currently include NOAA, Western Washington Agricultural Association, Skagit Co. Dike District Partnership #17, Skagitians to Preserve Farmland, WDFW and WSDA. For the Skagit HDM Multi-benefit Alternative Analysis project a working group was formed. Work group participants included: Skagit Co. Dike District #3, Skagit Co. Dike District #17/Dike District Partnership, Dike & Drainage District #22, Seattle City Light, Skagit Conservation District, Skagit Watershed Council, TNC, The Upper Skagit Tribe, USGS, NOAA and WDFW.

### 5.4 Mission and Vision

To create and advance mutually beneficial strategies that support the long-term viability of agriculture and salmon while reducing the risks of destructive floods.

### 5.5 Funding

3FI partners participate in regular meetings through their own organizational funding, and the cost of facilitation has been provided through grants received by TNC and WDFW. Funding for specific projects done under the oversight and guidance of 3FI partners is outlined below.

A \$305,000 EPA National Estuary Program Watershed Lead Organization grant to TNC resulted in the development of a scope of work for hydrodynamic modeling, an alternatives analysis tool to score projects, a farmland preservation strategy and an “agricultural industrial cluster” study in the Skagit Valley.<sup>67</sup> The grant was used to bring together interest groups in the Skagit Delta area to restore the estuary and protect agricultural lands. The grant allowed TNC and its partners to identify and prioritize potential restoration projects and also complete the Lower Skagit Delta

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<sup>62</sup> *ibid*

<sup>63</sup> <https://studylib.net/doc/6836131/memorandum-of-agreement>

<sup>64</sup> [https://wdfw.wa.gov/sites/default/files/2020-02/hdm-ersa\\_summary\\_report\\_web\\_version.pdf](https://wdfw.wa.gov/sites/default/files/2020-02/hdm-ersa_summary_report_web_version.pdf)

<sup>65</sup> The Nature Conservancy. 2014. 3FI Final Project Summary Report for Grant Agreement #G1200526. Request Access.

<sup>66</sup> *ibid*

<sup>67</sup> The Nature Conservancy. 2014. 3FI Final Project Summary Report for Grant Agreement #G1200526. Request Access.

Agricultural Land Base Analysis to evaluate long-term farmland protection needs to maintain a viable agricultural industry.

Following the grant, the 3FI Oversight Team conducted outreach to landowners and dike/drainage districts to “assess where opportunities may exist for projects to move forward.”<sup>68</sup> These results expanded on the concepts proposed during the grant. Identified projects were designed to “achieve long-term viability of Chinook salmon tidal delta habitat and community flood risk reduction in a manner that protects and enhances agriculture and drainage.” Additional funding to further the Hydrodynamic Model Project (described below) was provided through SRFB and NOAA with a match from WDFW.<sup>69</sup>

## 5.6 How 3FI Approaches IFM

3FI representatives have been involved in several IFM projects in Skagit Delta including the Skagit Hydrodynamic Modeling project and the Estuary Restoration Strategic Assessment.

## 5.7 Projects

The below projects are examples of the depth and breadth of work that 3FI is involved in.

### *Skagit Hydrodynamic Model Project and Estuary Restoration Strategic Assessment*

The Skagit Hydrodynamic Model Project (HDM), as part of the 3FI initiative, “devised a work group made up of farm, fish and flood interests and spent 5 years developing the approach, methods and science to evaluate 23 project concepts plus three combination projects”. The work group was led by WDFW, NOAA and TNC. The approach to determine the projects was called the Estuary Restoration Strategic Assessment.

The Estuary Restoration Strategic Assessment<sup>70</sup> was the framework developed to identify projects within the Skagit Hydrodynamic Model Project that balanced “estuary restoration for Chinook salmon recovery and the need to maintain critical drainage infrastructure” and protect farmland. The projects were identified using a multi-benefit ‘alternatives analysis’ and assessment criteria that “evaluated the potential benefits and impacts of more than twenty project concepts for estuary restoration. In a collaborative decision-making process placing equal weight on farms, fish, and flooding, participants used data to develop recommendations for restoration actions that will increase estuarine habitat for salmon while providing benefits and minimizing negative impacts for farms and flood risk reduction”.<sup>71</sup>

Project rankings included fish-supporting projects like tidegate maintenance, increases in Chinook smolt productivity through increase of riverine channels, increase in diversity of tidal marsh habitats, and flood-supporting projects like avoiding creation of new dikes and reducing surface water elevation. The result [was] a strategy for moving projects forward that maximized

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<sup>68</sup> [https://salishsearestoration.org/images/e/ee/SDHP\\_2014\\_skagit\\_hydrodynamic\\_model\\_report.pdf](https://salishsearestoration.org/images/e/ee/SDHP_2014_skagit_hydrodynamic_model_report.pdf)

<sup>69</sup> J. Baker, personal communication, July 2021.

<sup>70</sup> [https://wdfw.wa.gov/sites/default/files/2020-02/hdm-ersa\\_summary\\_report\\_web\\_version.pdf](https://wdfw.wa.gov/sites/default/files/2020-02/hdm-ersa_summary_report_web_version.pdf)

<sup>71</sup> The Nature Conservancy. 2014. 3FI Final Project Summary Report for Grant Agreement #G1200526. Request Access.

benefits and minimized impacts across the three interests. In 2018, a comprehensive project technical [report](#) was released.

The team has identified 13 projects that are highest priority with one of the 13 completed ([the \\$16.5 million Fir Island Farm project](#)) and two others that are advancing through the implementation pathway ([Milltown Island](#) and [Deepwater Slough Phase 2/Island Unit](#)). The Milltown and Deepwater projects are led by a coordinator at WDFW.

#### *Fir Island Farm Restoration Project*

The Fir Island Farm restoration project was spearheaded by WDFW and Skagit County Dike, Drainage and Irrigation District 22. Project elements included restoring about 131 acres of public farm land to minimize impact to private landowners. The restored acres primarily created “estuary habitat for juvenile Chinook as part of the Chinook Recovery Plan”.<sup>72</sup> The Fir Island project was rated “very highly” in the Skagit HDM project ranking index. The project’s shared goals and outcomes were established through a “critical” Landowner Agreement, a legal and binding agreement signed by WDFW and District 22 that was “tightly linked to a monitoring and adaptive management plan”<sup>73</sup> that included groundwater/surface water level and salinity projection measures. Project components included a setback dike designed using Natural Resources Conservation Service standards which details specifications for dike height, width and erosion that have climate change impacts on flooding incorporated into infrastructure design.

#### *Fisher Slough Tidal Marsh Restoration Project*

The Fisher Slough project, funded and implemented separately from 3FI, received federal funding from NOAA’s Recovery Program for its promise to “demonstrate job creation” along with funding from EPA, National Fish and Wildlife Foundation, Skagit County Dike District 3, Skagit County Drainage and Irrigation District 17, WDFW’s Estuary and Salmon Restoration Program (ESRP), the RCO’s SRFB and private donors.

The project was completed in 2011 and occurred in three phases: floodgate replacement, drainage infrastructure and levee setbacks. The goal of the project was to restore freshwater marsh for juvenile Chinook and other salmonids, improve passage for adult spawners, improve flood storage to reduce the frequency and severity of flooding on neighboring farmland, and provided updated flood and drainage infrastructure.

Partners on the project include TNC, private landowners, Skagit Dike District 3, Skagit Drainage and Irrigation District 17 and Skagit County.<sup>74</sup>

The project restored about 60 acres of tidal wetlands, expanded fish passage, and improved flood storage capacity and has yielded “multiple values related to restoration such as job creation, improved flood protection and drainage, reduced maintenance costs, and increased recreation

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<sup>72</sup> [https://www.youtube.com/watch?v=xPSLqFGhqpw&list=PLo22nBM4mjeRzh21\\_R8Mm5XLO59XXkAGU&index=4](https://www.youtube.com/watch?v=xPSLqFGhqpw&list=PLo22nBM4mjeRzh21_R8Mm5XLO59XXkAGU&index=4)

<sup>73</sup> *ibid*

<sup>74</sup> Nearshore Summit and Synthesis Presentation – “Partnerships Matters”.

[https://www.youtube.com/watch?v=xPSLqFGhqpw&list=PLo22nBM4mjeRzh21\\_R8Mm5XLO59XXkAGU&index=4](https://www.youtube.com/watch?v=xPSLqFGhqpw&list=PLo22nBM4mjeRzh21_R8Mm5XLO59XXkAGU&index=4)

opportunities.”<sup>7576</sup> According to analyses from ECONorthwest and TNC, the \$7.7 million investment in the project resulted in 10 times more juvenile Chinook salmon using the site and the site produces up to 22,000 more juvenile Chinook annually. Additionally, it is suggested that from \$9.1 million up to \$20.6 million in benefits are expected from the project over the next 50 years, demonstrating a return on the investment even without a full consideration of ecosystem service benefits.<sup>7778</sup> Skagit Dike District 3, Skagit Drainage and Irrigation District 17 are currently operating the infrastructure of this completed project.

## 6. The Sustainable Lands Strategy

### 6.1 Defining Features and Geographic Focus

The Sustainable Lands Strategy (SLS) is a “forum of organizations, agencies, and individuals that are working to balance the need to restore vital salmon habitat while also protecting the viability of local agriculture in Snohomish County.”<sup>79</sup> SLS was convened in 2010 by Snohomish County, Tulalip and Stillaguamish Tribes, state and federal agencies, and agricultural and environmental stakeholders to improve coordination and generate progress for fish, farm, and flood management interests.<sup>80</sup> The SLS is supported administratively by the Snohomish County Conservation and Resources Department, Surface Water Management Division.<sup>81</sup>

SLS operates in the Snohomish River Basin, the second largest river system in Puget Sound. The Snohomish River watershed covers 1,856 square miles in Snohomish and King Counties. The Snohomish River travels from the Cascade Range to Possession Sound, just north of Everett. There are more than 1,700 rivers and tributaries in the watershed, the largest of which are the Snohomish, Skykomish, and Snoqualmie. Nine salmonid species use the rivers for spawning, including Chinook, sockeye, coho, chum, and pink salmon, cutthroat trout, bull trout, and steelhead and rainbow trout. The Skykomish and Snohomish populations of Chinook are both listed as threatened, as well as four bull trout populations<sup>82</sup> and is one of the primary producers of anadromous salmonids in Puget Sound.<sup>83</sup>

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<sup>75</sup> <https://cedar.wvu.edu/cgi/viewcontent.cgi?article=2810&context=ssec>

<sup>76</sup> [https://salishsearestoration.org/images/f/f6/Weinerman\\_et\\_al\\_2012\\_fisher\\_slough\\_economic\\_benefits.pdf](https://salishsearestoration.org/images/f/f6/Weinerman_et_al_2012_fisher_slough_economic_benefits.pdf)

<sup>77</sup> <https://cedar.wvu.edu/cgi/viewcontent.cgi?article=2810&context=ssec>

<sup>78</sup> <https://cedar.wvu.edu/cgi/viewcontent.cgi?article=1596&context=ssec>

<sup>79</sup> <https://www.farmfishflood.org/about-us>

<sup>80</sup> <https://www.farmfishflood.org/about-us>

<sup>81</sup> <https://snohomishcountywa.gov/DocumentCenter/View/60305/Stillaguamish-Reach-Scale-Plan-PDF?bidId=>

<sup>82</sup> Snohomish Basin Salmon Conservation Plan Status and Trends 2019.

[https://www.snohomishcountywa.gov/DocumentCenter/View/71060/SnohomishBasin10YearReport\\_2019-12-30\\_reduced](https://www.snohomishcountywa.gov/DocumentCenter/View/71060/SnohomishBasin10YearReport_2019-12-30_reduced)

<sup>83</sup> <https://www.eopugetsound.org/terms/119>



## SNOHOMISH WATERSHED

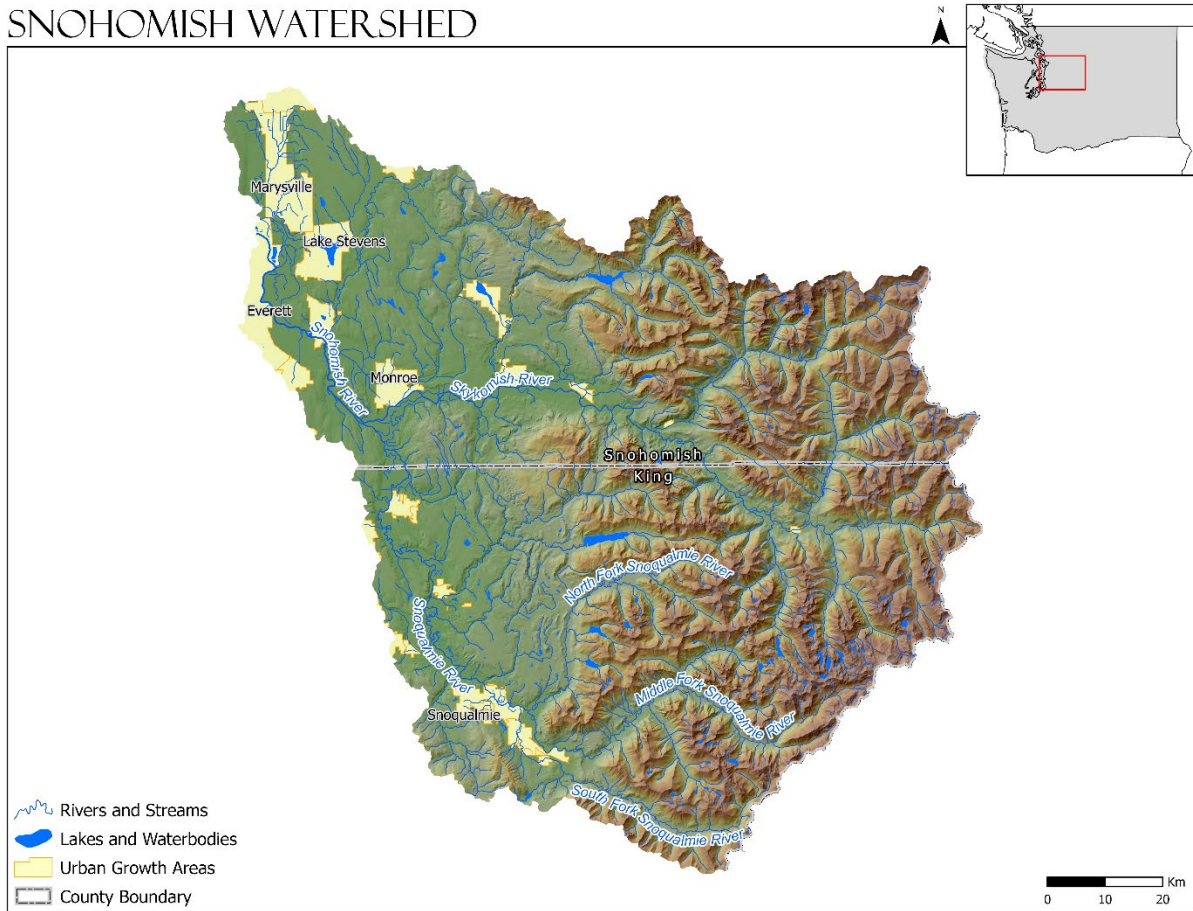


Image 7. Map of the Snohomish River Watershed, Puget Sound Institute

SLS additionally operates in the Stillaguamish River basin, the fifth largest tributary to Puget Sound. It includes more than 3,112 miles of river, stream and marine shore habitat. The Stillaguamish (Stilly) enters Puget Sound at the City of Stanwood, 16 miles north of Everett, in northwestern Snohomish County and drains into both Port Susan and Skagit Bay. It can be divided into three general regions: the North and South Forks and the Lower Mainstem, the latter of which is about 23 percent of the entire Stillaguamish Basin. The Stillaguamish Basin reaches into both Snohomish and Skagit Counties.

## STILLAGUAMISH WATERSHED

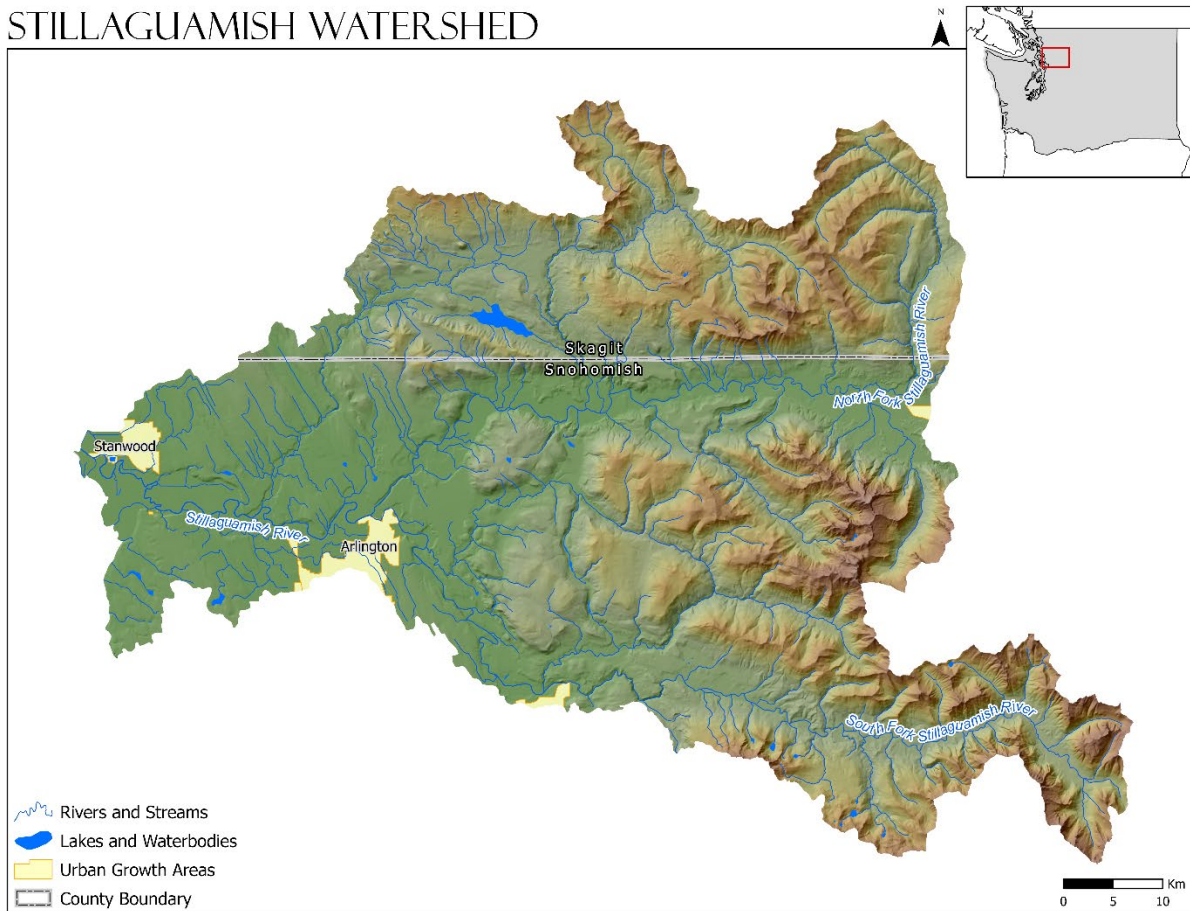


Image 8. Map of the Stillaguamish River Watershed, Puget Sound Institute

As of 2005, land use within the Stillaguamish watershed was approximately 76 percent forestry use, 17 percent rural use, 5 percent agriculture, and 2 percent urban use.<sup>84</sup> The Stillaguamish Valley has been widely diked, drained and filled for agriculture purposes. According to the Stillaguamish Recovery Plan, the “channelization of streams, loss of wetlands, construction of drainage ditches have increased magnitude and severity of peak stream-flows and has increased nutrient run-off.”<sup>85</sup>

### 6.2 Lead, Consultants, Stakeholders, Partners

SLS consists of several different groups, committees and tasks forces. Unlike the majority of the other IFM organizations analyzed, the SLS does not have any agency leads, nor is it led by any one agency (but is supported by Snohomish County’s Surface Water Management team). According to the SLS By-laws, the SLS “has no regulatory authority – which continues to reside in the convening governments – and is not a required review or process step for projects, be they

<sup>84</sup> Stillaguamish Implementation Review Committee (SIRC). 2005. Stillaguamish Watershed Chinook Salmon Recovery Plan. Published by Snohomish County Department of Public Works, Surface Water Management Division. Everett, WA.

<sup>85</sup> <https://www.psp.wa.gov/shared-salmon-strategy/watersheds/watershed-stillaguamish.htm>

restoration or ag/infrastructure. Instead, SLS is an opportunity to take advantage of integrated farm-fish watershed information” and the “success of SLS is based on mutual respect between farm and fish communities and a willingness to go beyond toleration of the other within a common landscape to...achieve ‘net gain’”.<sup>86</sup>

Prior to 2020, SLS was convened and led by an Executive Committee comprised of between four to ten members that was divided into “Fish” and “Agriculture” Caucuses to ensure a balance of member interests. The Executive Committee (now termed the Steering Committee) is comprised of up to fourteen members, with two co-chairs, one from each caucus. An SLS facilitator additionally is on hand for every Steering Committee meeting. Members are appointed and then elected by their respective caucus, with the Tulalip and Stillaguamish Tribes each allowed to appoint a committee member. The two SLS caucuses meet as needed to review proposals from committees, teams and task groups.<sup>87</sup> Standing committees were established to develop projects, ideas and concepts to implement for the SLS. The SLS includes specific integration/implementation teams, referred to as ‘ITs’. The two ‘ITs’ are the Stillaguamish IT and the Snohomish IT which develop and coordinate specific projects, prepare grants, and oversee task group activities. ‘ITs’ are responsible for “facilitating [the] development of suites of actions” while the Steering Committee is responsible for creating “enabling conditions to move [those] actions forward.”<sup>88</sup>

In addition to the ITs, the Communications Work Group oversees communications about SLS to the community. A new work group called the Multi-Benefit Monitoring Team is just getting started. The intention of this group is to establish a tracking and monitoring framework to show progress of the SLS effort. An NTA was submitted by Snohomish Conservation District to “evaluate the effectiveness of multi-benefit planning and project implementation in the Stillaguamish and Snohomish River floodplains.”<sup>89</sup> Finally, a funding committee is being considered as a standing committee. Its purpose would be to assist SLS teams with coordinating and developing funding packages to best meet the needs of SLS.

SLS’s disappearing task groups (DTGs) work on short-term projects or efforts that may be site-specific or effort-specific.<sup>90</sup> Established work groups include the Comprehensive Plan Work Group which is preparing input for the County’s Comprehensive Plan update.

Forums and councils that work collaboratively with SLS partners include the Snohomish Basin Salmon Recovery Forum, Snohomish Basin Salmonid Recovery Technical Committee, the [Stillaguamish Watershed Council \(SWC\)](#), which focus on certain tasks such as salmon recovery or on certain regions. SWC membership includes the Cities of Arlington, Stanwood, and several others in Snohomish County, non-profits like Wild Fish Conservancy and the Pilchuk Audubon Society, local conservation, diking/flood control and public utility districts, citizen groups, companies, government and tribal agency representatives (Tulalip and Stillaguamish Tribes,

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<sup>86</sup> SLS By-laws document

<sup>87</sup> SLS Roles and Responsibilities Document 2020

<sup>88</sup> Stilly IT presentation 9.12.19. <https://www.farmfishflood.org/sls-it>

<sup>89</sup> <https://actionagenda.pugetsoundinfo.wa.gov/Project/Detail/13362>

<sup>90</sup> *ibid*

WDFW, and Ecology, for example).<sup>91</sup> Additional councils, such as the Stillaguamish Tribal Council, play a role in the decision making and implementation process of regional projects.

### 6.3 Mission and Vision

The mission of the Sustainable Lands Strategy is to help generate net gains in the productivity and sustained health of fish and farm communities (broadly defined to include agricultural productivity and enhancement, flood control, tribal culture and traditional knowledge, environmental quality) by providing participants with: 1) best available science and technical support, 2) a neutral, mutually respectful forum for farm-fish collaboration, 3) packaging suites of broadly supported fish-farm measures that together generate net gain, and 4) monitoring and evaluation to measure progress.<sup>92</sup> According to a representative, the SLS is currently being reviewed by the SLS participants and Steering Committee to ensure it makes sense in the current context. In addition, a vision is being crafted to help point the way to a desired future condition.

The mission of the Stillaguamish Integration Team is to "inform other efforts within the SLS" and seeks to "help the Stillaguamish Community increase the pace, magnitude and effectiveness of efforts to significantly advance salmon recovery, agricultural viability and flood risk reduction in the Stillaguamish Valley."<sup>93</sup>

### 6.4 Goals and Objectives

The Sustainable Lands Strategy (SLS) was established with the intent that fish, farm, and flood management advocates can make more progress by working together than by being at odds with each other. SLS goals, termed 'principles' by the organization, include:

- Net gain for fish, farm and flood control interests
- Mutual respect through communication
- Starting with common information base
- Focusing on agreed upon principles with an established, neutral, collaborative forum to discuss interests
- Providing value as a non-regulatory coalition

As noted above, SLS is currently revisiting the organization's mission, vision and goals for the future.<sup>94</sup>

### 6.5 Funding

SLS is not funded as an organization, but Snohomish County Public Works Surface Water Management pays for a facilitator. In addition, the County and other entities pay for technical support from several consultants supporting various Workgroups. All other positions are voluntary, including members and chairs of the Steering Committee. SLS partners, including Snohomish County and the Stillaguamish Tribe have received funding through Floodplains by

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<sup>91</sup> [Stillaguamish Watershed Council Meeting Notes 9.23.20](#)

<sup>92</sup> Bylaws of the Snohomish Sustainable Lands Strategy 2014

<sup>93</sup> <https://www.farmfishflood.org/sls-it>

<sup>94</sup> The SLS facilitator is developing a SLS Handbook which documents the most recent process development efforts and collaborative agreements developed since 2019, which will assist in this effort.

Design as well as various Near Team Actions, among other sources including Salmon Recovery moneys, some of which is used to support the activities of SLS.

SLS focuses fund raising on grants that support multiple benefits like Floodplains by Design and Near-Term Actions from the Puget Sound Partnership. Simultaneously, SLS Partner entities frequently apply for funding to further their organizational or agency interests. As described in more detail below, SLS Partners who have projects that address a specific set of SLS attributes are encouraged to bring those projects forward to seek the support of the SLS Steering Committee. SLS will be seeking to understand the full breadth of funding provided to SLS Partners and documenting how the projects completed with this support help SLS accomplish its mission.<sup>95</sup>

### *NTAs*

In 2017, Snohomish County received \$240,000 to pursue integrated floodplain management through NTA 2016-0310. In particular the funding was to “produce four reach level plans that link natural conditions to opportunities to benefit salmon, agriculture and flood risk reduction” in the Stillaguamish and Snohomish Watersheds.<sup>96</sup> Part of the reach scale plans include the development of an ArcGIS Story Map that provides a visual narrative of floodplain management in one of the reaches, the Skykomish River’s Sultan Reach.<sup>9798</sup>

An NTA ([2018-0888](#)) submitted in 2019 by Snohomish County seeks funding to “build capacity to explore and develop a funding strategy to more strategically target funding sources and enhance the ability to fund resource protection/restoration projects in the Snohomish-Stillaguamish LIO.”

In 2019, Snohomish County and the Snohomish Conservation District submitted an NTA request for \$300,000 for the “Monitoring Effectiveness of Multi-Benefit Floodplain Project Implementation in Snohomish and Stillaguamish Rivers” project. The NTA ([2018-0873](#)) seeks to use “the Index of Floodplain Health created by the Pierce Conservation District and partners...to develop a similar monitoring framework to evaluate the effectiveness of multi-benefit planning and project implementation in the Stillaguamish and Snohomish River floodplains.”<sup>99</sup> As of 2021, the NTA is un-funded.

In 2020, SLS received \$175,000 ([NTA 2018-0097](#)) for the project “Sustainable Lands Strategy Communication and Outreach” The goal of this grant is to “build a communication and outreach package” that shares stories about life in the floodplains, creates an educational website, and does outreach events<sup>100</sup>.

In 2018, the Stillaguamish Tribe received \$100,000 for the project “[Stillaguamish Floodplain Acquisitions and Restoration](#)” to “protect and restore a corridor of floodplain land along the

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<sup>95</sup> D. Roberts, personal communication, June 2021

<sup>96</sup> These include two relevant NTAs: [2018-0310](#) and [2018-0249](#)

<sup>97</sup> <https://snoco-gis.maps.arcgis.com/apps/Cascade/index.html?appid=50423de792e2484ebdba907361bed1d7>

<sup>98</sup> [https://pugetsoundestuary.wa.gov/wp-content/uploads/2021/03/2018-0623\\_Final\\_Factsheet.pdf](https://pugetsoundestuary.wa.gov/wp-content/uploads/2021/03/2018-0623_Final_Factsheet.pdf)

<sup>99</sup> <https://actionagenda.pugetsoundinfo.wa.gov/Project/Detail/13362>

<sup>100</sup> [https://pugetsoundestuary.wa.gov/wp-content/uploads/2021/02/2018\\_0097-Initial-Factsheet.pdf](https://pugetsoundestuary.wa.gov/wp-content/uploads/2021/02/2018_0097-Initial-Factsheet.pdf)



major Chinook salmon bearing waters of the Stillaguamish”<sup>101</sup> adding to other restoration efforts in the Stillaguamish.

### *Floodplains by Design Grants*

Snohomish County Public Works received approximately \$4.9 million from Floodplains by Design for the project “Advancing Sustainable Lands Solutions in the Snohomish Basin” in the 2019-2021 funding cycle. Snohomish County Public Works was awarded \$8.8 million in the 2021-2023 Floodplains by Design funding cycle for the “Community Floodplains Solutions” project.<sup>102</sup> The running total of that project is \$50.9 million. Grant funds will be used for “property acquisitions, farmland conservation, implementation of agricultural viability and floodway projects, and design of large-scale integrated floodplain projects.”<sup>103</sup>

Additional Floodplains by Design grants include the award of \$894,000 in the 2017-2019 funding cycle to Snohomish County for the ‘Assessment for Restoration of Habitat and Infrastructure for the Lower Snohomish River’ project which “created a GIS-based assessment of the lower Snohomish River basin.”<sup>104</sup>

The Stillaguamish Tribe received \$4,272,000 from Floodplains by Design for the Lower Stillaguamish Fish, Farm, and Flood Management<sup>105</sup> project in the 2019 to 2021 funding cycle. The total project cost is \$5,772,000. The projects consists of several ‘components’:

1. Improving flood hazard protection by designing repairs to a dike and improvements to a drainage channel.
2. Acquiring two large parcels and restoring habitat on them.
3. Reducing water pollution by designing an anaerobic bio-digester to treat cattle and chicken waste.
4. Treating large deep-seated glacial landslide for reducing fine sediment loads into the South Fork of the Stillaguamish River.
5. Reviewing dike setback alternatives.

Planned outcomes of the Lower Stillaguamish Fish, Farm, and Flood Management includes over 80 acres restored, inventorying and assessing repairs section of failing dikes, improving salmon habitat in the lower reaches of South Fork Stillaguamish River and the restoration of [Irvine Slough](#) as a floodwater conveyance channel (which has been previously dredged).

## 6.6 How SLS Approaches Integrated Floodplain Management

Unlike the other organizations reviewed in this synthesis, the Sustainable Lands Strategy has “no governing body” but instead offers an opportunity to “take advantage of integrated farm-fish watershed information, technical and design assistance, packaging of fish-farm projects for net gain and broad support, and priority access to funding and permitting assistance.”<sup>106</sup>

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<sup>101</sup> [https://pugetsoundestuary.wa.gov/wp-content/uploads/2020/12/2018\\_0218\\_FinalFactsheet.pdf](https://pugetsoundestuary.wa.gov/wp-content/uploads/2020/12/2018_0218_FinalFactsheet.pdf)

<sup>102</sup> <https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Hazards/Floods-floodplain-planning/Floodplains-by-design>

<sup>103</sup> <https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Hazards/Floods-floodplain-planning/Floodplains-by-design>

<sup>104</sup> [Floodplains by Design: Report to the Legislature](#)

<sup>105</sup> [Floodplains by Design: Report to the Legislature](#)

<sup>106</sup> *ibid*

SLS representatives herald the group’s value precisely because it is non-regulatory and “coalition of the willing”.<sup>107</sup> SLS does not have a county, bureau, or agency lead that is spear-heading project efforts. SLS does have a leadership committee, the Steering Committee, which coordinates and supports the efforts of SLS. According to findings from several interviews led by consultants working with the Stillaguamish IT, participants in the Sustainable Lands Strategy share a “strong and deep commitment to advancing salmon recovery and agricultural interests” and are “clear in their vision” and are “seeking the next level of collaborative work and structure.”<sup>108</sup> SLS leadership are aware that as a collaborative body, SLS’s “value proposition must be sufficiently compelling to attract voluntary participation.”<sup>109</sup>

According to the Stillaguamish Reach Scale Plan, SLS participants understand that fish, farm and flood “management interests must all receive benefits through integrated planning in order for the effort to be viable.”<sup>110</sup> The SLS approach includes four “elements”:

- Information sharing and coordination through “user-friendly database” and web-sites, GIS maps
- A neutral, facilitated forum
- Balanced, multi-benefit projects
- Monitoring and evaluation of projects to “adaptively improve tools and strategies” building upon evaluation programs like PSP’s Vital Signs and the Stillaguamish Watershed Council and Snohomish Forum’s salmon recovery goals<sup>111</sup>

The SLS Steering Committee supports projects brought to SLS that are seeking partner buy-in. To better support partners when proposing projects, SLS has created and shared a list of ‘Attributes’ that every project should seek to attain. These attributes include projects that are transparent, fundable, permittable, locally developed, include buy-in from the community, are aligned and consistent with SLS’s mission, values and strategy, identify political issues, “builds or deepens partnerships”, address climate change and clearly identify “grant recipient and partner responsibilities”.<sup>112</sup>

## 6.7 Projects

The below projects are examples of the depth and breadth of work that SLS is involved in and are considered priority projects in 2021.

SLS is collaborating on several efforts with Snohomish County Public Works Surface Water Management (SWM) who have “made targeted investments in the reach to improve habitat and water quality and reduce flooding.”<sup>113</sup> Previous plans, including the Stillaguamish Watershed Chinook Salmon Recovery Plan (SIRC 2005), the Snohomish County Agriculture Action Plan (Snohomish County 2005), Stillaguamish River Comprehensive Flood Hazard Management Plan

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<sup>107</sup> SLS Organizational Structure And Roles Document, December 2020

<sup>108</sup> MacIlroy, C., Easton, S. Stilly IT Working Strategy Document Discussion 2019.

<sup>109</sup> Bylaws of the Snohomish Sustainable Lands Strategy 2014

<sup>110</sup> *ibid*

<sup>111</sup> [Stillaguamish Reach Scale Plan 2018](#)

<sup>112</sup> SLS Attributes Document, shared by SLS

<sup>113</sup> *ibid*

(Ecology and SWM 2004), Snohomish County Hazard Mitigation Plan (SCEM 2015), and the Stillaguamish Shellfish Protection Program (SWM 2011) are being used to inform recent Lower and North Fork Stillaguamish [reach-scale plans](#).

Planned outreach and engagement activities for SLS in the 2021 to 2022 biennium include:

- Tabling at markets, fairs as permitted with handouts
- Digital storytelling training for representatives from agricultural, fish and flood communities/agencies to produce digital stories
- A video production focusing on telling stories of individuals living on the floodplain in Snohomish County for an audience of legislators, funders and other stakeholders
- Farm tour(s) and dinner(s) in the Stillaguamish Valley
- Digital media productions and events including newsletters, multimedia website to “empower and inspire people to advocate for farm, fish, flood issues”, film screenings, virtual farm tours
- Social marketing survey to determine consumer spending habitats related to agriculture and salmon in the floodplains
- Increased communication regarding acquisitions, projects and grants

The [Agriculture Resilience Plan](#) includes several efforts to work directly with agriculture producers in the Snohomish watershed. Targeted outreach includes addressing zoning regulations, encouraging growth management practices and “continuing to develop “coordinated approaches and restoration” that include the interest of local farmers and foresters. The Agriculture Resilience Plan acknowledges that the largest threat to restoring floodplain connectivity in the region is the “conversion of existing agriculture lands to rural residential uses” and seeks to expand beyond “short-term, specific floodplain projects [that] may have a narrow focus for benefit of salmon recovery”.<sup>114</sup> Several goals of the Agriculture Resilience Plan include projects that are either underway or forecasted including:

- Farmland prioritization mapping conducted by the Snohomish Farmland Conservation Working Group
- Working to improve drainage infrastructure (along with tide gates and installation of fish passages) by the Snohomish Conservation District in coordination with the Stillaguamish Flood Control 7
- Improving flood protection for agriculture in Snohomish County
- Improve irrigation water during low stream flows
- Installing of BMPs to “reduce the negative impacts of agriculture in the floodplain”<sup>115</sup>
- Purchasing of agriculture easements in the Stillaguamish Valley, led by American Farmland Trust and Washington Farmland Trust, with a goal to fund three to six easements

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<sup>114</sup> <https://snohomished.org/ag-resilience>

<sup>115</sup> *ibid*



- Acquisition of eight parcels in the Stillaguamish basin for coordinated “reach scale floodplain restoration projects”<sup>116</sup>

SLS is also involved in several salmon habitat plans, including the Snohomish River Basin Salmon Conservation Plan<sup>117</sup>, through the [Snohomish Basin Salmon Recovery Forum](#), that focuses on salmon recovery in the Snohomish River basin and seeks to “protect, restore, and enhance the productivity and diversity of all wild salmon stocks in the Snohomish River basin to a level that will sustain fisheries and non-consumptive salmon related to cultural and ecological values.”<sup>118</sup> The Forum “focuses primarily on habitat issues, as this is where local governments and organizations have the most influence, although members also stay informed about harvest and hatchery changes and issues. The Forum’s work emphasizes the federally listed species of Chinook and bull trout, but also includes all salmon species with the aim of avoiding future listings, particularly coho.

SLS is currently supporting the development of the Lower Skykomish Floodplain Land Strategy. The strategy will seek to guide acquisitions, easements, and other land management projects under current and future Floodplains by Design grants as well as inform opportunities for land management decision making in other areas or under other grants and harmonize efforts under other plans and policies.

Lastly, SLS is supporting the development of new standard easements that will be used to provide incentives to willing landowners that would work with Snohomish County on river channel and flood management efforts.

## 7. Fish, Farm and Flood

### 7.1 Defining Features and Geographic Focus

[King County’s Fish, Farm and Flood](#) operates in the Snoqualmie Watershed, focusing in the Snoqualmie Agriculture Production District (APD), and is led by the Department of Natural Resources and Parks. The Snoqualmie Watershed covers primarily the lower 30 miles of the Snoqualmie valley from Snoqualmie Falls north to the Snohomish County line. This area includes the 14,600-acre Snoqualmie Agricultural Production District and some of the most important habitat for Chinook salmon, which was listed as threatened under the endangered species act in 1999.<sup>119</sup> The Snoqualmie Valley has a “mile-wide floodplain” with a large portion of that floodplain in agricultural use. The Snoqualmie River basin and the Snohomish River basins produce between 25 to 50 percent of coho in Puget Sound. The Chinook populations in the basin are measured at less than “10% of historic levels.”<sup>120</sup>

<sup>116</sup> <https://snohomishcd.org/ag-resilience-plan-document>

<sup>117</sup> [http://www.govlink.org/watersheds/7/pdf/WRIA%207\\_Plan/Final\\_Compiled\\_Plan.pdf](http://www.govlink.org/watersheds/7/pdf/WRIA%207_Plan/Final_Compiled_Plan.pdf)

<sup>118</sup> *ibid*

<sup>119</sup> <https://www.fisheries.noaa.gov/topic/laws-policies#endangered-species-act>

<sup>120</sup> [Snohomish River Basin Salmon Conservation Plan](#)

## SNOQUALMIE WATERSHED

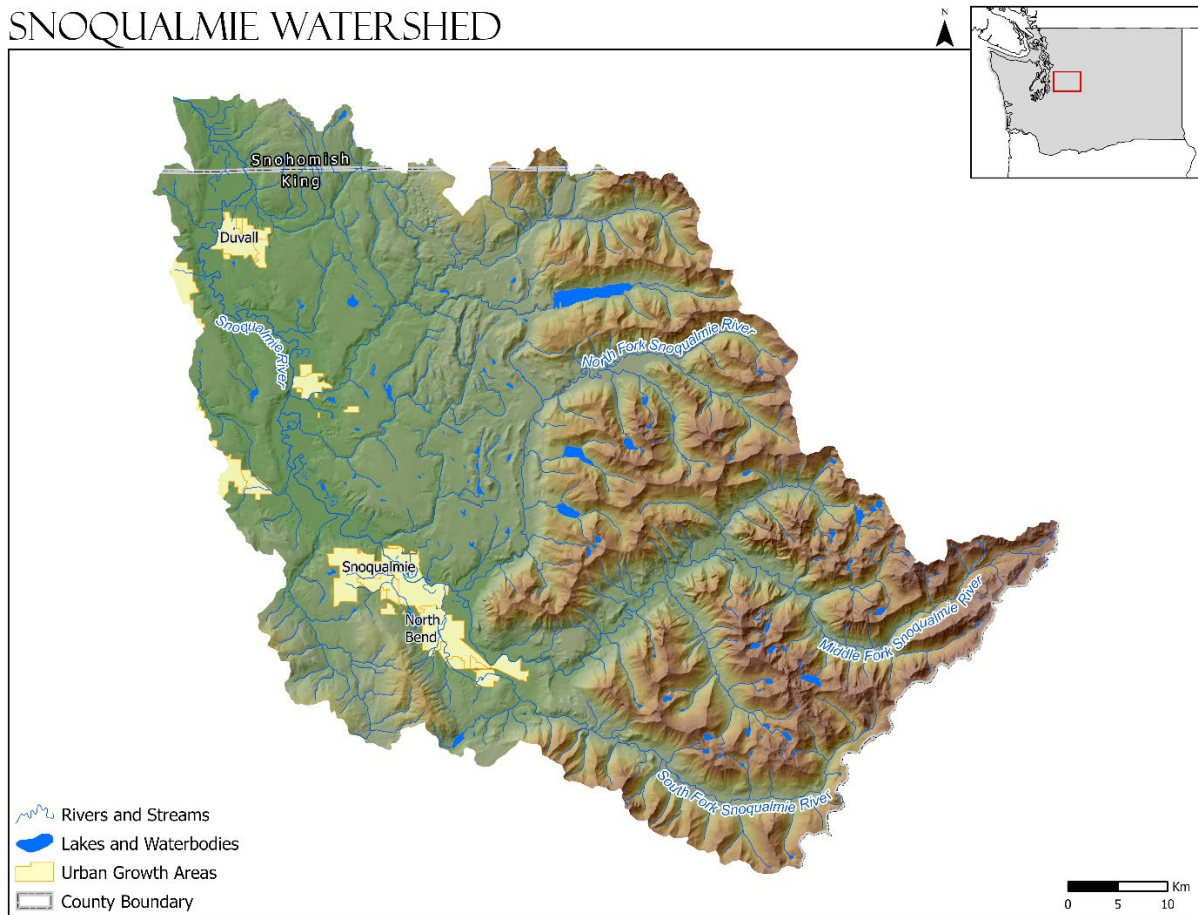


Image 9. Map of the Snoqualmie Watershed, Puget Sound Institute

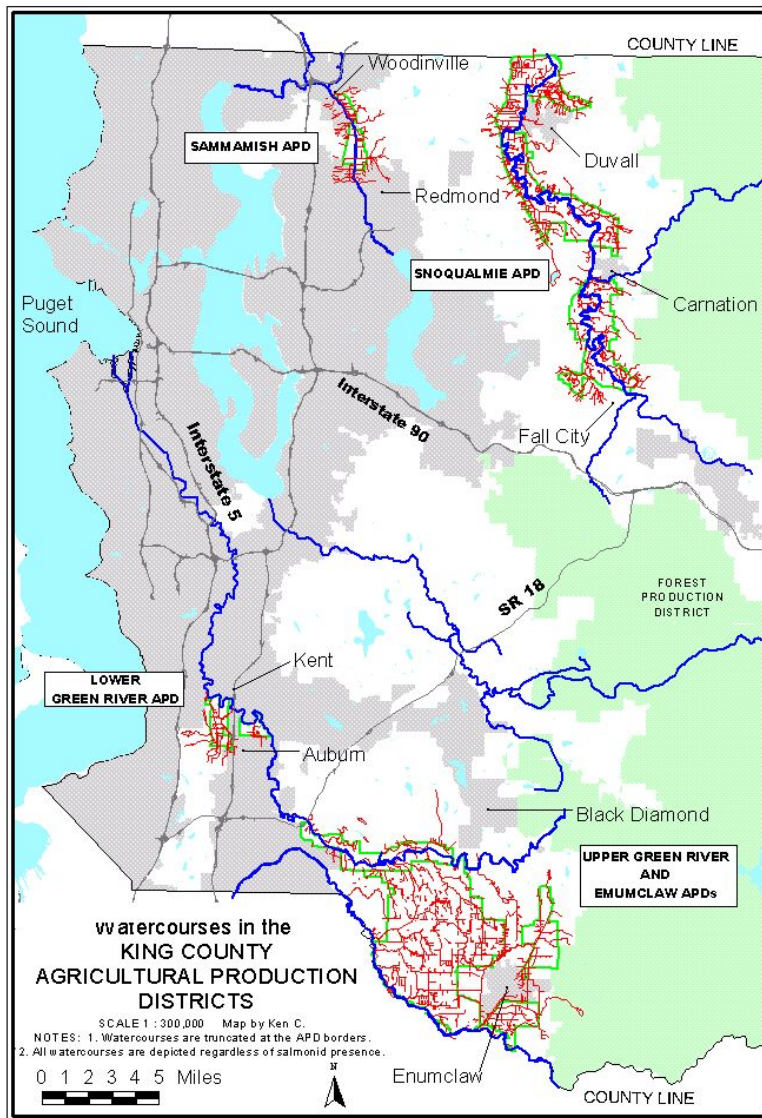


Image 10. Map of the King County Agricultural Production Districts, King County<sup>121</sup>

Fish, Farm and Flood was created out of a King County Council request during a Comprehensive Plan update process in 2012 to create a “collaborative watershed planning process with the goal of maintaining and improving agricultural viability, improving ecological function and habitat quality, and restoring floodplains through integrated, watershed-wide strategies”.<sup>122</sup> This three year process, termed ‘FFF 1.0’ (spanning from 2013 to 2017) led to approximately 42 fish, farm, and flood-related recommendations. In 2018, the ‘FFF 1.0’ process graduated to become ‘FFF 2.0’ with the establishment of an Implementation Oversight Committee (IOC). At that time three

<sup>121</sup> <https://kingcounty.gov/services/environment/water-and-land/stormwater/agricultural-drainage-assistance/maps.aspx>

<sup>122</sup> [R650 Proviso Final Report](#)

disappearing task forces were created. These task forces are a [Riparian Buffers Task Force](#) (sunsetting in 2019), a [Regulatory Task Force](#) (sunsetting in 2020), and the [Agricultural Land Resource Strategic Plan Task Force](#) (ongoing).

## 7.2 Lead, Consultants, Stakeholders, Partners

Fish, Farm and Flood is managed by the King County Department of Natural Resources and Parks' Water and Land Resources Division. FFF projects are guided by the Fish, Farm and Flood Advisory Committee and Implementation Oversight Committee (IOC). Members of the IOC include representatives from Snoqualmie Watershed Forum, Wild Fish Conservancy, Tulalip Tribes, Snoqualmie Tribe, Agricultural Commission, SnoValley Tilth, Snoqualmie Valley Preservation Association, King Conservation District, City of Duvall, Fall City Community Association, WDFW, Ecology, WSDA, and the King County Department of Natural Resources and Parks.

## 7.3 Mission and Vision

The mission of FFF is to “explore the issues creating obstacles and conflict around salmon recovery, flood protection and productive agriculture with the purpose of advising King County on how best to advance all three interests. Member of the FFF 1.0 and 2.0 groups have pledged as individuals or through their respective organizations, to support and advocate for each other’s key work.”<sup>123</sup>

Each Fish, Farm and Flood task force has articulated their own mission statements.

The specific missions of each task force is:

- **Riparian Buffers Task Force:** To provide the foundation and guidance for a scientifically credible, context-sensitive, locally derived riparian buffer implementation strategy developed with the participation of parties represented by the Fish, Farm, Flood, and any needed additional representation, which provided positive outcomes for both fish and farms. The task force developed a set of voluntary riparian planting recommendations based upon land use, watercourse type and/or needed riparian habitat function for salmon. The Riparian Task Force’s work has concluded and results are available [here](#). Included in this work is a comprehensive synthesis of riparian buffer literature and a white paper that discusses the positives and concerns of riparian buffers from an agricultural perspective. The Buffer Task Force representing, fish, farm, and flood interests agreed to a variable width strategy for watercourses for implementation in the King County Snoqualmie Agriculture Production Districts.
- **Regulatory Task Force:** To examine the regulatory constraints to agricultural production and “make recommendations that will make drainage projects cheaper and easier, make farms safer during floods, minimize the impact of mitigation actions on farm land, and maintain the current level of environmental protections.”<sup>124</sup> The Regulatory Task Force concluded in December 2020 with key deliverables including a summary of discussion

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<sup>123</sup> B. Ledoux, personal communication, May 2021

<sup>124</sup> <https://kingcounty.gov/services/environment/watersheds/snoqualmie-skykomish/fish-farms-flooding/Regulatory-Task-Force.aspx>



and actions, memo of concurrence with DLS-Permitting and a letter of recommendations to King County Executive Dow Constantine.<sup>125</sup>

- **Agricultural Land Resource Strategic Plan Task Force:** To improve the long-term productivity of farmland, bring more acres into production, especially food production, and increase opportunities for farmers to develop necessary infrastructure to support or increase their farm business.

## 7.4 Goals and Objectives

Fish, Farm and Flood has recommended actions that are guided by the Implementation Oversight Committee (IOC). The immediate and ongoing priorities of the IOC include:

- Development and implementation of a plan for comprehensive drainage maintenance
- Creation of three task forces to carry out detailed work plans: Riparian Buffers Task Force, Regulatory Task Force, and Agricultural Land Resource Strategic Plan Task Force
- Increase the pace for salmon recovery efforts in the Snoqualmie Valley by accelerating the rate of completion of large-scale habitat restoration projects

## 7.5 Funding

Fish, Farm and Flood operates out of the King County Department of Natural Resources and Parks and is led by a coordinator position funded by King County's Surface Water Management fees. Surface Water Management fees also fund portions of FFF-supported agriculture drainage projects<sup>126</sup> in the valley. Grants are the primary source of funding for FFF-supported projects. These include a \$100,000 Puget Sound National Estuary Program grant (Near-Term Action #2016-0045)<sup>127</sup> to research riparian buffers/implement the Riparian Buffer Task Force, and various funding sources for large scale projects such as the [Fall City Floodplain Restoration project](#).

King County Water Land and Resources Division's "Restoring Snoqualmie River Floodplain Processes" project was approved by Floodplains by Design for the 2021-2023 funding cycle. King County was awarded \$10,309,278 to "[construct] high-priority agricultural drainage projects including removing 1,200 feet of levee and 1,400 feet of revetment, constructing new revetment and a flood protection berm, excavating a new 2,900-foot bank channel, and planting native vegetation in the Snoqualmie River floodplain."<sup>128</sup>

Additional funding for FFF-supported projects includes a grant submitted to FEMA in May 2021 to support a 2D modeling effort (more details on the above is in the *Projects* section below).

## 7.6 How FFF Approaches Integrated Floodplain Management

According to a representative, FFF works cooperatively with agricultural interests in the Snoqualmie Valley on efforts such as "improving drainage, creating the Agricultural Land

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<sup>125</sup> <https://kingcounty.gov/services/environment/watersheds/snoqualmie-skykomish/fish-farms-flooding/>

<sup>126</sup> B. Ledoux, personal communication, April 2021

<sup>127</sup> [https://pugetsoundestuary.wa.gov/wp-content/uploads/2020/06/2016\\_0045\\_Factsheet\\_Final.pdf](https://pugetsoundestuary.wa.gov/wp-content/uploads/2020/06/2016_0045_Factsheet_Final.pdf)

<sup>128</sup> <https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Hazards/Floods-floodplain-planning/Floodplains-by-design>

Resource Strategic Plan Task Force, and understanding regulatory hurdles.” These efforts are improving because groups like the King Conservation District, Snoqualmie Valley Preservation Alliance and SnoValley Tilth are all represented in the Fish, Farm and Flood’s Implementation Oversight Committee and are members of the Agricultural Caucus. Fish, Farm and Flood additionally recognizes the current and increasing challenges of climate change and its effect on agriculture land in the Valley.

According to a representative, Fish, Farm and Flood knows that are projects in the valley that will be uniquely beneficial to salmon recovery and others that will be uniquely beneficial to flood safety or agriculture drainage. However, it will be important to “build a system where a [agricultural] property is identified” and not all projects are “separated out by pathway” but instead “incorporate all aspects” and help land owners “...to get technical expertise...such as helping them with a drainage project that can also benefit salmon in the project.”<sup>129</sup> Fish, Farm and Flood has determined there is a “need to balance agricultural viability, salmon recovery, and farmland conversion”.<sup>130</sup>

FFF developed a measures of success document<sup>131</sup> in 2020 that describes the status of the organization’s fish, farm and flood projects. The projects are delineated as ‘fish’ projects (salmon recovery), ‘farm projects’ and ‘flood’ projects (drainage and flood hazard management). An additional measure of success is termed ‘collaboration’ measures. Actions on stated projects are measured in a range from Not Started to Complete. An abbreviated list of actions is below.

#### *Fish Projects Measures of Success*

- Accelerated Progress on Haffner/Barfuse Project (see *Fall City Floodplain Restoration project* below)
- Build and maintain a pipeline of prioritized projects
- Enhance Basin Steward and King County Snoqualmie staff capacity<sup>132</sup>
- Improve salmon recovery efforts – accelerate the rate of restoration through increasing staff, funding, buffer task force, etc.

#### *Farm Projects Measures of Success*

- Restore funding for a fish biologist to participate in King County’s [Agricultural Drainage Assistance Program \(ADAP\)](#) and opportunities to install and/or improve necessary drainage infrastructure not currently covered by ADAP. ADAP “helps agricultural property owners improve drainage of their agricultural lands by providing both technical and financial assistance”.<sup>133</sup>
- A drainage comprehensive technical needs assessment to inform the Integrated Drainage Process plan – a process that provides a set of guiding principles and procedures that supports multi-benefit, multi-objective capital projects including developing an

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<sup>129</sup> B. Ledoux, personal communication, April 2021

<sup>130</sup> [FFF Implementation Oversight Committee Meeting Agenda, February 26, 2020](#)

<sup>131</sup> *ibid*

<sup>132</sup> As of 2021, a basin steward position is funded at .5 FTE as well as 3 other scientist/engineer positions

<sup>133</sup> <https://www.kingcounty.gov/services/environment/water-and-land/stormwater/agricultural-drainage-assistance.aspx>



“integrated, collaborative process [in King County] that will identify beneficial clarifications and modifications to King County Code, create inter-local agreements and revise workflows to more efficiently review and approve multi-objective resource projects”.<sup>134</sup>

#### *Flood Projects Measures of Success*

- Improve road safety in flood-prone areas
- Prioritize created flood storage capacity for decreased flood hazard
- Complete 90 home elevations per decade (in coordination with the [King County Flood Buyout and Elevation Program](#))
- Further develop the Agricultural Resilience Strategy through the [Agricultural Land Resource Strategic Plan Task Force](#)
- Provide farmworker housing

#### *Collaboration Projects Measures of Success*

- Further pursuing multi-benefit projects, requesting additional budget support, improve communication and collaboration with the Flood Control District and increasing communications

## 7.7 Projects

The below projects are examples of the depth and breadth of work that Fish, Farm and Flood is involved in and are considered priority projects in 2020 and 2021.

#### *Fall City Floodplain Restoration*

In 2017, the Fish, Farm, and Flood (FFF) Advisory Committee agreed to a set of 34 recommendations merging farming interests and salmon recovery. The Fall City Floodplain Restoration salmon recovery project (formerly the Haffner-Barfuse Project) was the first salmon recovery projects scheduled for implementation under the FFF’s 1.0 agreement. The project began with pre-design in 2018 with design and funding proceeding in 2021 with construction to begin in 2022 and 2023. The project is “one of the many salmon recovery projects that need to be implemented to restore critical rearing habitat such as natural river shorelines, gravel bars, and floodplain side channels that have been lost or degraded”<sup>135</sup> and was identified and prioritized in the Salmon Recovery Funding Board (SRFB)-funded [Snoqualmie at Fall City \(SAFC\) Reach Restoration Assessment \(2011\)](#).

The \$17 million project includes funding from the Washington State Resource Conservation Office, a King County Cooperative Watershed Management Grant through the King County Flood Control District, King County Surface Water Management Fees, Floodplains by Design and the Snoqualmie Tribe. Property acquisition grants were provided by King County conservation futures, the King County Parks Levy, the King County Flood Control District, and Washington State Salmon Recovery Funding Board (SERF).

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<sup>134</sup> B. Ledoux, personal communication, April 2021

<sup>135</sup> <https://www.kingcounty.gov/services/environment/animals-and-plants/restoration-projects/projects/fall-city-floodplain-restoration.aspx>

Planned outcomes of the project will include the restoration of in-stream and riparian habitat on the Snoqualmie River with goals to reconnect approximately 145 acres of floodplain, remove approximately 2,600 feet of levee/revetment, construct 2,500 feet of side channel, and relocate road/berms. The project is currently moving forward with final design and construction.<sup>136</sup> FFF works closely with project partners on the Fall City Floodplain Restoration team to “ensure that the project team is meeting and talking to neighboring properties, talking with landowners about impacts of the project and bringing in third party review” to ensure accurate modeling.<sup>137</sup>

### *Buffer Task Force*

In 2017, King County received a \$100,000 grant from the Puget Sound National Estuary Program (Near-Term Action #2016-0045) called “Balancing Fish, Farms and Floods in King County's Snoqualmie Watershed”. The grant was requested to create a Buffer Task Force that would use best available science to provide a locally focused “riparian buffer strategy that balances salmon recovery with agricultural viability” and “develop the [Snoqualmie Agriculture Riparian Decision Tool](#)”. The Buffer Task Force concluded in 2019. In 2020 the team produced a synthesis report<sup>138</sup> alongside the King County Agriculture, Forestry and Incentives Unit’s “Riparian Buffers in an Agricultural Setting” report which summarizes the effects of riparian vegetation on agricultural land.<sup>139</sup> Next steps are to form a Buffer Implementation Task Force to explore how buffers will be planted in the valley, what incentives would help accelerate voluntary riparian buffer plantings, and set measures for success.<sup>140</sup>

### *Technology/Data-Related Projects*

In 2019, the FFFF Flood Caucus introduced the idea of using 2D HEC-RAS modeling in evaluating flood effects in the lower Snoqualmie Valley to the FFF Regulatory Task Force (RTF). The RTF agreed that a recommendation to the FFF Implementation Oversight Committee (IOC) should be made to fund the development, maintenance and periodic updates to a 2D model specific to the lower Snoqualmie Valley. Tools to model flooding (developed by Seattle-based hydrology and geomorphology firm Watershed Science and Engineering) with a particular focus on analyzing potential flood impacts of large scale tree plantings<sup>141</sup> have been brought forward to the IOC.<sup>142</sup> As of 2021, FFF applied for funding through a FEMA grant for the 2D modeling project.<sup>143</sup> According to a 2021 newsletter, the model could “help with developing a better

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<sup>136</sup> <https://your.kingcounty.gov/dnrp/library/water-and-land/habitat-restoration/barfuse-restoration/fall-city-floodplain-restoration-notice-of-action.pdf>

<sup>137</sup> B. Ledoux, personal communication, April 2021

<sup>138</sup> [https://www.kingcounty.gov/~media/services/environment/watersheds/snoqualmie-skykomish/snoqualmie-fish-farm-flood/Buffers\\_Task\\_Force/BufferTaskForce\\_FinalReport.ashx?la=en](https://www.kingcounty.gov/~media/services/environment/watersheds/snoqualmie-skykomish/snoqualmie-fish-farm-flood/Buffers_Task_Force/BufferTaskForce_FinalReport.ashx?la=en)

<sup>139</sup> [https://www.kingcounty.gov/~media/services/environment/watersheds/snoqualmie-skykomish/snoqualmie-fish-farm-flood/Buffers\\_Task\\_Force/Riparian-Buffers-in-an-Agricultural-Setting.ashx?la=en#:~:text=Riparian%20buffers%20can%20also%20complicate,and%20creating%20habitat%20for%20pollinators](https://www.kingcounty.gov/~media/services/environment/watersheds/snoqualmie-skykomish/snoqualmie-fish-farm-flood/Buffers_Task_Force/Riparian-Buffers-in-an-Agricultural-Setting.ashx?la=en#:~:text=Riparian%20buffers%20can%20also%20complicate,and%20creating%20habitat%20for%20pollinators)

<sup>140</sup> B. Ledoux, personal communication, May 2021

<sup>141</sup> Fish, Farm and Flood 2.0 Actions List. Request access.

<sup>142</sup> [https://kingcounty.gov/~media/services/environment/watersheds/snoqualmie-skykomish/snoqualmie-fish-farm-flood/2020\\_Meetings/FFF\\_IOC\\_Meeting\\_Packet\\_02-26-2020.ashx?la=en](https://kingcounty.gov/~media/services/environment/watersheds/snoqualmie-skykomish/snoqualmie-fish-farm-flood/2020_Meetings/FFF_IOC_Meeting_Packet_02-26-2020.ashx?la=en)

<sup>143</sup> King County Water and Land Resources [Snoqualmie Valley 2d Model] Application to FEMA. Request access.

understanding of local effects of flooding, specifically smaller-scale floods (in particular two, five, and ten-year flood events), upon local communities and related infrastructure.”<sup>144</sup>

### *Other Projects*

The Agriculture Strategic Plan is underway and expected to be drafted by June.

As of May 2021, FFF submitted a 2021 [Cooperative Watershed Management Grant](#) application to the King County Flood Control District for approximately \$52,000 to “explore the potential of directing plantings associated with agriculture drainage projects to areas critical for salmon recovery (rather than the default areas adjacent to the drainage improvement site required by current state HPA conditions). The intended benefit would be to bring higher quality improvements to salmon habitat as part of agriculture work and ideally, net gain.”<sup>145</sup> Project partners include Snoqualmie Valley Watershed Improvement District, King Conservation District, Snoqualmie Indian Tribe and Tulalip Tribes, and WDFW.

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<sup>144</sup> <https://content.govdelivery.com/accounts/WAKING/bulletins/2c4139d>

<sup>145</sup> Grant application submitted by King County. Request access.

## 8. Floodplains for the Future

### 8.1 Defining Features and Geographic Focus

Since 2013, Floodplains for the Future (FFTF) partners have collaborated to support, fund, and implement multi-benefit floodplain projects and activities in the Puyallup Watershed. Between 1915 and 1940 the Puyallup, White and Carbon rivers were straightened and disconnected from the floodplain. As glacier-fed rivers, they have high sediment and frequently flood the floodplain.

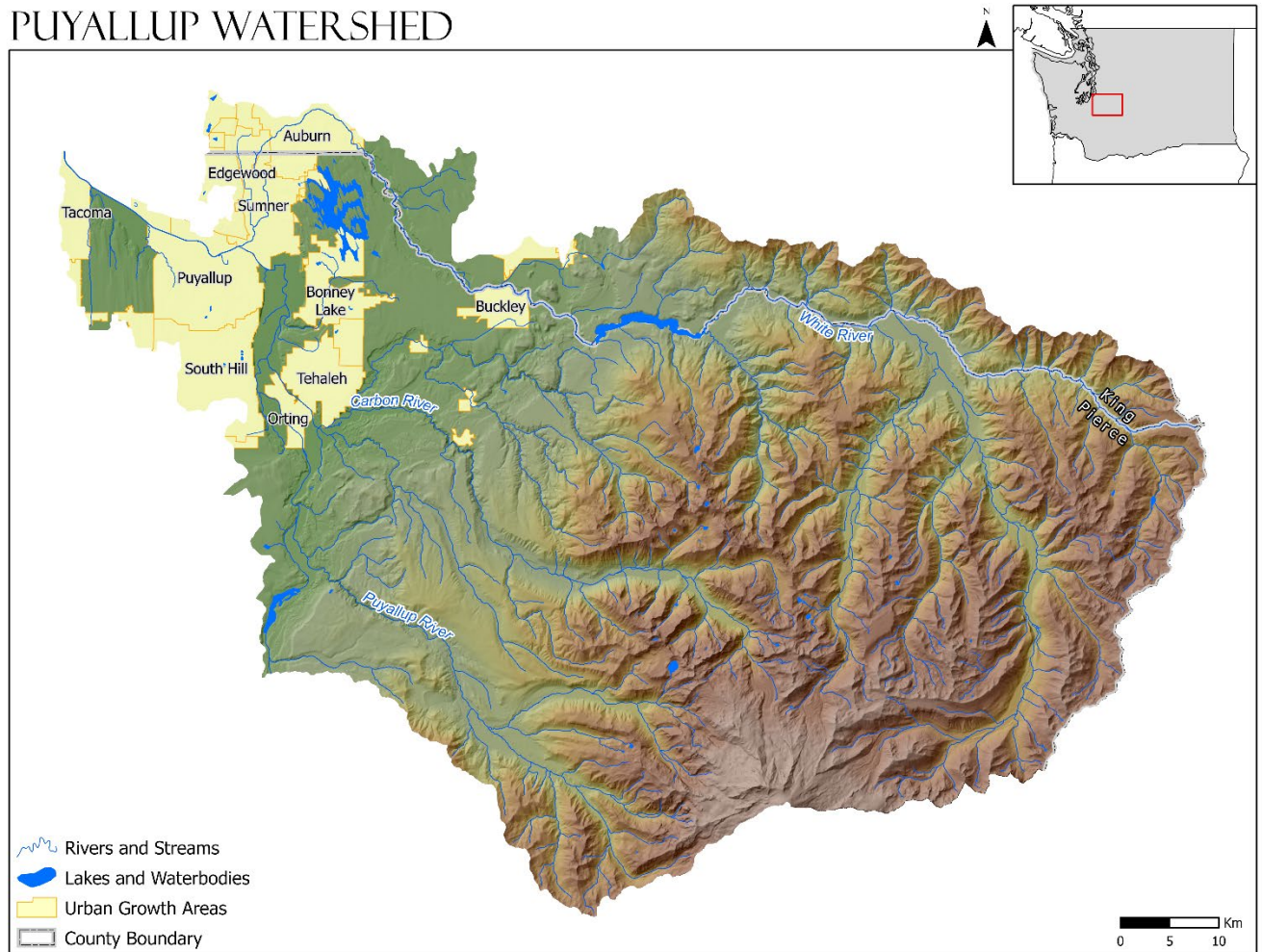


Image 11. Map of the Puyallup Watershed, Puget Sound Institute

### 8.2 Background

In the early 1900's King County farmers redirected the White River into the nearby Stuck River, residing in Pierce County. This diversion "spawned a long-lived lawsuit between King and Pierce Counties"<sup>146</sup> which was settled in 1913 resulting in the White River permanently joining the Puyallup River. Additional work to control the flooding White and Puyallup Rivers resulted

<sup>146</sup> <https://www.thenewstribune.com/news/local/article143641179.html>

in the construction of the Mud Mountain Dam, completed in 1948, which is operated by the Army Corps of Engineers (with a new \$112 million fish passage facility constructed in 2017).<sup>147</sup> Several towns in the Puyallup basin face increasing flood risks including the City of Sumner whose current levees are unequipped for mitigation of 100 year floods.<sup>148</sup> Additionally, an estimated 96 miles of historic fish habitat has been lost or disconnected from the floodplain in the Puyallup Watershed.<sup>149</sup> In the Lower Puyallup and Lower White Rivers “the nearly 37,400 acres of floodplain have been reduced to less than 2,000 acres because of levees and revetments. The low numbers of salmon have also driven federal ESA listings in the Puyallup Watershed”.<sup>150</sup>

In 1987, Pierce County joined FEMA’s [National Flood Insurance Program \(NFIP\)](#) and in 1990 formally adopted a floodplain management plan. Pierce and King County are recognized as Class 2 counties in FEMA’s Community Rating System (CRS) as part of NFIP. The Community Rating System, ranging from 9 to 1 is a voluntary program that discounts flood insurance premium rates to “reward community actions” that meet the three goals of CRS.<sup>151</sup> A ranking of ‘2’ is considered very high.

The Puyallup Tribe developed the first setback levee study and Pierce County developed the Rivers Flood Hazard Management Plan (RFHMP) in 2013 “in response to high [flooding] costs and is intended to provide meaningful and long-lasting solutions for river management and flood protection in Pierce County.”<sup>152</sup> Floodplains for the Future have invested over \$70.9 million in integrated floodplain management projects since 2013 as of 2020.

### 8.3 Lead, Consultants, Stakeholders, Partners

Representatives from Pierce County, tribal governments, municipalities, Pierce Conservation District, the WRIA 10/12 Lead Entity, PCC Farmland Trust (now Washington Farmland Trust), Forterra, the King-Pierce Farm Bureau, the Port of Tacoma, the South Puget Sound Salmon Enhancement Group, American Rivers, State agencies, drainage districts, and consultants all work with Floodplains for the future with funding and support from the Department of Ecology, TNC, and Puget Sound Partnership.

### 8.4 Mission and Vision

Floodplains for the Future’s mission statement is “to encourage shared leadership in a trusting and transparent environment in order to plan, fund, and implement multi-benefit floodplain projects in the Puyallup, White, and Carbon River floodplains.” Its vision is that “restored connections between rivers and land improve habitat for salmon, protect communities and critical infrastructure from flooding, and provide new opportunities for recreational and cultural uses while preserving agricultural lands in the Puyallup River Watershed.”<sup>153</sup>

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<sup>147</sup> <https://www.nws.usace.army.mil/Missions/Civil-Works/Locks-and-Dams/Mud-Mountain-Dam/>

<sup>148</sup> <https://www.thenewstribune.com/news/local/article143641179.html>

<sup>149</sup> [WRIA 10/12 Salmon Recovery Plan](#)

<sup>150</sup> [WRIA 10/12 Salmon Recovery Plan](#)

<sup>151</sup> These include: reducing flood damage to insurable property, strengthen and support the insurance aspects of the NFIP and encourage a comprehensive approach to floodplain management. CRS communities represent 5 percent of all communities participating in NFIP: <https://www.bellairctx.gov/DocumentCenter/View/20794/NFIP-CRS-Fact-Sheet?bidId>

<sup>152</sup> Pierce County Floodplains by Design Grant Application. Request access.

<sup>153</sup> <https://floodplainsforthefuture.org/aboutus/>

Floodplains for the Future’s Integrated Management Group have developed a long-term vision that includes floodplain reconnection and habitat restoration efforts, agricultural land preservation, community outreach, and monitoring. The group works together in order to help advance and improve these important projects and to ensure that farm, fish, and flood values are equally represented through all stages of implementation.

## 8.5 Goals and Objectives

FFTF partners have released six strategies<sup>154</sup> that guide their approach to integrated floodplain management:

- Reconnect floodplain through levee setbacks and side channel reconstruction
- Remove structures at-risk of flooding through parcel acquisition and demolition
- Preserve agricultural land through conservation easements
- Restore habitat and watershed processes to support all salmon and trout species
- Identify agricultural resiliency opportunities and action plans
- Develop a strong, commonly understood collaborative structure and partnership.

FFTF has a ‘Shared Monitoring Program’ that “monitors the progress of actions by FFTF partners” using 18 metrics called the ‘Index of Floodplain Health’ that the organization released in their 2019 – 2020 annual report. This monitoring program demonstrates clear performance indicators for each of the Floodplains for the Future partners and delineates projects through four categories: fish and habitat, flood risk reduction, agricultural viability and climate.

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<sup>154</sup> <https://floodplainsforthefuture.org/monitor-progress/>



## Index of Floodplain Health

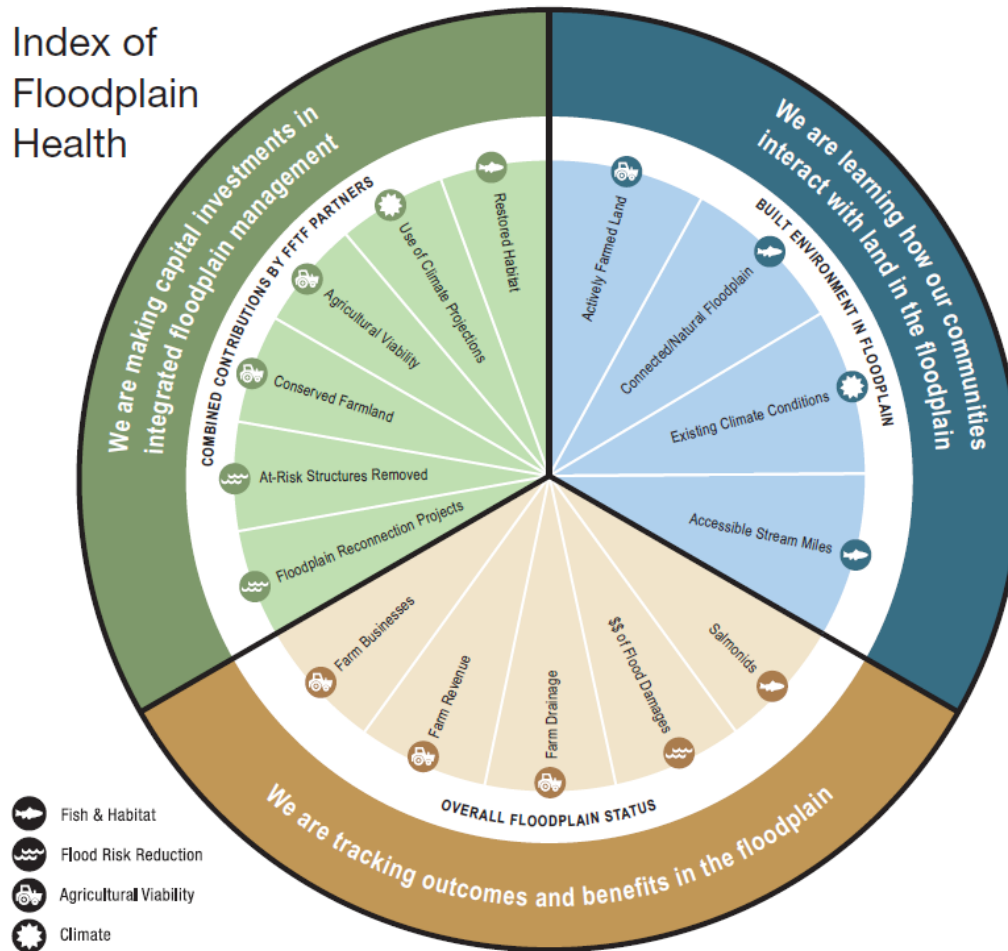


Image 12. Floodplains for the Future Index of Floodplain Health Metrics<sup>155</sup>

### 8.6 Funding

Funding for Floodplains for the Future comes from a variety of source with over \$70.9 million in total investments in integrated floodplain management since the organization's founding in 2013. In 2019, the combined contributions by Floodplains for the Future partners was over \$7.4 million with approximately \$3.8 million provided by local partners, \$3.6 million from Washington State, and \$1,000 from federal funding sources. In 2020, the combined contributions by Floodplains for the Future partners was \$10.09 million with approximately \$3.5 million provided by local partners, \$4.2 million from Washington State and \$2 million from federal funding sources. Additional funding for the [Clear Creek Acquisition and Floodplain Reconnection](#) project has come from NOAA.

Specific programs that have funded projects also include the Pierce County Planning and Public Works Department, the Flood Control Zone District, Pierce County Real Estate Excise Taxes and conservation futures. Grant funding has come from Floodplains by Design, the Salmon Recovery Funding Board, the Estuary and Salmon Restoration Program, the Puget Sound

<sup>155</sup> [https://floodplainsforthefuture.org/wp-content/uploads/2021/01/FFTE\\_AnnualReport\\_20192020.pdf](https://floodplainsforthefuture.org/wp-content/uploads/2021/01/FFTE_AnnualReport_20192020.pdf)

Acquisition and Restoration Fund, NRCS's Regional Conservation Partnership Program and private foundations.

### *Floodplains by Design Grants*

Pierce County received \$7,750,000 from Floodplains by Design in the 2019-2021 funding cycle for the 'Floodplains for the Future: Puyallup, White, & Carbon Rivers' project.<sup>156</sup> The total project cost was \$9.6 million. According to the grant description, Pierce County and Floodplains for the Future has 17 capital projects currently underway. The Floodplains by Design grant was used to "advance 11 of the capital projects along the Puyallup, White, and Carbon Rivers, as well as on South Prairie Creek." The project will advance efforts to reconnect over 970 acres, remove over 18,000 linear feet of levee, construct eight logjams, and protect 200 acres of agricultural land.

For the 2021-2023 funding cycle, Pierce County was awarded \$10.2 million by Floodplains by Design for the 'Puyallup Watershed Floodplains for the Future' project.<sup>157</sup> The projects aims to "restore 2.5 miles of natural riverine processes, reconnect 37 acres of floodplain, preserve approximately 350 acres of farmland, and result in six complete designs for future construction of ecosystem recovery projects throughout the Puyallup watershed."<sup>158</sup> The FbD grant will support "seven in-progress, multi-year projects that, when completed in the next 20 years, are projected to restore 10-15 miles of natural riverine processes and reconnect 700+ acres of floodplain."<sup>159</sup>

## 8.7 How Floodplains for the Future Approaches IFM

According to an organization representative, Floodplains for the Future functions because it is built on a "relationship that has evolved in [Pierce] County over a long period of time...with no one specific interest taking precedence." FFTF uses an integrated floodplain management approach because "working towards integrated solutions results in projects and funding opportunities that increase the pace and magnitude of FFTF actions to improve floodplain health."<sup>160</sup> FFTF works hard to support the "ability of all three interests (flood, farm and fish) to meet their individual goals."<sup>161</sup> Pierce County Surface Water Management hosts the FFTF coordinator position on behalf of the partnership, funded through Floodplains by Design. FFTF has had successful experiences adopting the IFM approach for several reasons including, in part, because FFTF is a "capital integration program. FFTF partners are typically organization staff that are tasked with planning and implementing actions consistent with established policy. These organizations agree to partner and collaborate to increase the pace and magnitude of the projects. Staff perspectives likely influence policy through technical expertise and weigh-in.

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<sup>156</sup> <https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Hazards/Floods-floodplain-planning/Floodplains-by-design>

<sup>157</sup> [Floodplains by Design 2021-2023 Project List](#)

<sup>158</sup> Pierce County Floodplains by Design Grant Application. Request access.

<sup>159</sup> *ibid*

<sup>160</sup> *ibid*

<sup>161</sup> K. Berger, personal communication, January 2021

Additionally, FFTF is “[intentional in supporting] farms, for farmers [and] for the farm economy.” Regarding agriculture community involvement, FFTF partners with the Pierce County Agricultural Program, Pierce Conservation District, the Strategic Conservation Partnership, and previously had a partnership with Washington State University, termed the Farming in the Floodplain program, funded by Floodplains by Design grants (see below for more details).

### *Farming in the Floodplains Project*

Farming in the Floodplains (FFP) was an initial agricultural component of Floodplains for the Future. FFP began with the PCC Farmland Trust (now Washington Farmland Trust) and transitioned ownership to the WSU-Puyallup extension office, with projects funded through Floodplain by Design.<sup>162</sup> FFP projects addressed several agriculture specific components including:

- “Integrating agricultural interests into proposed large levee setback projects
- Protecting and conserving agricultural land
- Minimizing conversion of agricultural lands to non-agriculture uses
- Maintaining viable farming economy
- Improving drainage on existing farms and
- Increasing the resilience of flood management infrastructure, the ecosystem, and agriculture as climate changes”<sup>163</sup>

Farming in the Floodplain-related efforts include the installation of over 2,400 linear feet of riparian buffer spanning four farms and seven private properties. Conservation easements, led by the Strategic Conservation Partnership (comprised of Pierce County, Washington Farmland Trust and Forterra), are used to secure agricultural land in perpetuity. Several farms have been conserved including [Matlock Farm](#), [Wild Hare Farm](#), and [Ford Farm](#). Efforts are underway for a fourth agricultural conservation project.

Farming in the Floodplains was involved in the [Clear Creek Acquisition and Floodplain Reconnection](#) project beginning in 2015. The project is expected to reconnect 250 to 590 acres of floodplain and is in the planning stages, having completed its [strategy plan](#) in summer 2020.<sup>164</sup> Farming in the Floodplain worked with agricultural landowners in the project area to develop the Clear Creek Agricultural Resilience Action Plan. The plan identifies actions and strategies to increase the resiliency of agriculture in the Clear Creek area. The Agricultural Resilience Action Plan will be finalized in July 2021.

Farming in the Floodplains is no longer operational as of 2021. FFTF, alongside the Pierce County Conservation District and Pierce County Agriculture representatives are working together to determine next steps in supporting agriculture in the Puyallup Watershed.<sup>165</sup>

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<sup>162</sup> <https://farminginthefloodplain.org/resources/>

<sup>163</sup> <https://farminginthefloodplain.org/resources/>

<sup>164</sup> <https://farminginthefloodplain.org/wp-content/uploads/2020/04/Draft-Study-Plan.pdf>

<sup>165</sup> K. Berger, personal communication, May 2021

## 9. Yakima Basin Integrated Plan

### 9.1 Defining Features and Geographic Focus

The Yakima River Basin covers over 6,155 square miles and is home to over 370,000 residents, including 11,000 members of the Yakama Nation. The Yakima River originates in the Cascade Mountains and flows nearly 215 miles to the Columbia River.<sup>166</sup> It has 464,000 irrigated acres and is one of the top agricultural producing regions in the state, yielding up to \$4.5 billion from crops, and supports an outdoor recreation economy that contributes \$1.2 billion annually, providing over 14,000 jobs.<sup>167</sup> The Basin has five reservoirs with approximately 1 million acre feet water capacity that can deliver approximately 2.3 million in acre feet.

### 9.2 Background

Since the late 19<sup>th</sup> century the “Basin has experienced water supply challenges [with the introduction] of irrigated agriculture”.<sup>168</sup> In a report to the Committee on Energy and Natural Resources in 2017, the origins of the Yakima Basin’s need for improved water management are described as follows: “Water shortages and litigation in the first half of the 20th century led to a court decree in 1945, which established that irrigators throughout the Basin would share water shortages equally in times of drought. An adjudication of the Basin’s water rights was filed in 1977 and the Yakama Nation filed suit to adjudicate the tribe’s rights, which have the oldest priority date and thus seniority in the system. The 1977 suit, *Ecology vs. Aquavella*, was filed by Ecology in the Yakima County Superior Court to “determine the legality of all claims for use of surface water in the Yakima River Basin...[which] led to a thorough examination of evidence verifying each claim (over 4,000) for the right to use surface water in the basin.”<sup>169</sup> The court was the “largest and longest water rights adjudication”<sup>170</sup> case in Washington State history and was settled in 2019.

Subsequent growth throughout the 1970’s further strained an already over-allocated water supply — contributing to ongoing water shortages, litigation, and conflict in the Basin.”<sup>171</sup> In 1979 Congress authorized the Yakima River Basin Water Enhancement Program (YRBWEP) to help mitigate the Basin’s water supply issues. Since then, Congress has authorized three subsequent YRBWEP phases. Phase I built fish screens and ladders (1984), Phase II implemented water conservation measures for agriculture and instream flows (1994) and Phase III initiated a watershed-scale balanced approach to Yakima Basin water supply management called the Yakima Basin Integrated Water Resource Management Plan (Integrated Plan). Founded in 2009, the Integrated Plan is 30-year plan that is implemented in three 10-year phases: an initial development phase from 2013 to 2023, a second phase from 2024 to 2034 and a final development phase from 2035 to 2045.

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<sup>166</sup> <https://www.govinfo.gov/content/pkg/CRPT-115srpt107/html/CRPT-115srpt107.htm>

<sup>167</sup> [Integrated Plan Overview Film](#)

<sup>168</sup> <https://www.govinfo.gov/content/pkg/CRPT-115srpt107/html/CRPT-115srpt107.htm>

<sup>169</sup> <https://ecology.wa.gov/Water-Shorelines/Water-supply/Water-rights/Adjudications/Ecology-v-Aquavella>

<sup>170</sup> *ibid*

<sup>171</sup> *ibid*

In 2013 the State of Washington passed legislation (SSSB 5367 the “Yakima River Basin Water Resource Management Act) which authorized the state to fund up to half of the Yakima Basin Integrated Plan. Remaining funding would come from non-state sources. SSSB 5367 also stipulated that the funding ratios did not apply to individual projects, nor are projects pre-authorized and require appropriate “project related analyses and permits.”<sup>172</sup> In 2019, Congress passed the [John D. Dingell, Jr. Conservation, Management, and Recreation Act](#)<sup>173</sup> which authorized the Integrated Plan, including the [Kachess Drought Relief Pumping Plan](#), and to expand water conservation to areas in the basin not previously supported (to reach a goal of 85,000 acre feet).<sup>174</sup> Unique features of the Yakima Basin Integrated Plan include that the Integrated Plan is operating in an area far more likely to be subject to periods of drought (which have recently occurred in 1992 to 1994, 2001, 2005, 2015 and 2019); extensive fish passage and habitat restoration is needed to restore a historic and robust fishery (that includes ESA listed steelhead and bull trout) decimated by the “development of the basin — including the five major storage reservoirs Reclamation built without with fish passage”<sup>175</sup> and that the Plan is a partnership between “federal and state agencies, local government at all levels, and the Yakama Nation.”<sup>176</sup>

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<sup>172</sup> [YRBWEP Workgroup Meeting Notes, September 4, 2013](#)

<sup>173</sup> The Dingell Act additionally permanently funds the Land and Water Conservation Fund, expanded several national parks, protected habitat in several states, and designated approximately 200 miles of wild and scenic rivers in Oregon and Bureau of Land Management-directed efforts.

<sup>174</sup> [2019 Yakima Basin Integrated Plan Highlights Newsletter](#)

<sup>175</sup> Malloch, S. “Basin-Wide Water Collaboration: the Yakima Basin Integrated Plan at 10 Years from Inspiration to Implementation.” *The Water Report* 186 (August 2019): 1-14.

<sup>176</sup> *ibid*

## YAKIMA WATERSHED

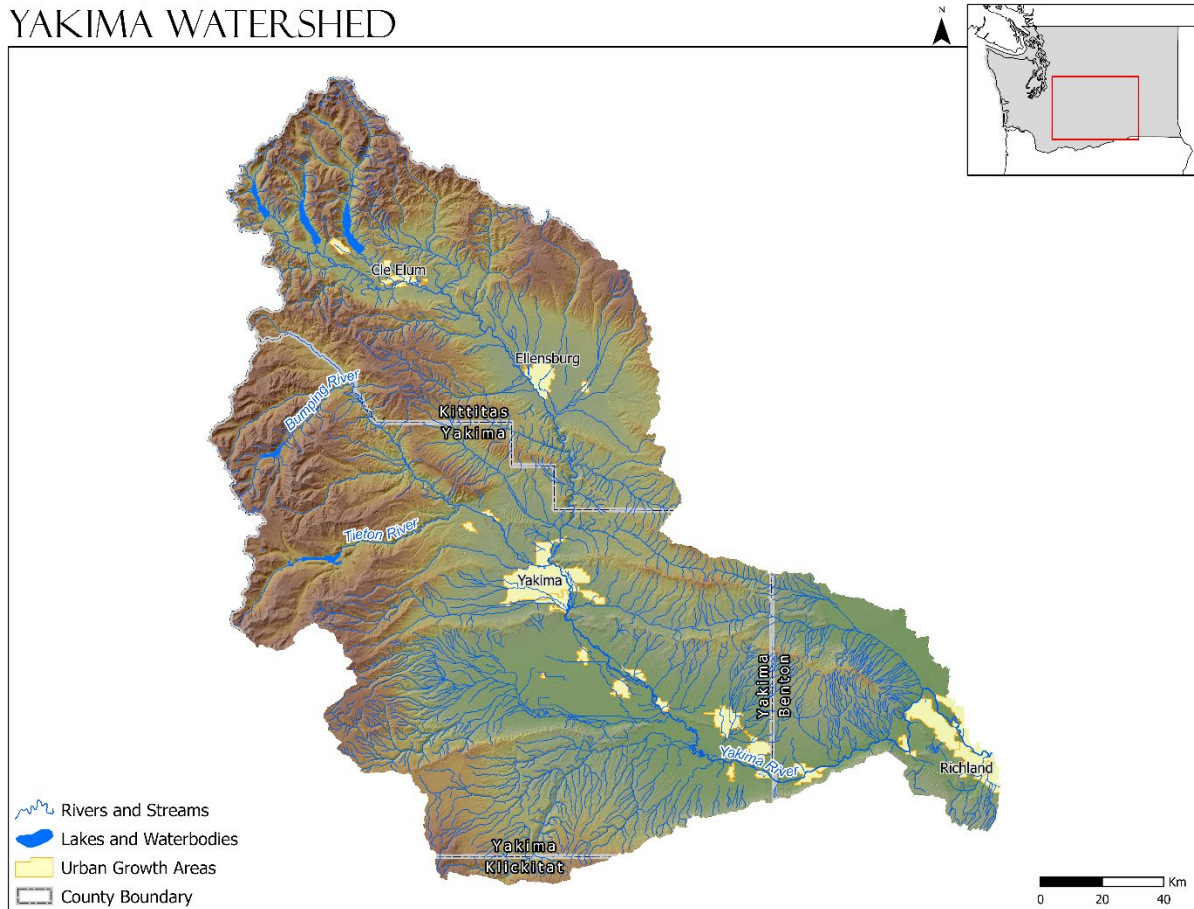


Image 13. Map of the Yakima River Basin Watershed, Puget Sound Institute

The Integrated Plan places “agriculture conservation and habitat enhancement as two separate elements of the integrated plan” that “complement each”.<sup>177</sup> The Integrated Plan’s focus is on “improving water supplies, achieving drought resiliency, responding to climate change, providing fish passage, and restoring the ecosystem, while improving economic vitality and supporting growing communities.”<sup>178</sup> Fishery restoration goals include flow improvement, fish passage and habitat enhancement.

According to a video produced by the Bureau of Reclamation “[prior to the [Plan] we could only speak to about two to three habitat projects that Reclamation worked on from 1994 to about 2009. And since 2013 there have been over 40 projects that Ecology has funded and has worked with partners to build. That’s an amazing achievement to have 40 projects worked on.” YRBWEP brings “diverse, often conflicting, interests together for the same goal [with]

<sup>177</sup> Malloch, S. “Basin-Wide Water Collaboration: the Yakima Basin Integrated Plan at 10 Years from Inspiration to Implementation.” *The Water Report* 186 (August 2019): 1-14.

<sup>178</sup> [2020 Yakima Basin Integrated Water Resource Management Plan Cost Estimate and Financing Plan](#)



convergence, attitude and resolve.”<sup>179</sup> Since 2013, Integrated Plan efforts have “achieved approximately 34,951 acre-feet in total water savings.”<sup>180</sup>

### 9.3 Lead, Consultants, Stakeholders, Partners

YRBWEP has an Implementation Committee, the YRBWEP workgroup and several subcommittees. The YRBWEP “workgroup provides policy and project development consultation on the implementation of the Integrated Plan.”<sup>181</sup> The Implementation Committee coordinates with Bureau of Reclamation leadership in Washington, DC.

The following subcommittees and working groups are a part of YRBWEP:

- Water Use Subcommittee
- Habitat Subcommittee
- Economic Subcommittee
- Groundwater Subcommittee
- Watershed Lands Subcommittee
- Outreach Working Group

Members of the YRBWEP Workgroup, which administers the Integrated Plan, include representatives from federal agencies including the Bureau of Reclamation, NOAA, WDFW, USDA, Ecology, USFS, DNR, the Yakama Nation, Washington State agencies, local irrigation and reclamation districts (Kittitas, Kennewick, Roza, Sunnyside Valley, Yakima-Tieton), non-profits like Trout Unlimited and American Rivers, city and county council representatives and other stakeholders including the Yakima Basin Fish and Wildlife Recovery Board and the Yakima Basin Storage Alliance.

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<sup>179</sup> [2020 Yakima Basin Integrated Water Resource Management Plan Cost Estimate and Financing Plan](#)

<sup>180</sup> *ibid*

<sup>181</sup> *ibid*

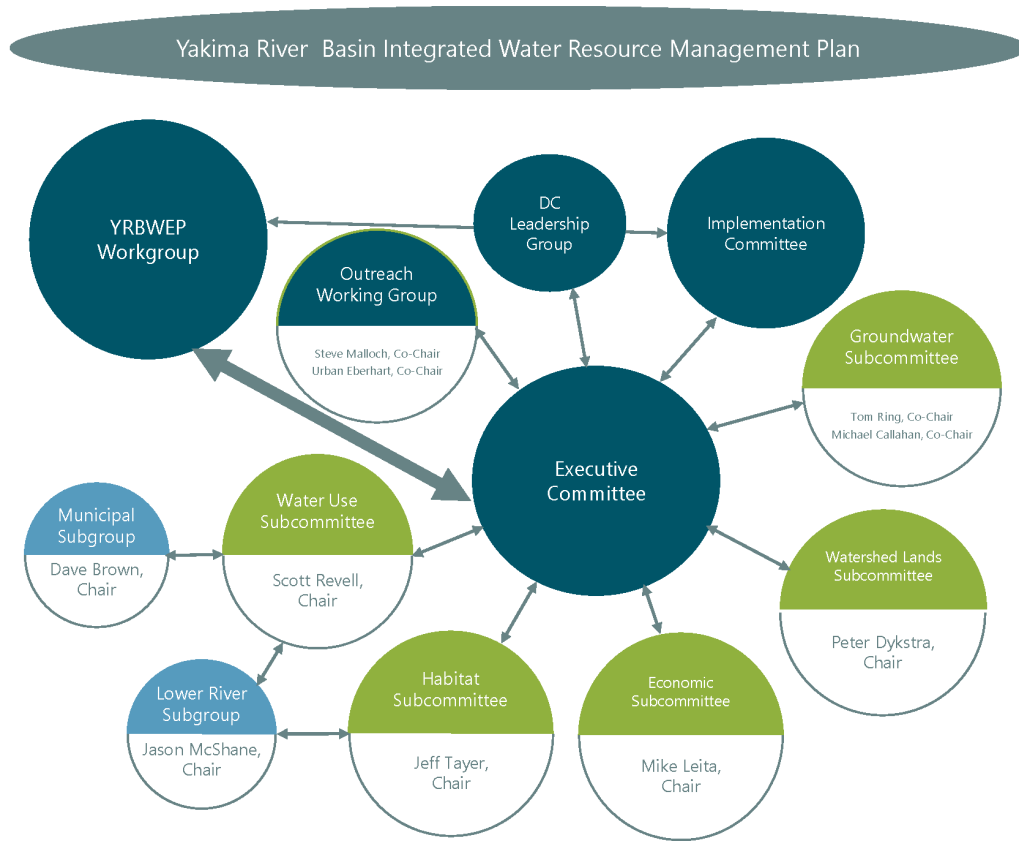


Image 14. Yakima River Basin Integrated Plan Organizational Diagram

## 9.4 Mission and Vision

“The Integrated Plan moves beyond long-standing conflicts over water and fisheries and is taking pragmatic, collaborative steps to address the looming problems of climate change, especially loss of snowpack and earlier spring runoff. Families, fish and wildlife, businesses, and agriculture all depend on cool, clean, reliable water supplies in the Yakima River Basin to thrive and prosper.”<sup>182</sup>

## 9.5 Goals and Objectives

The goals of the Integrated Plan are to:

- Provide opportunities for fish passage to historic fish spawning and rearing grounds, comprehensive watershed and aquatic protection, as well as ecological restoration that address instream flows and aquatic habitat
- Improve water supply reliability for municipal and agricultural needs during drought years

<sup>182</sup> [Integrated Plan Overview Film](#)

- Develop a comprehensive approach for the conservation of water supplies for crop irrigation, municipal and domestic uses, and power generation
- Improve the ability of water managers to respond and adapt to the potential effects of climate change
- Contribute to the vitality of the regional economy and sustain the riverine environment

The Integrated Plan consists of seven elements.<sup>183</sup> The objectives of each elements are summarized below.

Element	Objective
Habitat	To provide fish and wildlife habitat enhancement in the basin including floodplain restoration, flow improvement, removal of fish passage barriers, screening diversions, and land and river corridor protection.
Fish Passage (six projects)	To provide upstream and downstream passage for anadromous and resident fish at all Reclamation reservoirs.
Enhanced Water Conservation	To conserve up to 170,000 acre-feet of water annually, allowing better instream flows for fish and more precise delivery and use of water. Local governments actively encourage improvements in water conservation from individual homeowners for indoor and outdoor use.
Structural and Operational Changes (to existing infrastructure)	To improve aging federal and non-federal infrastructure.
Surface Water Storage	To provide 450,000 acre-feet of new storage. The Initial Development Phase storage project accesses 200,000 acre feet of inactive storage at Kachess Reservoir via a new pumping plant facility and 14,600 acer-feet from raising the level of Cle Elum Reservoir. Building new reservoirs and expanding an existing reservoir are proposed for later phases.
Groundwater Storage (regional and municipal)	To increase storage by intentionally storing water in aquifers, and then either pumping it or allowing it to return to the river to improve flows, meet demands, and reduce water temperatures.
Market Driven Reallocation	Creating conditions and removing barriers to allow for efficient water rights trading between willing parties to improve water supplies and stream flow conditions

## 9.6 Funding

As required under [RCW 90.38.120](#), Ecology’s Office of the Columbia River and the State Treasurer produce an annual funding report. RCW 90.38.120 states that it is “the intent of the legislature for the state to pay its fair share of the cost to implement the integrated plan. At least one-half of the total costs to finance the implementation of the integrated plan must be funded

<sup>183</sup> <https://fortress.wa.gov/ecy/czshare/ocr/YBIP/Outreach/YBIPprimer.pdf>

through federal, private, and other non-state sources, including a significant contribution of funding from local project beneficiaries...[and that] the department shall deliver...a cost estimate and financing plan that addresses the total estimated cost to implement the integrated plan and analyzes various financing options.”<sup>184</sup>

The State’s biennial (two-year) budget cycle requires Integrated Plan project costs to be broken down by their various phases in order to fit into this two-year funding schedule.<sup>185</sup> This creates a challenge because “most funding is only secured in 2-3-year intervals due to state and federal budget cycles, which necessitates that projects that are expected to take more than 2-3 years have an implementation timeline that can be flexible based on available funding.”<sup>186</sup>

For each of the seven Integrated Plan elements, budget estimates for each phase are below:

**Table 2: Estimated Costs for Integrated Plan 35 Year Implementation Project<sup>11</sup>**

INTEGRATED PLAN ELEMENT	INITIAL DEVELOPMENT PHASE	MIDDLE DEVELOPMENT PHASE	FINAL DEVELOPMENT PHASE	FULL DEVELOPMENT COSTS
Habitat/watershed protection and enhancement	\$374,400,000	\$53,050,000	\$53,050,000	\$480,500,000
Fish passage (6 projects)	\$185,200,000	\$244,800,000	\$100,000,000	\$530,000,000
Surface water storage	*\$247,700,000	**\$986,425,000	**\$982,425,000	\$2,216,550,000
Groundwater storage - regional and municipal	\$7,400,000	\$57,900,000	\$57,900,000	\$123,200,000
Structural and operational changes	\$39,900,000	***\$143,100,000	***\$143,100,000	\$326,100,000
Enhanced water conservation	\$94,900,000	\$167,300,000	\$167,300,000	\$429,500,000
Market driven reallocation	\$3,100,000	\$475,000	\$475,000	\$4,050,000
Integrated plan update costs		\$1,500,000	\$1,500,000	\$3,000,000
<b>Total</b>	<b>\$952,600,000</b>	<b>\$1,654,550,000</b>	<b>\$1,505,750,000</b>	<b>\$4,112,900,000</b>

<sup>184</sup> [2020 Yakima Basin Integrated Water Resource Management Plan Cost Estimate and Financing Plan](#)

<sup>185</sup> *ibid*

<sup>186</sup> *ibid*

Figure 1. Cost estimation table, Office of the Columbia River, Yakima Basin Integrated Plan Cost Estimate and Financing Plan Report<sup>187</sup>

The Initial Development Phase (second column above) has a total cost of \$952.6 million, “with 69% of funding coming from federal/other sources and 31% coming from state sources.” Certain projects, such as the Kachess Drought Relief Pumping Plant (KDRPP) have construction, financing, operation, and maintenance costs being paid by the water users in the Roza Irrigation District who benefit from the project — for approximately \$218.6 million or approximately 22% of total IDP costs. A breakdown of Initial Development Phase projects include the \$236.2 million KDRPP project, the \$131.5 million [Cle Elum Dam Fish Passage](#) project and \$99.3 million for the Teanaway Community Forest Acquisition.

#### *State Funding*

Since 2013, Washington State has appropriated (to Ecology) the following per biennium<sup>188</sup>:

Biennium	Amount	Percentage of Total (%)
2013-2015	\$143 million	15
2015-2017	\$30 million	3.1
2017-2019	\$32.6 million	3.4
2019-2021	\$40 million	4.7
2021-2023	\$42 million	Unknown at this time

Significant state funding comes from the Salmon Recovery Funding Board (SRFB) which distributes money to the lead entity, the Yakima Basin Fish and Wildlife Recovery Board, through the State’s Recreation and Conservation Office. Since 1999, the Yakima Basin Lead Entity has had 117 local projects approved for over \$23.5 million dollars of SRFB funding. The extent of the SRFB projects spans throughout Yakima Basin.

<sup>187</sup> [https://app.leg.wa.gov/ReportsToTheLegislature/Home/GetPDF?fileName=YBIP2020CostEstFinancePlan\\_FINAL\\_3\\_5\\_21\\_7b5838c6-1a6a-4bcb-9c80-ab49a3eb5243.pdf](https://app.leg.wa.gov/ReportsToTheLegislature/Home/GetPDF?fileName=YBIP2020CostEstFinancePlan_FINAL_3_5_21_7b5838c6-1a6a-4bcb-9c80-ab49a3eb5243.pdf)

<sup>188</sup> <https://fortress.wa.gov/ecy/czshare/ocr/YBIP/Outreach/YBIPprimer.pdf>



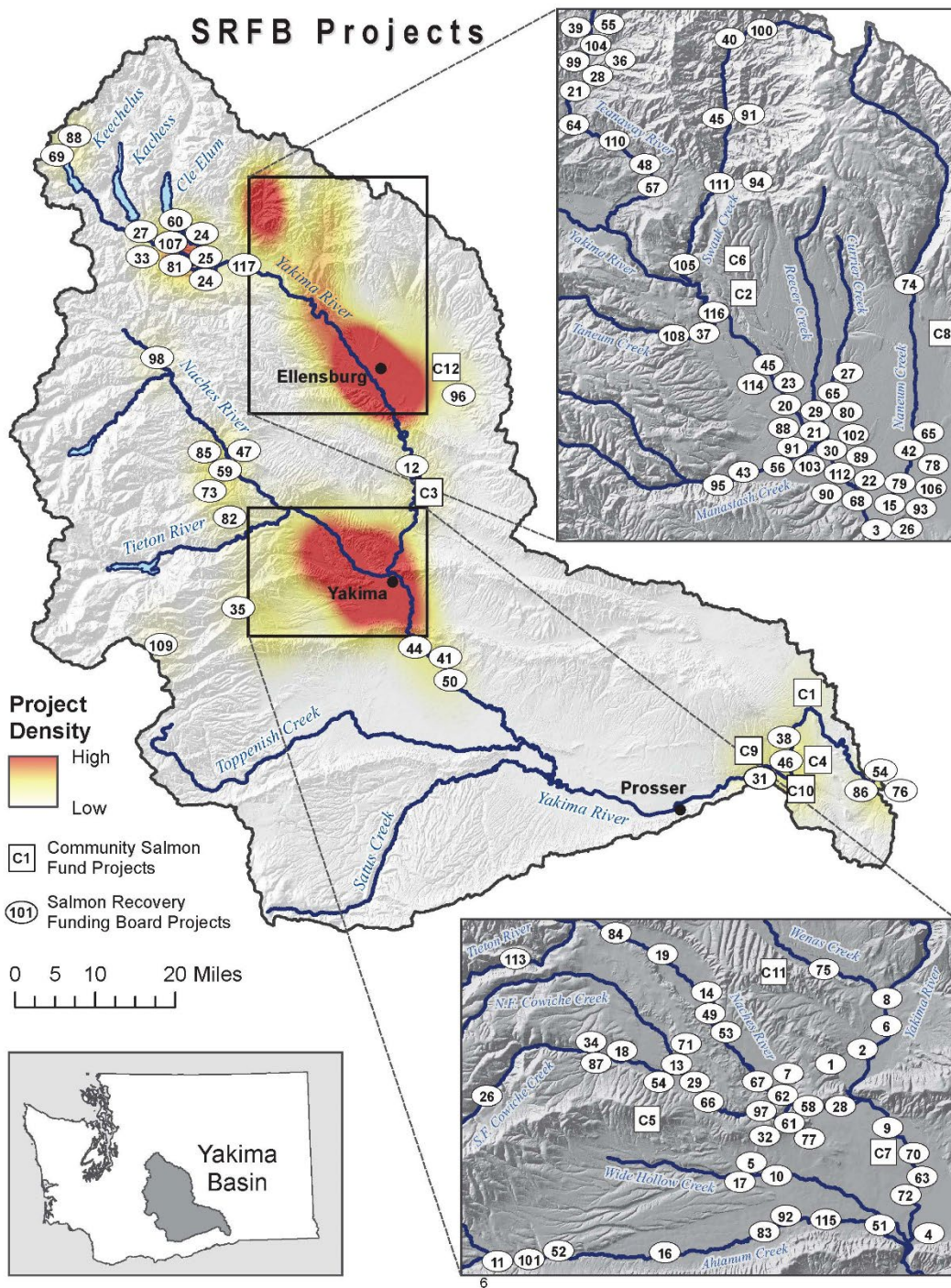


Image 15. Map of SRFB Funded Projects in Yakima County 1999 to 2019<sup>189</sup>, Salmon Recovery Board and the National Fish and Wildlife Foundation Yakima Basin Habitat Restoration Projects

<sup>189</sup> [http://ybfwrp.org/wp-content/uploads/2020/06/Habitat-Restoration-Projects-Booklet\\_02\\_04.pdf](http://ybfwrp.org/wp-content/uploads/2020/06/Habitat-Restoration-Projects-Booklet_02_04.pdf)



## Federal Funding

From 2011 to 2021, the Integrated Plan's federal funding included the following:<sup>190191</sup>

Agency	Program	Cumulative Funding Amounts from 2011 to 2021 (in millions)
Reclamation	Yakima River Basin Water Enhancement Project (includes YRBWEP Phase 2 projects)  *From 2011 to 2021, funding from Reclamation has averaged \$15 million annually with a low of \$9.3 million in 2014 and highs of \$28.1 million in 2018 and \$30.15 million in 2021. <sup>192</sup>	\$181.35*
Bonneville Power Administration <sup>193</sup>	Northwest Power and Conservation Council Fish and Wildlife Program  *No funding awarded in 2021	\$214.5*
US Forest Service	Land and Water Conservation Fund	\$30.5
NOAA Fisheries	Pacific Coastal Salmon Recovery Fund	\$13.2
USDA, NRCS	Regional Conservation Partnership Program (2015 to 2021) <sup>194</sup> ; Environmental Quality Incentives Program (2011 to 2016)	\$20.63
Bureau of Indian Affairs	Lining and Piping Wapato Irrigation Project	\$8.7
National Fish and Wildlife	Partners for Fish and Wildlife, National Fish Passage Program	\$1.3
US Army Corps of Engineers	Flood Plain Restoration	\$9.985

<sup>190</sup> Yakima Basin Integrated Plan (January 2019). "Robust Agriculture & Abundant Salmon."

<https://fortress.wa.gov/ecy/ezshare/ocr/YBIP/Outreach/YBIPprimer.pdf>

<sup>191</sup> Yakima River Basin Integrated Water Resource Management Plan FY 2011 – FY 2021 Federal Projects Funding Table

<sup>192</sup> <https://fortress.wa.gov/ecy/ezshare/ocr/YBIP/Outreach/YBIPprimer.pdf>

<sup>193</sup> The Bonneville Power Administration funds the Yakima/Klickitat Fisheries Project and the Yakima Tributary Access and Habitat Program. More on funding and Yakima Basin Habitat Restoration Projects, funded through the State's RCO can be found here: [http://ybfwrp.org/wp-content/uploads/2020/06/Habitat-Restoration-Projects-Booklet\\_02\\_04.pdf](http://ybfwrp.org/wp-content/uploads/2020/06/Habitat-Restoration-Projects-Booklet_02_04.pdf)

<sup>194</sup> NRCS' Regional Conservation Partnership Program projects include the 'Yakama Nation On-Reservation Lower Yakima Basin Restoration Project' in fiscal year 2015/2015 for \$4.6 million which was awarded to the Yakama Tribe. An additional \$7.54 million was awarded to the Yakama Tribe for the 'Yakima Integrated Plan – Toppenish to Teanaway' project, an early component of the overall Integrated Plan.

### *Floodplains by Design Grants*

In the 2017 to 2019 funding cycle, Floodplains by Design awarded \$2.1 million to Yakima County for the ‘Rambler’s Park Phase 6 and Trout Meadows Phase 2’<sup>195</sup> project. The project was one several sequential phased projects to “[to develop] a new fish-friendly boulder bed overflow channel around Nelson Dam while ensuring [the] two bridges are protected. Through levee setback and excavation, and reconstruction of former floodplain channels, the second and final phase of the Trout Meadows project sought to reduce pressure on McCormick Levee, reduce flood heights in the immediate vicinity, and reconnect quality floodplain habitat.”<sup>196</sup>

In the 2019 to 2021 funding cycle, Yakima County received \$8 million for the ‘Gap to Gap 1135 Locally Preferred Alternative Project’ to “reconnect 1,039 acres of floodplain” and other floodplain enhancement projects and \$531,000 for Phase 1 of the ‘Naches-Cowiche Flood Risk Reduction and Floodplain Restoration’ project.<sup>197</sup> Yakima County also received \$4.476 million for the Nelson Dam removal project (which is projected to cost \$16.45 million, with the city contributing over \$7 million and removal work to being in 2021).<sup>198199</sup> Yakima County did not receive any Floodplains by Design funding in the 2021-2023 funding cycle.<sup>200</sup>

Additional proposed grant amounts include \$1.12 million for the ‘Ahtanum Creek Diversion Modifications’ project (proposes to remove and lower both the Ahtanum Creek diversion dam and the Wapato Irrigation Project fish screens, and create a new bypass channel on Ahtanum Creek) and \$757,732 for the ‘Naches-Rock Creek Confluence Restoration’ project (examining future flood risk reduction and habitat restoration). Running totals for the three projects are \$61.2 million, \$83.5 million, and \$85 million, respectively.

### **9.7 How the YBIP Approaches IFM**

“Washington’s most successful integrated water management plan” has had stakeholders “working with each other” for over 30 years.<sup>201</sup> In the Yakima basin, according to a representative from Reclamation, “the agricultural community is uniquely motivated to participate to make sure during drought years they get the water they need”.<sup>202</sup> Unlike the integrated floodplain management processes in Puget Sound, the Integrated Plan, and related efforts in the Yakima Basin, prioritize “responding to drought as a primary driver for the Integrated Plan” because “crops, and low water levels and increased temperatures impact

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<sup>195</sup> [Floodplains by Design: Report to the Legislature 2019](#)

<sup>196</sup> <http://www.washingtonnature.org/s/2017-Ranked-FbD-project-list-21417.pdf>

<sup>197</sup> <https://twitter.com/ecycentral/status/1227013448527073280>

<sup>198</sup> <https://www.yakimawa.gov/services/water-irrigation/files/Nelson-Dam-2020-Update.pdf>

<sup>199</sup> [https://www.yakimaherald.com/news/local/nelson-dam-removal-project-set-to-start-in-2021/article\\_c63d6fbc-e934-521f-944e-366604fb39a7.html](https://www.yakimaherald.com/news/local/nelson-dam-removal-project-set-to-start-in-2021/article_c63d6fbc-e934-521f-944e-366604fb39a7.html)

<sup>200</sup> <https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Hazards/Floods-floodplain-planning/Floodplains-by-design>

<sup>201</sup> *ibid*

<sup>202</sup> W. Christensen, personal communication, April 2021

fisheries.”<sup>203</sup> This was particularly salient, when in 2019, a [drought emergency](#) was declared throughout the Yakima basin.

Representatives of Reclamation have attributed YRBWEP success to committed and involved representatives from Reclamation and Ecology, as well as active participations from the public and tribal members. Reclamation tracks the number of participants attending workshops, which numbers nearly 100 attendees on average (with 30 to 50 members of the public attending)<sup>204</sup>. YRBWEP has an outreach subcommittee that specifically works on outreach, including distributing pamphlets that highlight the Plan.

Lastly, YRBWEP’s integrated floodplain management practices are well-recognized internationally. Reclamation representatives presented an overview of the Integrated Plan at the 8<sup>th</sup> World Water Forum in Brazil in 2018 and an Ecology representative presented to the Lincolnshire, UK-based Fens for the Future partnership in 2017.<sup>205</sup>

## 9.8 Projects

The below projects are highlights of the Integrated Plan that demonstrate the depth and breadth of its integrated floodplain management projects as of 2021. Projects are organized by the seven elements of the Integrated Plan:

- Fish Passage (six reservoir/dam projects)
- Habitat/Watershed Protection and Enhancement
- Enhanced Water Conservation
- Structural and Operational Changes
- Surface Water Storage
- Groundwater Storage (regional and municipal)
- Market Driven Reallocation (creating conditions and remove barriers to allow for efficient water right trading between willing parties to improve water supplies and stream flow conditions)<sup>206</sup>

### *Fish Passage Facilities and Pool Raise Projects*

The Integrated Plan includes plans to develop fish passages at six reservoirs, including the Clear Lake, Cle Elum, Bumping, Tieton (Rimrock), Keechelus and Kachess reservoirs. Initial construction began at the Cle Elum Reservoir in 2015 to construct a unique downstream fish passage system. The fish passage involves a [helix structure](#) that provides a safe passage way to exiting fish. Construction of the intake ramps, gate and helix will continue through 2024 along with the bypass tunnel in 2021 and an adult sockeye collection facility in 2023. The Cle Elum Pool raise project involves raising the dam’s “radial gates three feet” as well as stabilizing and protecting the shoreline in order to increase storage capacity by 14,600 acre feet of water.

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<sup>203</sup> [2019 Yakima Basin Integrated Plan Highlights Newsletter](#)

<sup>204</sup> Meeting notes

<sup>205</sup> W. Christensen, personal communication, April 2021

<sup>206</sup> <https://www.usbr.gov/pn/programs/yrbwep/2011integratedplan/newsletter/2020ybip.pdf>



Image 16. Map of Yakima River Basin Reservoirs<sup>207</sup>

#### *Kachess Drought Relief Pumping Plant*

Reclamation and Ecology are working with “local irrigation districts [including the Roza Irrigation District Board] to construct, operate and maintain the [Kachess Drought Relief Pumping Plant](#). In the fall of 2020, the Roza Irrigation District Board selected the floating pumping plant alternative [of the available options] to access additional stored water for farmers during drought years at Kachess Reservoir.”

<sup>207</sup> Bureau of Reclamation presentation slide at the 8<sup>th</sup> World Water Forum in Brazil 2018

As the water is pumped from the Kachess River to the Yakima River by the pumping plant, the Kittitas Reclamation District Tributary Supplementation Program “diverts the water at Easton Reservoir to hydrate creeks that otherwise dry up to “meet downstream irrigators’ needs. The pumping project [will] mitigate impacts to threatened bull trout populations via habitat improvements in the reservoir, its tributaries or in surrounding reservoirs.”

### Habitat/Watershed Protection and Enhancement Projects

A notable habitat protection and enhancement project is the [Schaake Habitat Improvement Project](#). The project began in 2003 when Reclamation purchased the 280-acre Schaake cattle ranch-oriented property under the “the authority of the Yakima River Basin Water Enhancement Project for its high potential to improve steelhead and salmonid habitat and to advance the goals of the Yakima Basin Integrated Plan.”<sup>208</sup> The Schaake Habitat Improvement project will restore approximately 130 miles of floodplain along a “2-mile reach of the Yakima River south of Ellensburg”, making it “one of the largest floodplain restoration projects in the Yakima River Basin.” Construction was planned for 2019 and 2020 and is ongoing, with revegetation activities through approximately 2024.

The Yakima River Gap-to-Gap Ecosystem Restoration project<sup>209</sup> seeks to “restore Yakima River floodplain function through property acquisition, level setback or removal” in the Union Gap reach of the Yakima. The project will lead to increases in “spawning and rearing habitat for multiple species, improve water quality in a key juvenile and adult migration corridor, reduce river temperatures, reduce nutrient-related water quality problems, and increase floodplain storage of runoff”.<sup>210</sup>

Gap to Gap sub-projects include the Outfall Relocation project<sup>211</sup> which relocated waste treatment plant outfall, in addition levee setback projects and Yakima County’s Blue Slough Reconnection Project which seeks to reconnect the Blue Slough to the Yakima River.

Habitat preservation projects have also occurred in the Teanaway Community Forest, including with large wood replenishment and completion of both summer and winter recreation plans.

A central focus of the habitat restoration and enhancement work emphasizes saving bull trout. This work includes habitat restoration and enhancement work in Gold Creek, the Upper Kachess River, Box Canyon Creek, and engineering designs for the South Fork Tieton and Gold Creek bridges to improve fish passage. Public outreach and education by the [Bull Trout Task Force](#) (with support from the Mid-Columbia Fisheries Enhancement Group) is underway.

### Enhanced Water Conservation Projects

Water conservation projects include the [Wapato Irrigation Project](#) and the completion of a new five-mile long pipeline. Additional irrigation pipelines projects include Manastash Creek area piping in the Kittitas Irrigation District, the [Manastash Creek/Anderson Diversion Irrigation](#)

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<sup>208</sup> <https://www.usbr.gov/pn/programs/yrbwep/phase2/schaake/index.html>

<sup>209</sup> <https://fortress.wa.gov/ecy/publications/documents/1912005.pdf>

<sup>210</sup> <https://apps.ecology.wa.gov/publications/documents/2012002.pdf>

<sup>211</sup> <https://yakimabasinintegratedplan.org/the-integrated-plan/>

[Water Acquisition](#), Manastash sprinkler conversions, the Manastash Conservation and Tributary Enhancement Project, the [Reed Diversion Design Barrier Removal](#) project and the acquisition of land along the confluence of the Manastash and Little Naches rivers. The Kittitas County Conservation District is “promoting on-farm irrigation and conveyance efficiency upgrades” and the Toppenish to Teanaway Conservation Partnership Program works with “landowners for irrigation efficiencies”. Larger projects include the aforementioned Cle Elum reservoir enhancement and enlargement projects (the Integrated Plan focuses on six reservoirs) and an Aquifer Recharge Assessment project.

Kittitas Reclamation District (KRD) has also completed a 2.7-mile lining of North Branch Canal, conserving an estimated 2,773 acre feet of water annually. Additionally, the Roza Irrigation District has undertaken several water efficiency projects including replacing “37+ miles of open lateral canal”<sup>212</sup> and sealing 2.6 miles of concrete-lined canal as well as installing expansion joints to reduce heat damage to the concrete-lined canal sections.

The [WaterSMART](#) program, funded by Ecology and Reclamation, works to do education and public outreach on water usage alongside “municipal water conservation efforts” (like the City of Yakima’s Aquifer Storage and Recovery<sup>213</sup>) and citizen efforts such as heritage gardens in Yakima.

### Market Driven Reallocation Project

Kittitas Reclamation District, Trout Unlimited and Mammoth Trading are partnering on a “market reallocation of water” study<sup>214</sup> and which will “improve water-banking processes”. Mechanisms and pathways to “improve [water transfer] transaction efficiency is being made with the development of the Yakima Basin Smart Market, a computer-based system that electronically matches willing water rights buyers and sellers.”<sup>215</sup>

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<sup>212</sup> [YBIP Highlights 2019 Report](#)

<sup>213</sup> <https://kimatv.com/news/local/yakima-increasing-water-storage-to-prepare-for-future-droughts>

<sup>214</sup> [YBIP Highlights 2020 Report](#)

<sup>215</sup> *ibid*



## 10. Summary

Floodplains and estuaries are dynamic and diverse landscapes that provide critical connections between terrestrial and aquatic systems, linking freshwater and marine processes. Intact floodplains and estuaries provide invaluable ecosystem services including flood damage mitigation, improved water quality, economically valuable farmlands, recreational opportunities, and critical habitat for a suite of flora and fauna. They have also been integral to Native Americans' lives and cultural practices for millennia.

The Floodplains and Estuaries Implementation Strategy emphasizes the importance of developing and implementing a system that supports integrated floodplain management approaches within and across Puget Sound river basins, incorporating needs related to improving regional flood safety, expanding and improving upon critical areas of salmon habitat, and preserving and maintaining regional agricultural viability in Puget Sound.

Implementing the appropriate integrated floodplain management approach to fish, farm and flood projects differs at the river basin and watershed scale, in each community and alongside different partners. Approaches also differ according to the priorities and interests of each organization, group and process compared in the synthesis.

Comparative analysis of the integrated floodplain management planning process of each IFM group can be a resource for floodplain practitioners. By comparing these IFM groups' backgrounds, stakeholders and partners, mission and vision, goals and objectives, funding and current projects, floodplain practitioners and the Puget Sound recovery community can integrate their floodplain management strategies more effectively.

This synthesis likewise seeks to support adaptive management of the Floodplains and Estuaries Implementation Strategy and is intended as a resource to inform and encourage further dialogue among integrated floodplain management practitioners to improve the development and implementation of integrated floodplain management approaches throughout Puget Sound.

## 11. Recommendations for Future Investigations

Each of the IFM groups analyzed in this synthesis operate within their own unique "ecosystem" – an ecosystem defined by their respective communities, histories, resources, needs and partners. Even given the unique operating contexts of each of the IFM groups, there are several opportunities that show promise for future impact but merit further study. These were identified through reflection from interviewees as well as through analysis of documents.

They include:

- Explore the impact of a facilitator trained in mediation, anti-bias, collaboration techniques and strategic organizational support
- Explore effective strategies for engaging the agricultural communities at the river-basin scale
- Study potential climate change impacts in selected river systems

## Explore the impact of a facilitator trained in mediation, anti-bias, collaboration techniques and strategic organizational support

Five of the six IFM groups and processes included in this comparison currently or previously have hired a consultant to act as a facilitator to mediate, convene and lead in-person and virtual meetings. Some of the groups have Floodplains by Design funding set aside for this position, while others have used operating funds (such as stormwater fees) to pay for these facilitators.

Some interviewees mentioned that a facilitator has different expertise than a project or program lead because a facilitator can “set a group up for communicative success” with their own skillset. One commenter noted was that “integration is an expertise of its own”. Several representatives mentioned that a facilitator that is a staff of a particular organization, for example, a County or Ecology staff, represent a particular “stance” that is a different from a “perceived-as-neutral” facilitator. The role of the unbiased party is a role that a deft and skillful facilitator can play.

One individual mentioned that their agency’s opinion is “different if presented by a facilitator” and that a facilitator “helps to bring out the quieter voices” at meetings. Nearly all of the groups anecdotally agreed that a facilitator could improve collaboration between group and community members, however, there are no quantitative data to demonstrate that groups have been more successful with a trained facilitator than not.

## Explore effective strategies for engaging the agricultural communities at the river-basin scale

Further investigation is recommended to explore the most effective strategy for engaging the unique agricultural communities that the IFM groups collaborate and partner with. As one IFM group representative suggested, IFM practitioners should ask “what are we doing for farms, for farmers, and for the farm economy?” Success stories of engagement with the agricultural community, such as the efforts in the Skagit delta (see Section 5) to rank and implement fish, farm and flood projects, demonstrates what can be an effective strategy for working with those communities in those locations.

The importance of preserving agricultural communities and the agriculture economy in Puget Sound is paramount to the continued success of floodplain management. According to an online survey with 75 respondents (of which 13 self-reported to have ‘dedicated agricultural interests’), several responded “that things are getting worse for farms in terms of vulnerability to development, flooding, and climate change. Those representing agricultural interests were particularly concerned—72 percent said things are getting worse (versus just over 50 percent for all respondents combined). Reasons cited include the loss of farmland to development, as a result of urban encroachment and population growth. Some also expressed concern about climate change altering precipitation patterns and increasing flood risk in the future.”<sup>216</sup>

At minimum, agricultural stakeholders must be consistently engaged in discussion alongside other partners and should be compensated for their participation. Several organizations’ agriculture resilience plans include assessments and recommendations to address development and its impact on agriculture, including Fish, Farm and Flood’s [Agricultural Land Resource](#)

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<sup>216</sup> [Floodplains by Design: Report to the Legislature](#)

[Strategic Plan Task Force](#) and the Sustainable Lands Strategy’s [Agriculture Resilience Plan](#). An integrated floodplain management approach, as supported by the Floodplains and Estuaries Implementation Strategy and demonstrated in groups’ agriculture strategic plans, shows promise in managing farm, fish and flood efforts in the region.

### Study potential climate change impacts in selected river systems

As mentioned in [Section 2.3.2](#), climate change considerations are impacting floodplain management planning processes. Few of the groups assessed in this synthesis have fully analyzed climate change risk and identified appropriate adaptation or mitigation measures. The Floodplains and Estuaries Implementation Strategy Narrative recommends that “future adaptive management of the Implementation Strategy should include strategy-specific assessment to enhance climate resiliency and incorporate the substantial progress made in regionally specific datasets, locally downscaled projections, and planning guidance at the regional, basin, and site scales.”<sup>217</sup>

Additional aspects of climate change that may be incorporated into future work plans include analysis of the environmental, social and/or economic justice components of climate change. An assessment of needs related to climate change for each group could prove beneficial to inform their next steps.

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<sup>217</sup> [Floodplains and Estuaries Implementation Strategy Narrative](#)

## 12. Appendix

### Integrated Floodplain Management Groups Comparison Table

This table provides a ‘snapshot’ view of each of the IFM groups included in this synthesis.

IFM Group, Organization or Process (in geographical order)	Location	Lead, Partners and Stakeholders	History	Mission and Vision	Goals and Objectives	Funding, Grants, Budget	Projects and Accomplishments
<b>Floodplain Integrated Planning</b>	Nooksack River (Whatcom County)	Led by the Whatcom County Flood Control Zone District (WCFCZD) with the Public Works Department providing staff support to the District. Includes representatives from WCFCZD, sub-zone districts advisory committees, diking districts, federal, state and local agency staff, local tribes, technical experts	In 1999, Whatcom County adopted the Lower Nooksack Comprehensive Flood Hazard Management Plan (CFHMP) and in 2005 the WRIA 1 Board adopted a salmon recovery plan (the WRIA 1 Salmonid Recovery Plan). Drawing from both of these plans the WCFCZD led a collaborative effort that resulted in the 2016 System-wide Improvement Framework (SWIF) to address levee deficiencies. Following the SWIF, the FLIP process began which broadened the scope of the planning process from the levee system to the entire floodplain including the upper forks. FLIP is designed to address the needs of fish, farms and other floodplain land uses through a collaborative process.	Develop an integrated floodplain management plan for the Lower Nooksack River that will reduce risk to public safety, property, and infrastructure, and support and enhance viable/sustainable/improving agricultural and fisheries economies.	<ul style="list-style-type: none"><li>• Reduce risk to public safety</li><li>• Minimize damage to public and private property and to public resources</li><li>• Provide a comprehensive understanding of the river</li><li>• Restore floodplain habitat formation processes and other environmental benefits where possible</li><li>• Build consensus around mutually beneficial outcomes</li><li>• Create a more resilient flood risk reduction system now and in the future</li><li>• Identify and prioritize a list of action items to implement plan</li></ul>	<p>FLIP is supported administratively by the WCFCZD with Public Works providing staff support. The WCFCZD received \$750,000 for their project “Develop Data &amp; Support for Floodplain Management Strategies” (NTA 2016-0113). The WCFCZD received \$2.09 million from Floodplains by Design, as well as \$1.5 million from the State Recreation and Conservation Office for the ‘Canyon Creek Integrated Flood-Fish’ project.</p> <p>The WCFCZD also received approximately \$1.2 million for the Deming Levee Improvement Project in the 2017 funding cycle. In the 2019-2021 funding cycle, Whatcom County received approximately \$6.0 million from Floodplains by Design for Phase 1 of the ‘Nooksack River: Floodplains that Work’ project. In the 2021-2023 funding cycle Whatcom County received \$6,515,464 for the second phase of this project.</p>	FLIP supports the CFHMP and its variety of associated projects including the Ferndale Levee Improvement Project which was developed in the CFHMP, and was included in the 2016 SWIF plan. The FLIP process organizes projects based on the five defined reaches of the lower Nooksack river with each reach having a specific strategy (designed based on Floodplains by Design reach strategies).
<b>Farms, Fish and Flood Initiative (3FI)</b>	Operates in the Skagit River Watershed (including the Skagit and Samish Rivers)	3FI Participants currently include NOAA, Western Washington Agricultural Association, Skagit Co. Dike District Partnership #17, Skagitonians to Preserve Farmland, WDFW and Consortium. For the Skagit HDM Multi-benefit Alternative Analysis project a working group was formed. Work group participants included: Skagit Co. Dike District #3, Skagit Co. Dike District #17/Dike District Partnership, Dike & Drainage District #22, Seattle City Light, Skagit Conservation District, Skagit Watershed Council, TNC, The Upper Skagit Tribe, USGS, NOAA and WDFW.	In 2012, TNC and Western Washington Agricultural Association, Skagitonians to Preserve Farmland, NOAA, Skagit County, and WDFW established The Farms, Fish and Flood Initiative (3FI) in the Skagit Valley. 3FI efforts grew from the 2005 Skagit Chinook Recovery Plan and the success of the Drainage and Fish Initiative. 3FI is the “first landscape scale effort in the Skagit Delta” to work on “estuary restoration, flood risk reduction and farmland protection”.	To create and advance mutually beneficial strategies that support the long-term viability of agriculture and salmon while reducing the risks of destructive floods.	3FI, using the Estuary Restoration Strategic Assessment as part of the Skagit Hydrodynamic Model Project, sought to identify projects that balanced “estuary restoration for Chinook salmon recovery and the need to maintain critical drainage infrastructure” and protect farmland.	<p>A \$305,000 EPA National Estuary Program Watershed Lead Organization grant to TNC; other grants including from SRFB and NOAA with a match from WDFW.</p>	<p>1) Skagit Tidegate and Fish Initiative (TFI), a framework that balances estuary restoration for Chinook salmon recovery and the need to maintain critical drainage infrastructure” led by the Skagit Dike District/</p> <p>2) Skagit hydrodynamic modeling project (HDM), as part of 3FI, created a work group made up of farm, fish and flood interests and spent five years developing the approach, methods and science to evaluate 23 project concepts plus three combination projects. The work group was led by WDFW, NOAA and TNC. The result is a strategy for moving projects forward that maximize benefits and minimize impacts across the three interests. The team has identified 13 projects that are highest priority with one of the 13 completed (<a href="#">the \$16.5 million Fir Island Farm project</a>) and two others that are advancing through the implementation pathway (<a href="#">Milltown Island</a> and <a href="#">Deepwater Slough Phase 2/Island Unit</a>). The Milltown and Deepwater projects are led by a coordinator at WDFW and the Skagit Dike and Drainage District Consortium.</p>

<b>The Sustainable Lands Strategy</b>	Operates in the Snohomish and Stillaguamish Watersheds (Snohomish County)	Snohomish County is the facilitator of the SLS, but does not have a formal seat on the Executive Committee	SLS was convened in 2010 by Snohomish County, Tulalip and Stillaguamish Tribes, state and federal agencies, and agricultural and environmental stakeholders to improve coordination and generate progress for fish, farm, and flood management interests, WDFW, Stillaguamish Flood Control District, Snohomish Conservation District, USFS, DNR, fisheries, tribes, cities, Ecology, private landowners. Ducks Unlimited, TNC	The mission of the Sustainable Lands Strategy is to help generate net gains in the productivity and sustained health of fish and farm communities by providing participants with: 1) best available science and technical support, 2) a neutral, mutually respectful forum for farm-fish collaboration, 3) packaging suites of broadly supported fish-farm measures that together generate net gain, and 4) monitoring and evaluation to measure progress.	The Sustainable Lands Strategy (SLS) was established with the intent that fish, farm, and flood management advocates can make more progress by working together than by being at odds with each other. SLS principles include: net gain for fish, farm and flood control interests, mutual respect through communication, agreed upon principles and a neutral, collaborative forum to discuss interests,	SLS is not funded as an organization, but Snohomish County Public Works Surface Water Management pays for a facilitator. In addition, the County and other entities pay for technical support from several consultants supporting various Workgroups. All other positions are voluntary, including members and chairs of the Steering Committee. Various funding sources include Floodplains by Design and NEP funding through several NTAs. In 2021, Snohomish County Public Works received \$8.8 million from Floodplains by Design for the 'Community Floodplain Solutions' project.	SLS is collaborating on several efforts with Snohomish County Public Works Surface Water Management (SWM) who have "made targeted investments in the reach to improve habitat and water quality and reduce flooding." Previous plans, including the Stillaguamish Watershed Chinook Salmon Recovery Plan (SIRC 2005), the Snohomish County Agriculture Action Plan (Snohomish County 2005), Stillaguamish River Comprehensive Flood Hazard Management Plan (Ecology and SWM 2004), Snohomish County Hazard Mitigation Plan (SCEM 2015), and the Stillaguamish Shellfish Protection Program (SWM 2011) are being used to inform recent Lower and North Fork Stillaguamish reach-scale plans.
<b>Fish, Farm &amp; Flood</b>	Snoqualmie Watershed, focusing on the 14,600-acre Snoqualmie Agricultural Production District (King County)	Lead by the King County Department of Natural Resources and Parks' Water and Land Resources Division. Has a Fish, Farm and Flood Advisory Committee and Implementation Oversight Committee (IOC). Members of the IOC include representatives from Snoqualmie Watershed Forum, Wild Fish Conservancy, Tulalip Tribes, Snoqualmie Tribe, Agricultural Commission, SnoValley Tilth, Snoqualmie Valley Preservation Association, King Conservation District, City of Duvall, Fall City Community Association, WDFW, Ecology, WSDA, and the King County Department of Natural Resources and Parks.	Created out of King County Council request when updating Comp Plan in 2012. Three year process beginning in 2014-2017 agreed to 30 recommendations. Current stage of the organization evolved to Fish, Farm and Flood "2.0" in 2018 with establishment of Implementation Oversight Committee, Buffer Taskforce.	The mission of FFF is to explore the issues creating obstacles and conflict around salmon recovery, flood protection and productive agriculture with the purpose of advising King County on how best to advance all three interests. Member of the FFF 1.0 and 2.0 groups have "pledged as individuals or through their respective organizations, to support and advocate for each other's key work."	<ul style="list-style-type: none"><li>• Development and implementation of a plan for comprehensive drainage maintenance</li><li>• Creation of three task forces to carry out detailed work plans: Regulatory Task Force, Riparian Buffers Task Force, and Agricultural Land Resource Strategic Plan Task Force</li><li>• Increase the pace for salmon recovery efforts in the Snoqualmie Valley by accelerating the rate of completion of large-scale habitat restoration projects</li></ul>	Supported by the King County Department of Natural Resources and Parks and is led by a coordinator position funded by King County's Surface Water Management fees. Surface Water Management fees also fund portions of FFF-supported agriculture drainage projects. King County Water Land and Resources Division's received \$10.3 million in Floodplains by Design funding in 2021 for the 'Restoring Snoqualmie River Floodplain Processes' project.	FFF projects include the completed decision tool and report from the Buffer Task Force. A proposed 2D HEC-RAS modeling tool to evaluate flood effects in the lower Snoqualmie Valley. A grant submitted to the King County Flood Control District to explore plantings in drainage projects to support salmon recovery. FFF collaborates with King County on several projects including the Haffner/Barfuse Project, home elevation, road safety improvements and improving outreach and coordination.

<b>Floodplains for the Future</b>	Puyallup Watershed (includes the Puyallup, Carbon, White Rivers in Pierce County)	Pierce County Conservation District, the WRIA 10/12 Lead Entity, PCC Farmland Trust, Forterra, the King-Pierce Farm Bureau, the Port of Tacoma, the South Puget Sound Salmon Enhancement Group, American Rivers, State agencies, drainage districts, and consultants under contract to perform work on behalf of project sponsors; funding and support from the Department of Ecology, The Nature Conservancy, and Puget Sound Partnership	Since 2013, Floodplains for the Future partners have collaborated to support, fund, and implement multi-benefit floodplain projects and activities in the Puyallup Watershed.	The mission statement is “to encourage shared leadership in a trusting and transparent environment in order to plan, fund, and implement multi-benefit floodplain projects in the Puyallup, White, and Carbon River floodplains.” Its vision is that “restored connections between rivers and land improve habitat for salmon, protect communities and critical infrastructure from flooding, and provide new opportunities for recreational and cultural uses while preserving agricultural lands in the Puyallup River Watershed.”	<ul style="list-style-type: none"> <li>• Reconnect floodplain through levee setbacks and side channel reconstruction</li> <li>• Remove structures at-risk of flooding through parcel acquisition and demolition</li> <li>• Preserve agricultural land through conservation easements</li> <li>• Restore habitat and watershed processes to support all salmon and trout species</li> <li>• Identify agricultural resiliency opportunities and action plans</li> <li>• Develop a strong, commonly understood collaborative structure and partnership.</li> </ul>	<p>Pierce County received \$7,750,000 from Floodplains by Design in the 2019-2021 funding cycle for the ‘Floodplains for the Future: Puyallup, White, &amp; Carbon Rivers’ project.</p> <p>For the 2021-2023 funding cycle, Pierce County received a \$10.2 million grant request to Floodplains by Design for the ‘Puyallup Watershed Floodplains for the Future’ project. The project’s total cost would be approximately \$29 million.</p>	Floodplains for the Future supports a variety of agriculture, fish recovery and floodplain enhancement projects in coordination with Pierce County. Agricultural project details can be found at <a href="https://farminginthefloodplain.org/resources/">https://farminginthefloodplain.org/resources/</a> , including details on the Clear Creek Agricultural Resilience Action Plan.
<b>Yakima River Basin Integrated Plan</b>	Yakima River Basin (Yakima and Kittitas Counties)	The Integrated Plan is part of the Yakima River Basin Water Enhancement Program (YRBWEP). YRBWEP has an Implementation Committee, the YRBWEP workgroup and several subcommittees. The Workgroup includes Bureau of Reclamation, NOAA, WDFW, USDA, Ecology, USFS, DNR, the Yakama Nation, Washington State agencies, local irrigation and reclamation districts (Kittitas, Kennewick, Roza, Sunnyside Valley, Yakima-Tieton), non-profits like Trout Unlimited and American Rivers, city and county council representatives and other stakeholders including the Yakima Basin Fish and Wildlife Recovery Board and the Yakima Basin Storage Alliance.	Congress authorized the Yakima River Basin Water Enhancement Program (YRBWEP) in 1979 to help mitigate the basin’s water supply issues. Since then, Congress has authorized three subsequent YRBWEP Phases. Phase I built fish screens and ladders; Phase II implemented water conservation measures for agriculture and instream flows; and Phase III initiated a watershed-scale balanced approach to Yakima Basin water supply management called the Yakima Basin Integrated Plan (YBIP). Founded in 2009, the Integrated Plan is laid out as a 30-year plan that is implemented in three 10-year phases.	“The Integrated Plan moves beyond long-standing conflicts over water and fisheries and is taking pragmatic, collaborative steps to address the looming problems of climate change, especially loss of snowpack and earlier spring runoff. Families, fish and wildlife, businesses, and agriculture all depend on cool, clean, reliable water supplies in the Yakima River Basin to thrive and prosper.”	<ol style="list-style-type: none"> <li>1) Habitat/Watershed Protection and Enhancement</li> <li>2) Fish Passage</li> <li>3) Enhanced Water Conservation</li> <li>4) Structural and Operational Changes</li> <li>5) Surface Water Storage</li> <li>6) Groundwater Storage</li> <li>7) Market Driven Reallocation</li> </ol>	<p>The Integrated Plan is unique among the IFM groups in that it receives significant federal, state and local funding. Some of this comes from Washington State which must contribute up to half of the costs of the Integrated Plan with federal, private and non-state the other half per RCW 09.38.120). The cumulative amount of federal funding awarded from 2011 to 2021 is \$470.2 million.</p> <p>Significant state funding comes from the Salmon Recovery Funding Board (SRFB) which distributes money to the lead entity, the Yakima Basin Fish and Wildlife Recovery Board, through the State’s Recreation and Conservation Office. Since 1999, the Yakima Basin Lead Entity has had 117 local projects approved for over \$23.5 million dollars of SRFB funding.</p> <p>The entirety of the Integrated Plan’s is estimated to cost \$4.1 billion over its 35 year project timeline.</p>	<p>Ongoing and completed projects are organized by the seven elements of the Integrated Plan and include:</p> <ol style="list-style-type: none"> <li>1) Habitat/Watershed Protection and Enhancement <ol style="list-style-type: none"> <li>a) Schaake Habitat Improvement Project</li> <li>b) Yakima River Gap-to-Gap Ecosystem Restoration project</li> <li>c) floodplain restoration projects (Teaaway Community Forest, Naches-Cowiche Flood Risk Reduction, Toppenish Creek restoration)</li> <li>d) bull trout habitat enhancement projects</li> </ol> </li> <li>2) Fish Passage projects <ol style="list-style-type: none"> <li>a) Develop fish passages at six reservoirs, including the Clear Lake, Cle Elum, Bumping, Tieton (Rimrock), Keechelut and Kachess reservoirs</li> <li>b) Kachess Drought Relief Pumping Plant</li> </ol> </li> <li>3) Enhanced Water Conservation <ol style="list-style-type: none"> <li>a) Wapato Irrigation Project</li> <li>b) Creek, irrigation piping, on farm and irrigation upgrades</li> <li>c) Lining of the North Branch and Roza Irrigation District canals</li> </ol> </li> <li>4) Structural and Operational Changes</li> <li>5) Surface Water Storage</li> <li>6) Groundwater Storage (regional and municipal)</li> <li>7) Market Driven Reallocation <ol style="list-style-type: none"> <li>a) Creating conditions and remove barriers to allow for efficient water right trading between willing parties to improve water supplies and stream flow conditions e.g. water banking analyses</li> </ol> </li> </ol>



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