

DRAFT FOR DISCUSSION

Coordinated Investment in Ecosystems

Conceptual Framework

Snohomish County Pilot

Extract from Version 16-0120

https://salishsearestoration.org/wiki/Coordinated_Investment



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What is Coordinated Investment in Ecosystems?

Coordinated investment is not new. When we ask the field staff about what makes ecosystem management work, and how innovative projects happen, what they describe is what we are calling coordinated investment.

Our challenge is to make collaboration, communication, transparency, and accountability the DNA of how communities and their governments solve problems.

Coordinated investment is when agencies empower local teams and communities to restore ecosystem services in landscapes.

Teams Develop an Integrated Vision for Ecosystem Services at the Sub-basin Scale

We solve problems at a scale large enough to get the work done, but small enough to avoid unnecessary conflicts. We can recover both cold and clean flowing streams and protected economical farmlands.

Teams are Empowered and Engaged in the Community

The ability to implement ecosystem recovery requires small teams of people who know the social and ecological details of a place. Teams are built to get projects done, and they build from local and traditional ecological knowledge and strong connections to their communities. They leverage state and federal resources, and build from a foundation of community stewardship.

Teams Focus on Implementation, Value Innovation and Accountability

Coordinated investment is about designing and building rather than more regional planning. We need to find creative ways to get the work done, guided by both local and traditional ecological knowledge and scientific inquiry. Ultimately we must monitor the bottom line and require success.

Ecosystem Services

Agencies are broadly authorized to provide four highly valued ecosystem services through ecosystem management

Water Supply

How a watershed captures rain and provides abundant clean water for multiple uses

Hazard Reduction

How we manage landscapes to reduce risk and damage from floods, landslides, drought and other hazards

Sustained Agriculture

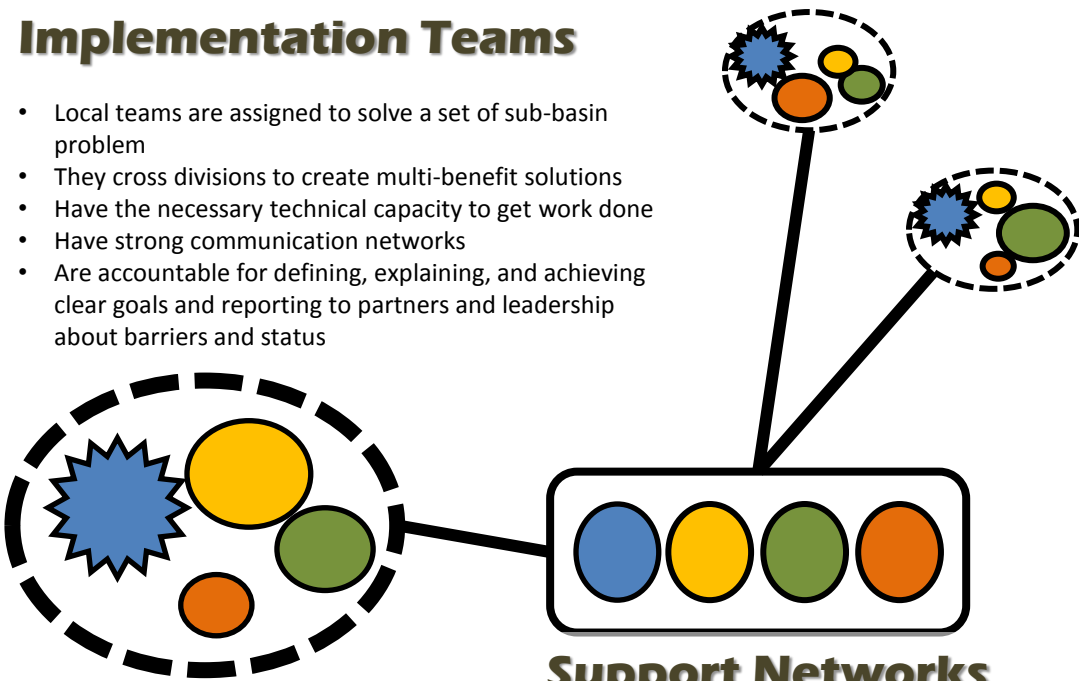
How soils and their health are protected so they can provision our communities with food, fuel and fibers

Fisheries & Wildlife

How our aquatic and terrestrial ecosystems sustain wild game, fish, shellfish, plants and tribal cultures.

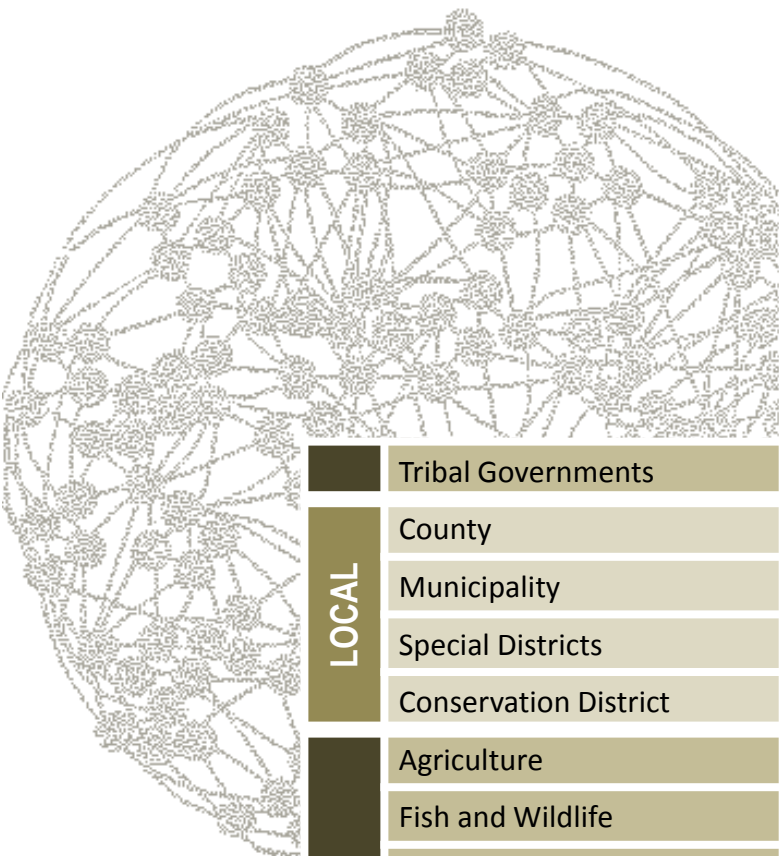
Implementation Teams

- Local teams are assigned to solve a set of sub-basin problem
- They cross divisions to create multi-benefit solutions
- Have the necessary technical capacity to get work done
- Have strong communication networks
- Are accountable for defining, explaining, and achieving clear goals and reporting to partners and leadership about barriers and status



Support Networks

- Link agency capacity and authority to local teams
- Temporarily increase team capacity
- Provide access to agency leadership and services
- Support teams with coaching and networking



		Services			
		Water Supply	Hazard Mgmt.	Agriculture	Wild Harvest
LOCAL	Tribal Governments	●	○	○	●
	County	●	●	●	●
	Municipality	○	●	○	
	Special Districts	●	●	●	
	Conservation District	○		●	○
STATE	Agriculture	○		●	
	Fish and Wildlife	○	*	*	●
	Ecology	●	●	*	
	RCO			○	●
	Natural Resources				○
	Puget Sound Partnership	○	○	○	●
	Health	●		○	
	Commerce	○	○	○	
	Conservation Commission	○		●	○
FEDERAL	Military/ERD		●		
	FEMA		●		○
	NOAA	○	*	*	●
	EPA	●		*	○
	NRCS	○		●	○
	USGS	○			○
	USFWS	○	*	*	○
	USACE	○	●		○

Teams and networks are built to insure that government is working together toward shared goals, across traditional boundaries.

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How do we Organize Coordinated Investment

To support teams, agencies organize themselves to provide the right kind of resources in a efficient and systematic manner. Our focus is to integrate and implement ecosystem management in places the size of a sub-basin, and then design supporting infrastructure based on the practical needs of teams. Interviews identify eight functions that need agency collaboration.



The following sequence best fits the needs of our Snohomish lowlands target area:

PHASE 1

(A) Community Engagement and (B) Project Design Capacity are needed immediately to turn our vision into actions. This work focuses on delivering existing fish, flood and farm projects with willing partners in a way that builds community understanding and collaboration.

PHASE 2

(C) Streamlined Grants, (D) Coordinated Farm Protection, and (E) Regulatory Efficiency are three tools that we need to improve our efficiency and effectiveness. These tools are best designed in response to the needs of teams developed in Step 1.

PHASE 3

(F) Ecosystem Observation, (G) Knowledge Management, and (H) Resilience Planning, are the tools that build our knowledge base, ask critical new questions about the landscape, and help us anticipate the future. These emerge to solve problems identified through implementation.

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A Community Engagement

Step 1

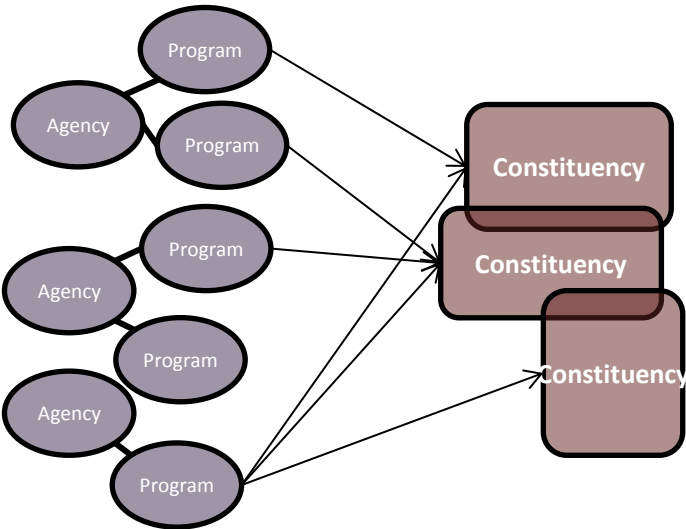
VISION – Agencies are in an ongoing dialog with formal and informal community leadership about the goals and methods of ecosystem management and through that dialog, develop shared direction. This effort draws from **(G) Information Management**, leads to better community engagement in **(B) Design Team Capacity** and **(H) Resilience Planning**, and information sharing about **(C) Regulatory Efficiency**.

Background and Problem Definition

- Each agency allocates limited resources to maintain a relationship with its constituency or the public affected by its authorities. No one agency thus has enough to maintain a effective dialog, and primarily uses communications to minimize political risk.
- Maintaining a positive relationship with its affected public is vital to maintaining the reputation of the agency in the eyes of legislatures.
- Different agencies represent the public trust doctrine with a focus on one issue or another, based on its technical understanding of ecosystem dynamics and its desired relationship with its constituents.
- Agencies may or may not want to be associated with one another, depending on their relative favor in the eyes of constituents.
- Stakeholder groups may not have representatives or members that can participate in ongoing discussions.
- From the public perspective, the roles of government, and the combined goals for ecosystem management are practically unintelligible. In general the public lacks basic information about ecosystem functions, ecosystem management, and the origin or character of agency authorities.
- Expansion of communications into an open ended dialog can be perceived as a political risk, or potentially draining limited resources.
- The costs of failed communications, in the form of public disclosure requests and legal challenges may not be calculated in the same currency as the staff cost of investing in up-front dialog.
- Some communication processes and “public comment periods” are required under state or federal law.
- While many agencies develop content “for distribution”, they do not have robust mechanisms for making durable connections to stakeholders and reacting and adjusting communications based on that dialog.
- Different agencies are connected to different actors.

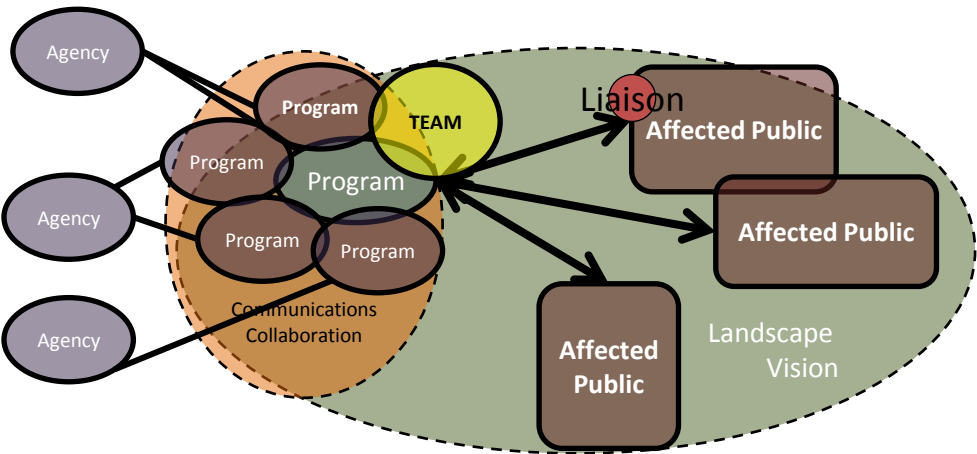
Current Condition

Existing agency programs all develop independent communications strategies with the public to meet their authority, with no attempt to develop consistency or build broad shared knowledge. From the public perspective, communications are episodic and disorganized.



Target Condition

Within a family of ecosystem management programs and a particular geography, a lead communications program works in close collaboration with an implementation team to provide the affected public clear consistent information about shared knowledge and goals. A implementation team is supported by the communications capacity of multiple agencies, as it maintains consistently engaged with identified publics. Where useful, agencies identify and support specific ombudsman-type individuals to help insure that information flow is strong and bi-directional



Agency	Programs and Activities
County	Surface Water Management and Planning and Development Services and Parks have ongoing communications with their constituents. SEPA processes – required at decision points often may not be connected to ongoing conversations. Agriculture Coordinator - Linda Neunzig is the de facto agricultural ombudsman. Septic Outreach?
Conservation District	Better Ground – ongoing outreach campaign and web site. Drought Strategy – proposal for new work through Washington CDs.
Sno-Cam ECO Net	Puget Sound Starts Here – Snohomish County has proposed an expansion of PSSH. Laura Goff (SCD), Stef Frenzl (SnoCo), Andy Noone (SSS),
LE-LIO-SLS	These vital stakeholder vetting and decision forums.
Sound Salmon Solutions	Citizen Action Training School - The RFEs through NSEA aim to develop a new stormwater and restoration education program. Washington Education for Decision Makers – continuing program to provide politically neutral information of ecosystem management.
WSU	Stormwater Outreach – new work proposed in increase stormwater outreach. Latino Outreach – ongoing program to inform latino community about stormwater and LID.
Special Districts	Provide pathway for local information flow within farming communities.
PTA, Rotary and other Boards	Provide access to community leaders and communication networks typically outside discussion of ecosystem management.
Ecology	Washington Conservation Corps --Americorps positions can expand capacity at low cost given adequate leadership. NPDES includes outreach and education requirements in stormwater permits, LID Training – to MS4 permittees.
WDFW	HPA – permits provide a regular point of interaction when the public wants to work in streams.
Puget Sound Institute	Encyclopedia of Puget Sound - New proposals for syntehsizing science related to implementation of the action agenda.
UW	New proposal for nutrient management to support ocean acidification.
Federal	NEPA is kept programmatic where possible and incorporate SEPA processes to resolve controversy. Communications Staff – each agency has programs to support communications, typically poorly connected to local networks.

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B Design Team Capacity

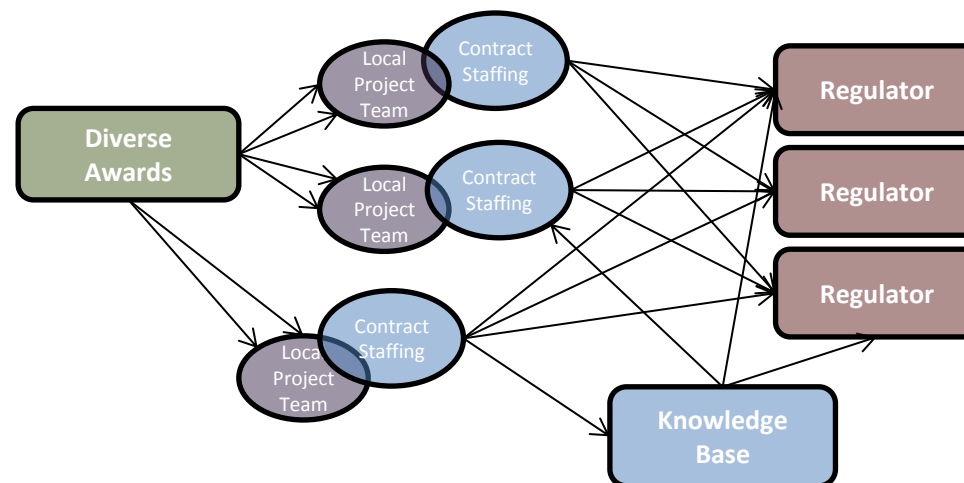
VISION – A shared pool of technical experts and project managers allows for the rapid deployment of project teams to augment local capacity, and build shared knowledge and operating practices. Design Teams depend on (A) **Community Engagement**, (C) **Regulatory Efficiency**, and (D) **Streamlined Grants**, and so can inform those processes. Design teams can strongly support (G) **Knowledge Management**.

Background

- Counties, NGOs and agricultural land owners lack the engineering and physical science capacity for large scale design of multi-benefit projects in floodplains.
- Building In-house capacity cannot be justified for episodic project work.
- A design team is currently assembled from scratch for each capital project to restore Puget Sound floodplains. Startup and administration of new teams for each project increases costs and creates risk through:
 - Reinvention of analytical methods and standards
 - Poor retention of lessons learned
 - Effort spent in contracting
 - Delays caused by having to increase and decrease capacity within a project.
- When design teams are more consistent they can build modelling capacity and more robust partnership with regulatory authorities and establish regional operating standards.
- Design teams linked to regulatory agencies create opportunities to improve efficiency during permitting.
- Over the short term, local publics may be resistant to building local capacity for sustained work in ecosystem restoration.

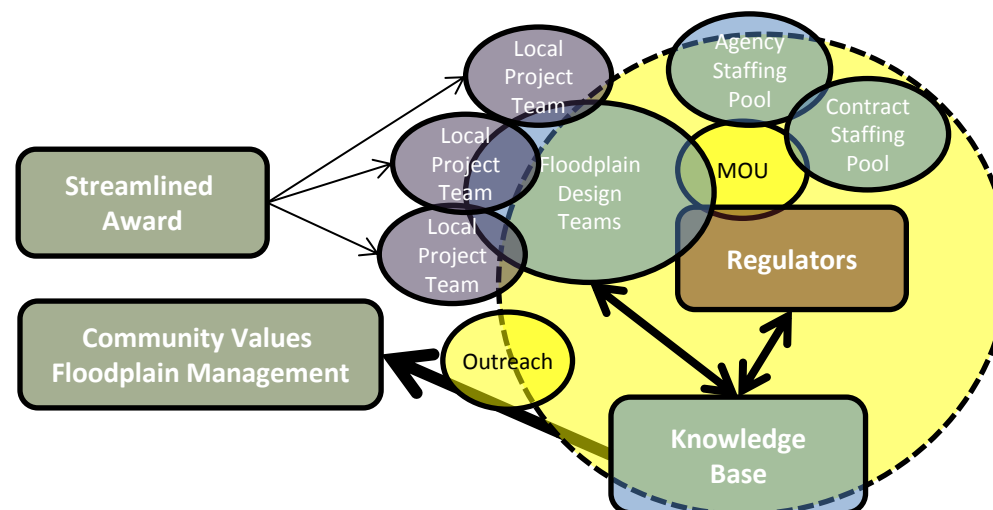
Current Condition

Diverse and inconsistent information flows and contracts deplete capacity and don't support development of shared knowledge base between regulators and projects. Agency staff are inconsistently integrated with project implementation.



Target Condition

- A set of agreements facilitates the ability to assign staff to augment local capacity for project management in target geographies.
- Teams cross disciplines and include ecologists, flood engineers, agricultural engineers and designers.
- The collective teams develop case studies and feed knowledge into communication strategies that address root social causes of poor ecosystem management.



Step 1

Agency	Programs and Activities
County	Public Works – has some limited capacity for fiscal administration, contracting, and project management.
Sound Salmon Solutions	Regional fishery enhancement group, not focused on capital projects.
Conservation District	Project management staff are focused on landowner assistance and revegetation.
Ecology	Floodplains by Design – capital program has the ability to develop flexible capacity for floodplain design. BMP Implementation Coordinator – assist in farm design?
Conservation Commission	District Engineers - supports pool of engineers within districts.
WDFW	ESRP – has capital with potential to create mobile staffing to support estuary restoration. Fish Passage Engineers – technical assistance.
WDOT, SPU, etc.	Various public agencies may have project management capacity that could be brought in through an IPA.
USACE	Continuing Authorities Programs – under a Project Cooperation Agreement, the USACE can provide project management.
NOAA	Restoration Center – provides technical assistance and project management. PROJECTS – programmatic review supported by technical review team sets in-work standards.
USGS	Federal scientists may be able to provide hydraulic and hydrologic modeling assistance.
The Nature Conservancy	Puget Sound Program - Has national and regional technical resources for planning and communications. Floodplains by Design – new proposal to increase reach scale design capacity.
Ducks Unlimited	Has project management and engineering capacity.
Futurewise	GreenLink watershed planning proposal (NEP)

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C Regulatory Efficiency

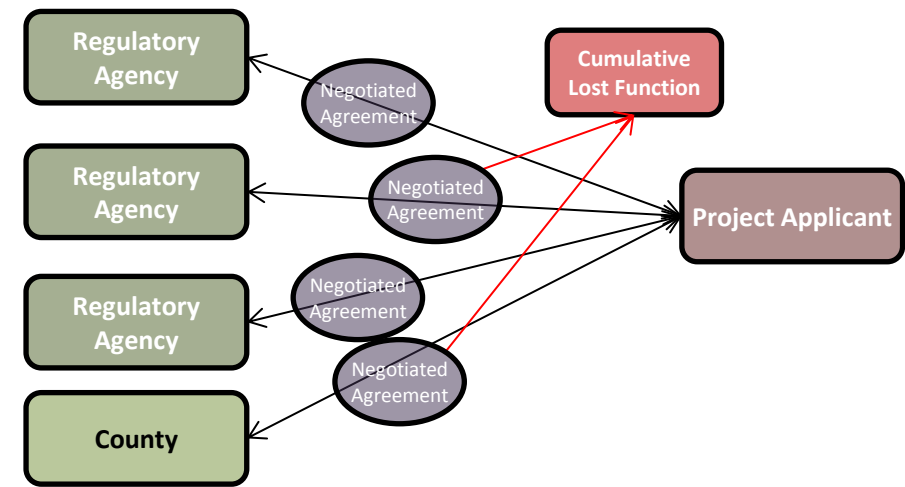
VISION – County, state and federal requirements are represented through a unified public interface and use shared standards. Regulation is predictable, quick and efficient, and focusses effort on using banks and in-lieu fees to maximize public benefit from regulatory effort.

Background

- Each agency is influenced by a different constituency AND regulatory authority is applied piecemeal among state, federal, and local law and ordinance. Regulation involves the redundant review of projects, while making very small gains in ecosystem condition.
- Communities want transparent and efficient application of standards that help us reach target landscape conditions.
- The Snohomish Agricultural Action Plan values streamlined ecosystem management for the benefit of agricultural entrepreneurs.
- Different agencies have different legal authorities with different triggers and domains.
- The county has the broadest reach, and deepest authority over land use, but is most subject to local political pressure. The county is well positioned through surface water management fees, and PDS permitting to coordinate among multiple agencies and interact with development projects.
- Due to large scale legacy impacts from past development, the best investment of mitigation funds may be to support key watershed projects rather than through protracted negotiation over on-site mitigation or small incremental injuries.
- There are both political and professional risks associated in applying a legal authority that affects private properties and businesses, making any change of implementation methods risky. Each authority requires some specialized legal understanding of precedent.
- Important language, such as “no net loss” may have imprecise or untested legal meaning.

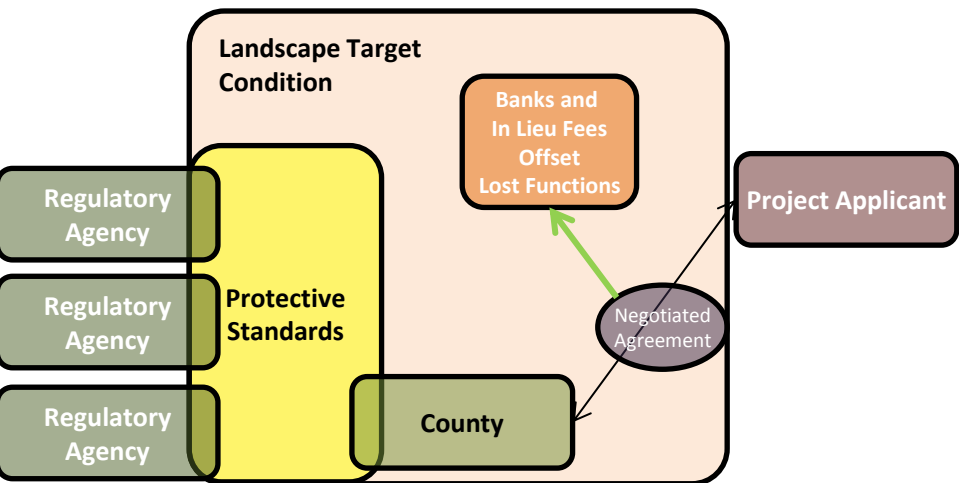
Current Condition

Project applicants are required to negotiate with multiple agencies, resulting in frustration and a complicated set of agreements, or avoidance of permitting. Due to different application of protective standards, and non-compliance, cumulative development results in cumulative loss of function.



Target Condition

- Regulators collaborate on a protective standard specific to a watershed that considers long term goals and incremental loss of function.
- A Habitat Equivalency Analysis is used to assign costs to unmitigated losses of function, that pays for watershed recovery.
- Federal and state staff are placed in close relationship with county collaborators, reducing collective workload and increasing quality and consistency of service.



Step 2

Existing Efforts

Agency	Programs and Activities
Ecology	Shoreline Management Act, Clean Water Act s404
Commerce	Growth Management Act
WDFW	HPA
NOAA/USFWS	ESA Section 7

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D Grant Streamlining

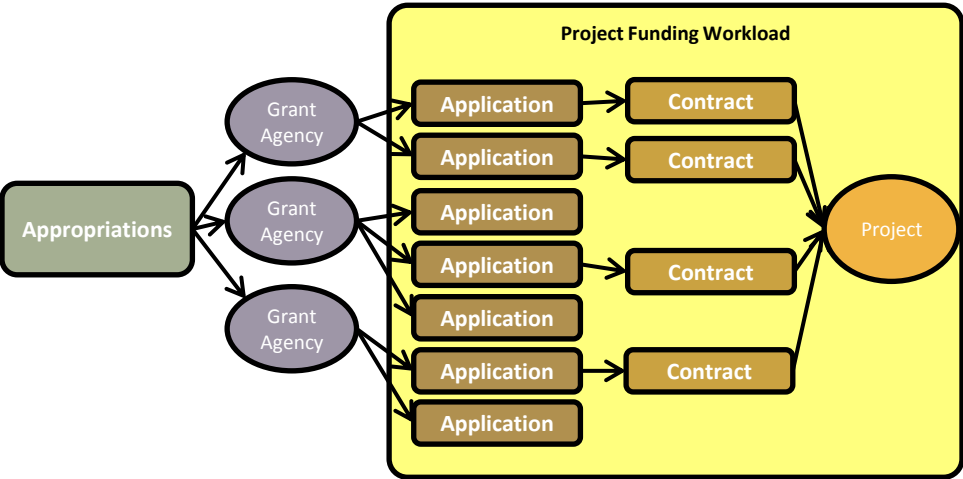
VISION – Project teams develop clearly defined multi-benefit projects that petition for funding from multiple sources through a single application , resulting in streamlined contracts that elegantly resolve match and reporting issues.

Background

- Grant programs are redundant in that they each build a strategy from some basis in planning, accept and review proposals, make a decision, and then provide funding through some contractual mechanism.
- There is tremendous value in the diversity of agency programs, because different programs specialize in making planning decisions in different environments for different purposes. This specialization strengthens project evaluation and selection.
- In order to secure complete funding, project proponents currently waste scarce project management resources trying to procure the necessary mix of funding to complete projects. Depletion of project management capacity delays projects, increases costs, and can reduce effectiveness.
- The best projects provide multiple benefits within a single action, but these projects do not compete well, because individual programs only value single benefits.

Current Condition

Project proponents accumulate sufficient funding by participating in multiple redundant application and contracting processes with different government funding programs. This process wastes limited project management resources, and obscures project definition.

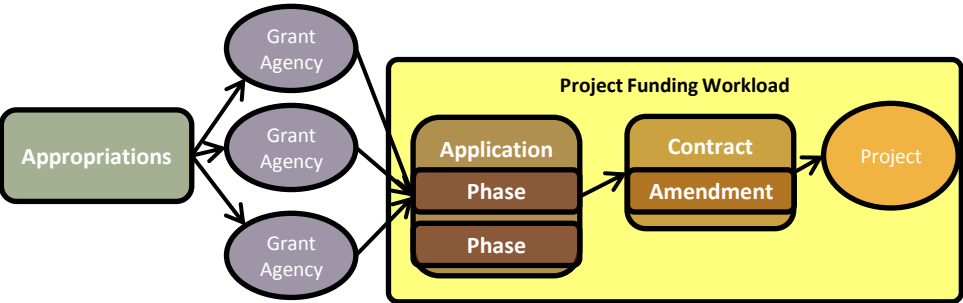


Potential Root Causes

- Each program uses independent processes for project solicitation.
- Grant programs don't coordinate solicitation processes.
- Programs have specific interests and criteria described by their authorizing legislation AND capital grant programs try to minimize non-capital costs and so don't develop the capacity for management of the collective grant system.

Target Condition

Project proponents represent complex projects with a single standard application, which is considered by multiple programs, each applying specialized review consistent with their authority but sharing information that improves the project proposal. Contracting is completed through a single agent, to minimize redundant administrative effort. Projects are analyzed, funded, and completed with greater efficiency and fewer delays. Match is managed through programmatic certification rather than award by award.



Step 2

Existing Efforts

Agency	Programs and Activities
RCO	Fish and Water Streamlining
Ecology	Fish and Water Streamlining
WDFW	Fish and Water Streamlining
NOAA	Fish and Water Streamlining, PCSRF
USFWS	Partners for F & W, Coastal Program
FEMA	Hazard mitigation program

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E Coordinated Farm Protection

Step 2

VISION – Agencies collaborate to acquire agricultural land at risk of development to build a stable productive land base, while actively enhancing ecosystem services in that landscape.

Background

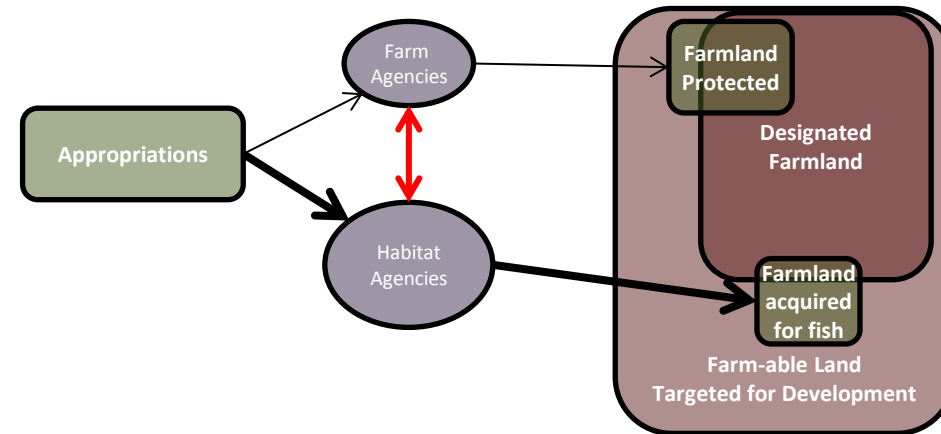
- Loss of farmland is a central concern in agricultural communities. Restoration acquisition is viewed as another source of agricultural land loss.
- Preserving agricultural landscapes, as an alternative to rural residential development is a critical too for maintaining landscape hydrologic function.
- Agricultural lands in floodplains are relatively well protected—there are potential agricultural lands not located in frequently flooded areas that are slated for development. This is greatest opportunity to prevent farmland loss.
- Expansion of agricultural protection into the developable land base, while improving buffering functions across the agricultural land base, reflects a natural synergy between agricultural protection and ecosystem recovery, necessary to prevent the decline of ecosystems.
- Acquisition for public benefit is in general disabled by slow response time, single benefit funding, and a general mistrust of public acquisition efforts.
- The development value of farmland is a critical long term asset among family farms.

Potential Root Causes

- Public property rights acquisition focusses on single benefit acquisition.
- The political support necessary to sustain acquisition depends on constituent groups that are motivated to support a program—those groups often focus on single benefits.
- Individuals develop identity around group belonging that relates to vocation or economic interest rather than shared vision of landscape condition.
- People spend more time talking within their group than talking across groups.

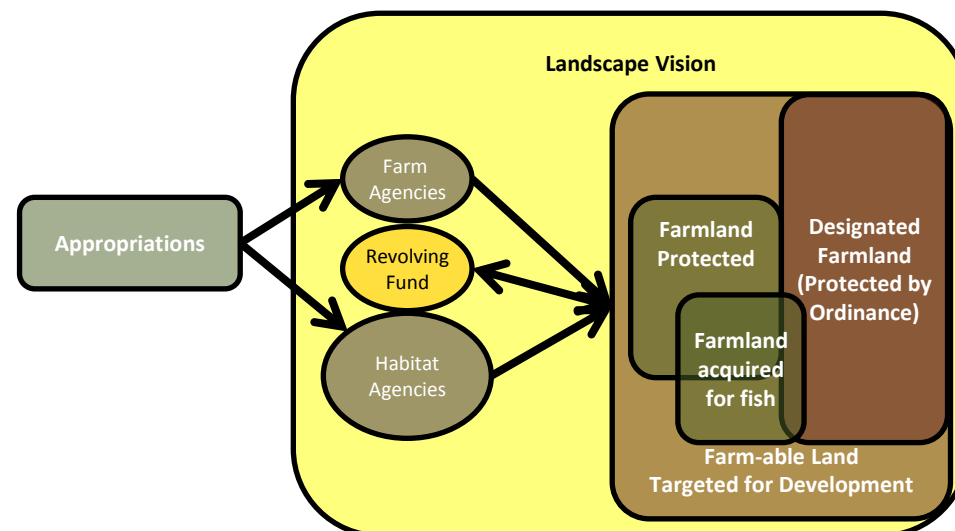
Current Condition

Farm advocates and habitat advocates compete for land, while farmable land is lost to development diminishing both the farm landscape and the chance for habitat recovery. Conflict reduces the confidence of appropriators.



Target Condition

In the context of a landscape vision, farm and habitat agencies collaborate on protection of designated farmland through ordinance, while focusing acquisition on the developable landscape, and combine resources to protect an expanded agricultural landscape with an enhanced habitat component, increasing the net acquisition of farmland, while expanding habitat functions in perpetuity within that land base. A revolving fund increases acquisition effectiveness. A clear system of accountability within the local community insures habitat stewardship over time. Collaboration strengthens confidence of appropriators.



Existing Efforts

Agency	Programs and Activities
County	Conservation Futures – currently managed by parks. Sustainable Land Strategy – potential forum for discussing farm sustainability planning. Agriculture Coordinator – county staff to support county farm sustainability planning.
Ecology	Floodplains by Design
WDFW	Wildlife Lands Division, ESRP, WWRP
EPA	NEP Riparian Easement Program
NRCS	Farmland Conservation Funding
Forterra	
PCC Farmland Trust	

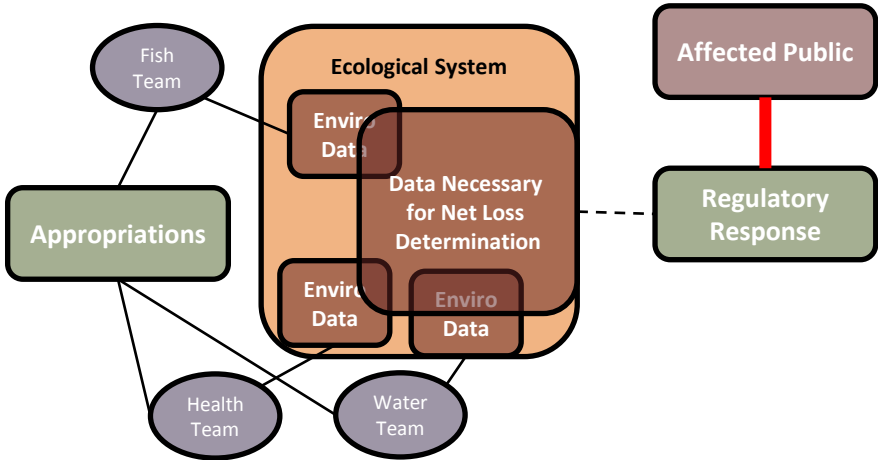
VISION - Agencies collect and synthesize data on water quality and habitat condition to track ecosystem status as a basis for local and regional planning, design, and regulation.

Background

- No one agency has the resources to monitor and detect change in ecosystem condition. Authorization and budgets for monitoring are often thin and programmed around single purposes.
- Monitoring that threatens to affect private interests by exposing ecosystem net loss may be targeted by private lobbyists for budget cuts.
- Without being able to describe the condition of a system, planning and regulation must be based on general principles, rather than as a response to precise observations. This results in a public health approach with local error, reducing public confidence in ecosystem management.
- Without sufficient environmental data, the assumption of no-net-loss of aquatic ecosystem functions cannot be proven or disproven.
- Regulatory workgroups at WDFW, USFWS, NOAA, Ecology, and Counties have a limited ability to design monitoring strategies as a tool for supporting their regulatory decisions.

Current Condition

Isolated workgroups collect environmental observations based on specific authorities. Planning and regulatory programs are not funded at a level that allows data collection, and cannot respond in real time to environmental conditions. Data are insufficient to inform ongoing planning and regulatory work. The affected public sees regulation as a nuisance rather than a service.

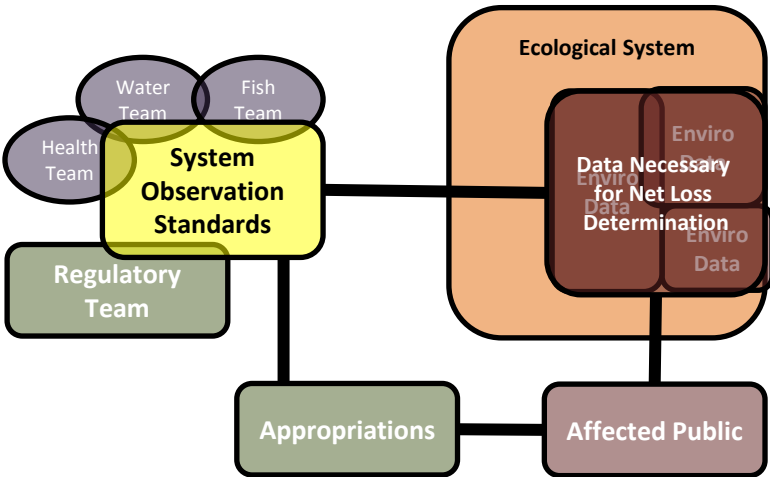


Potential Root Causes

- Status and trends monitoring doesn’t inform planning or regulation
- Planning and regulatory systems don’t have access to continuous field observations to inform policy
- Monitoring funding is limited and for narrow purposes
 - Leadership may not understand the value of environmental observation
 - Leadership may want to avoid the conflicts that may emerge if we rigorously observe environmental conditions.
- Monitoring is uncoordinated
 - We lack a shared vision for the how coordinated monitoring leads to useful outcomes.
 - Regulatory implementation is separate from the design of regulatory management

Target Condition

Data necessary for net-loss or gain determination are collected collaboratively by local, state, and federal partners and is informed by a shared data collection standards with a known chain of custody. Those data are publically available and transparently describe ecosystem condition to the affected public, and informs regulatory response (see Sheet C – No Net Loss Implementation). Tracking ecosystem condition is seen as a vital accountability measure by appropriators and the affected public.



Existing Efforts

Agency	Programs and Activities
County	Sustainable Land Strategy, Conservation Futures
Ecology	Floodplains by Design
WDFW	Wildlife Lands Division, ESRP, WWRP
EPA	NEP Riparian Easement Program
NRCS	Farmland Conservation Funding

Best Available Models

- The Puget Sound Ecosystem Monitoring Program, convened by PSP provides a regional example for monitoring coordination.
- Locally, state-tribal collaboration on fish-in/fish-out monitoring provides an example of collaborative implementation.

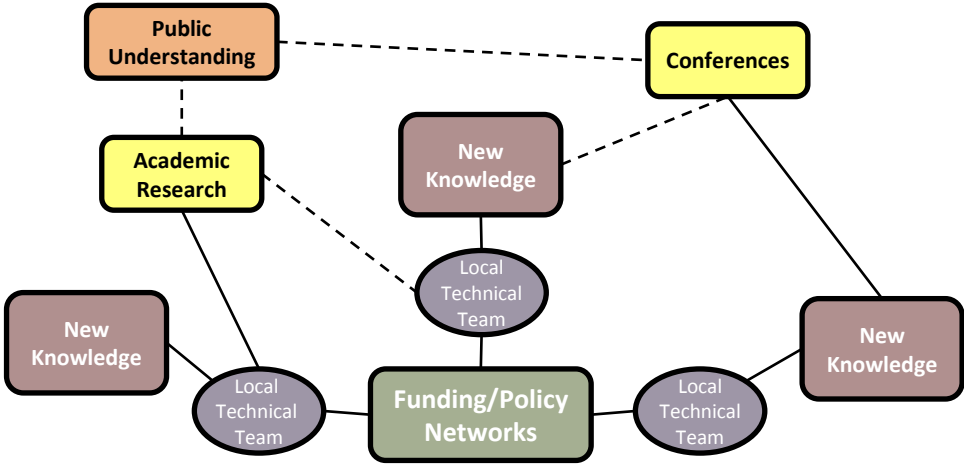
VISION - Agencies store and share information using an open-source framework to produce knowledge for policy development and public communications with a minimum of intermediation.

Background

- We store project outputs in a disorganized manner, with little attempt to integrate new information into a collective body of work.
- The existing professional conference system does not support synthesis, retention, or future distribution.
- Staff turnover results in knowledge loss. Institutions have limited capacity to retain and re-use information.
- Interagency networking is dominated by the policy community rather than technical staff, reducing opportunities for technical information exchange.
- Academic knowledge is stored within a system of professional publication which has a high cost for retrieval and use, and is not integrated with more informal knowledge generation by local technical teams.
- Organizations provide no incentive for technical staff to synthesize and share information as part of their duties—information exchange is viewed as risky behavior by staff.
- Information can be managed to control opinions or influence behavior, rather than to empower informed decision making.

Current Condition

Networking is focused in funding and policy circles, leaving isolated technical communities to share new knowledge through weak conference mechanisms. The public remains generally disconnected from agency and academic information cycles. Information is frequently lost.

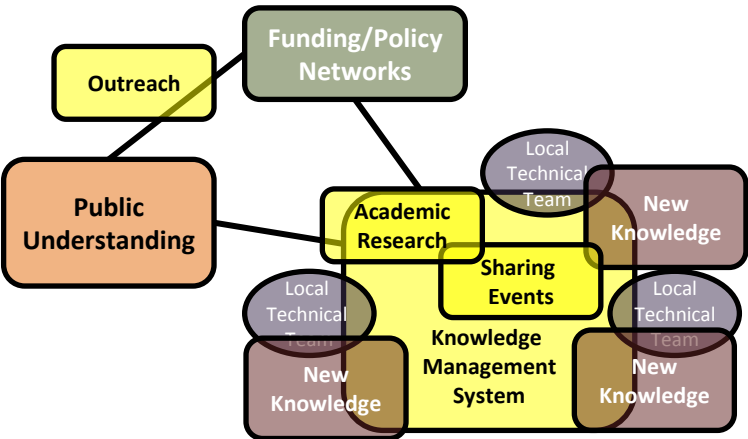


Potential Root Causes

- Knowledge developed by local teams is kept by individuals, and is seldom synthesized and shared.
- The work of organizing and synthesizing work products is not done by local project managers.
- There is a disincentive to admit problems
 - Funding is encouraged by the appearance of certainty
 - Funders lack access to knowledge for decision making
- Networking activity is dominated by policy community
 - Control over budget and authority is the central concern of management.
 - Decisions over budget and authority occur rapidly and without a strong knowledge base – you are at the table or on the table.

Target Condition

- Local technical teams are responsible for synthesizing new knowledge, and retaining that knowledge in a shared knowledge management system.
- That system provides information and data with transparent origins and mechanisms for quality critique, including local, best available GIS.
- This information is accessible and shared by all parties without intermediation.
- This open-source information sharing model allows for all participants to contribute information, and participate in synthesis.
- Knowledge gaps are evaluated as part of agency funding processes, and project work is designed to address knowledge gaps.



Existing Efforts

Agency	Programs and Activities
County	Sustainable Land Strategy, Conservation Futures
Ecology	Floodplains by Design
WDFW	Wildlife Lands Division, ESRP, WWRP
EPA	NEP Riparian Easement Program
NRCS	Farmland Conservation Funding

Existing Inter-agency Models

- The Puget Sound Science Review is a regional attempt to synthesize knowledge focused on peer-reviewed publications. The North Pacific Landscape Conservation Cooperative
- Locally, lead entity technical technical advisory groups provide a mechanisms for knowledge exchange. The Skagit Climate Science Consortium is a model for local science collaboration and sharing.

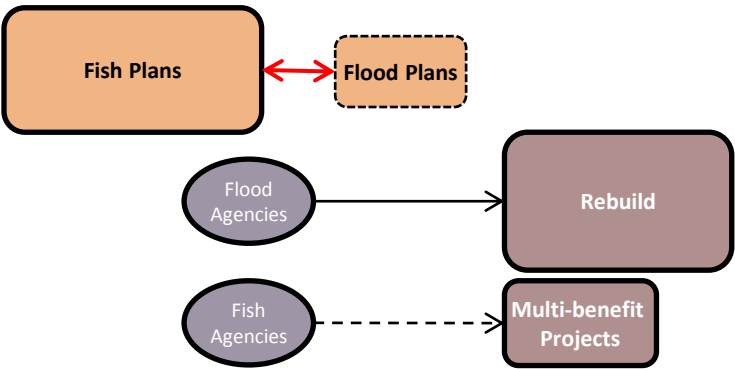
VISION –Agencies identify and resolve flood, landslide, and climate change risks using multi-benefit projects that combine hazard mitigation, and investment in both green and grey infrastructure.

Background

- Hazard resilience:
 1. Keeps human infrastructure out of high risk areas.
 2. Completes projects to reduce risks, and
 3. Mobilizes after disasters to rebuild and reduce future risk.
- The existing hazard system is starved for planning resources, post hazard work is focused on rebuilding without modification. County resilience planning results from diverse proposals and agency awards, with little consistency in methods of outcomes.
- The existing property values are based on development potential regardless of landscape position, placing private value in conflict with hazard mitigation.
- County ordinances are the setting where diverse state and federal requirements are integrated to set the stage for hazard management.
- Climate change will result in increase hazards that can only be addressed through proactive hazard mitigation.
- The ability to build multi-benefit projects depends on well structured planning activities that identify those projects.

Current Condition

Flood planning is poorly developed such that flood management is focused on maintaining river constraints and then comes in conflict with habitat recovery goals. Flood agencies assets are focused on rebuilding after disaster. Fish assets are reluctant to provide flood benefits because there is no cost share.

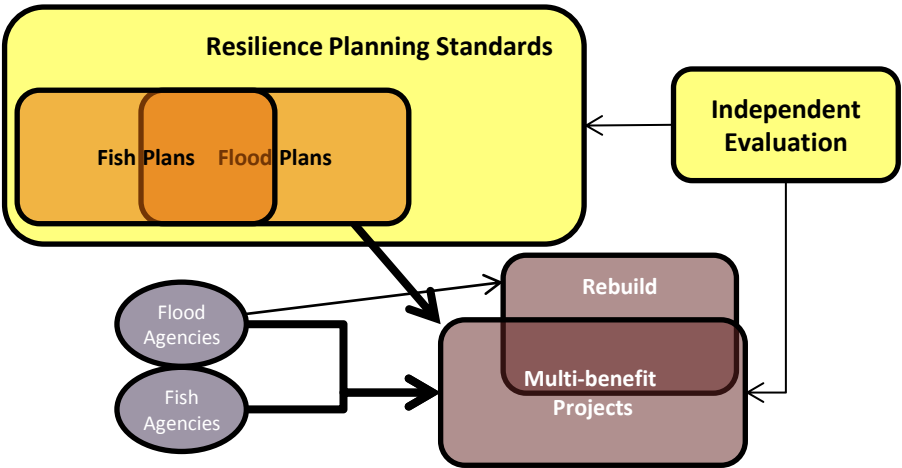


Potential Root Causes

- Fish recovery planning and flood management planning are not integrated in planning, and may not lead to multi-benefit project definition.
- Agency mandates are different AND the flood system assets are not applied to proactive planning AND design and engineering capacity is specialized in either fish or flood.
- Strong local constituencies are focused on responding to urgent situations, while proactive hazard mitigation tends to create short term hardship for citizens who are in harms way or reduce property value.

Target Condition

Fish and flood planning is integrated so that integrated floodplain management optimizes public service benefits. Consistent regional standards are used to consider climate change impacts and risks. Synchronized fish and flood resources are focused on multi-benefit projects that reduce flood hazards and increase habitat recovery. Planning mechanisms seamlessly lead to project development tasks.



Existing Efforts

Agency	Programs and Activities
FEMA	Hazard Mitigation Program, National Flood Insurance Program
County	Comprehensive Flood Plan
Military	State Hazard Mitigation Plan
Ecology	Floodplains by Design
USACE	System Wide Improvement Framework

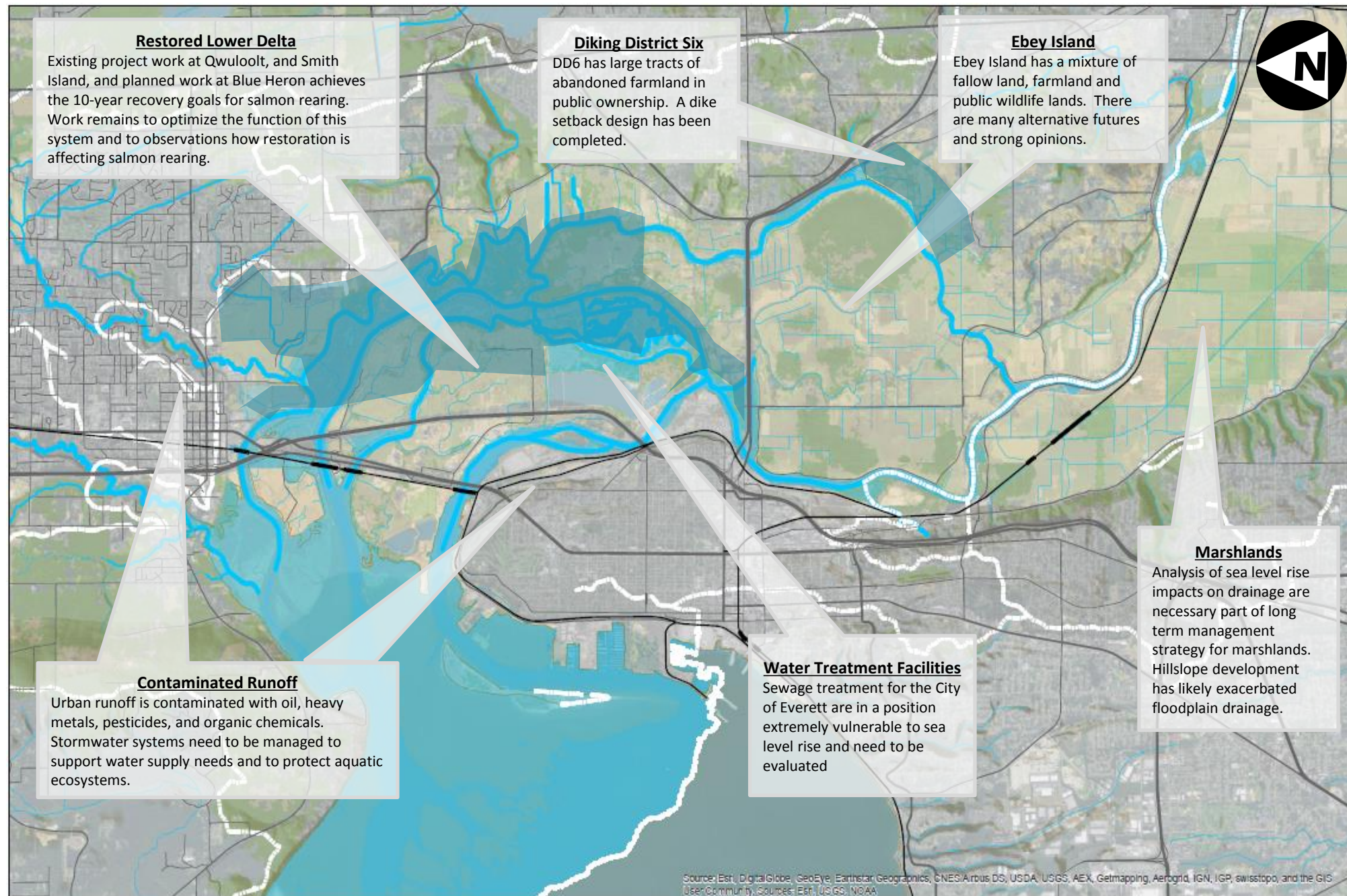
DRAFT FOR DISCUSSION

1 Snohomish Estuary

The Snohomish Delta is one of the largest river delta wetland complexes in Puget Sound. Land acquisition by the County has allowed for extensive restoration of tidal flooding to the lower delta. Productive agricultural lands within the freshwater tidal zone of the estuary, are dependent on levees and pumping, and are vulnerable to future sea level rise. There is no plan to respond or adapt to future sea level scenarios.

Vision

Systematic evaluation of sea level rise leads to an orderly and strategic retreat from the floodplain. Agricultural production is maintained under a long term strategy of protecting agricultural opportunities in higher elevation locations through the realignment of flood defenses.



Ecosystem Services

Agencies are broadly authorized to manage ecosystems to provide four highly valued ecosystem services:

Fisheries

Restoration of Qwuloolt, Smith Island, Blue Heron, Diking District 6, North Ebey results in relatively low impacts to existing agricultural operations, and achieves initial objectives for salmon recovery. There is work to be done to optimize the function of this new estuary landscape and to observe system recovery and effects on salmon populations.

Water Supply

The nutrient levels within the delta are elevated by municipal sewer outfalls, and nitrogen is currently managed under a TMDL (waste is now pumped into Puget Sound to avoid loading the estuary). Development and increased stormwater from the adjacent hillslope burdens agricultural drainage systems, but floodplain drainage operators are not compensated for that impact.

Flood Hazard

Under sea level rise, all infrastructure in the delta may be at risk. The greatest of these risks is the Everett Municipal water treatment facility. There has been no systematic assessment of how to manage this risk. The flood system depends on local taxation, which is insufficient for any retrofit of the system, and doesn't have resources for analysis of future impacts.

Agriculture

Agricultural lands are generally wet, and depend on drainage for viability. Under sea level rise, pumping costs are an impact that can make agriculture unprofitable in some settings. Lands under agricultural production have subsided from two to four feet. The process of flood sediment deposition that would build up these surfaces is prevented by the levees. Loss of agricultural land due to poor drainage results in loss of farmland area. The farmland base is thereby vulnerable to sea level rise. There may be opportunities for wetland agriculture or aquaculture. Following designation of agricultural lands several decades ago, it is extremely difficult to designate new agricultural lands to replace low lying land due to the loss of land value.



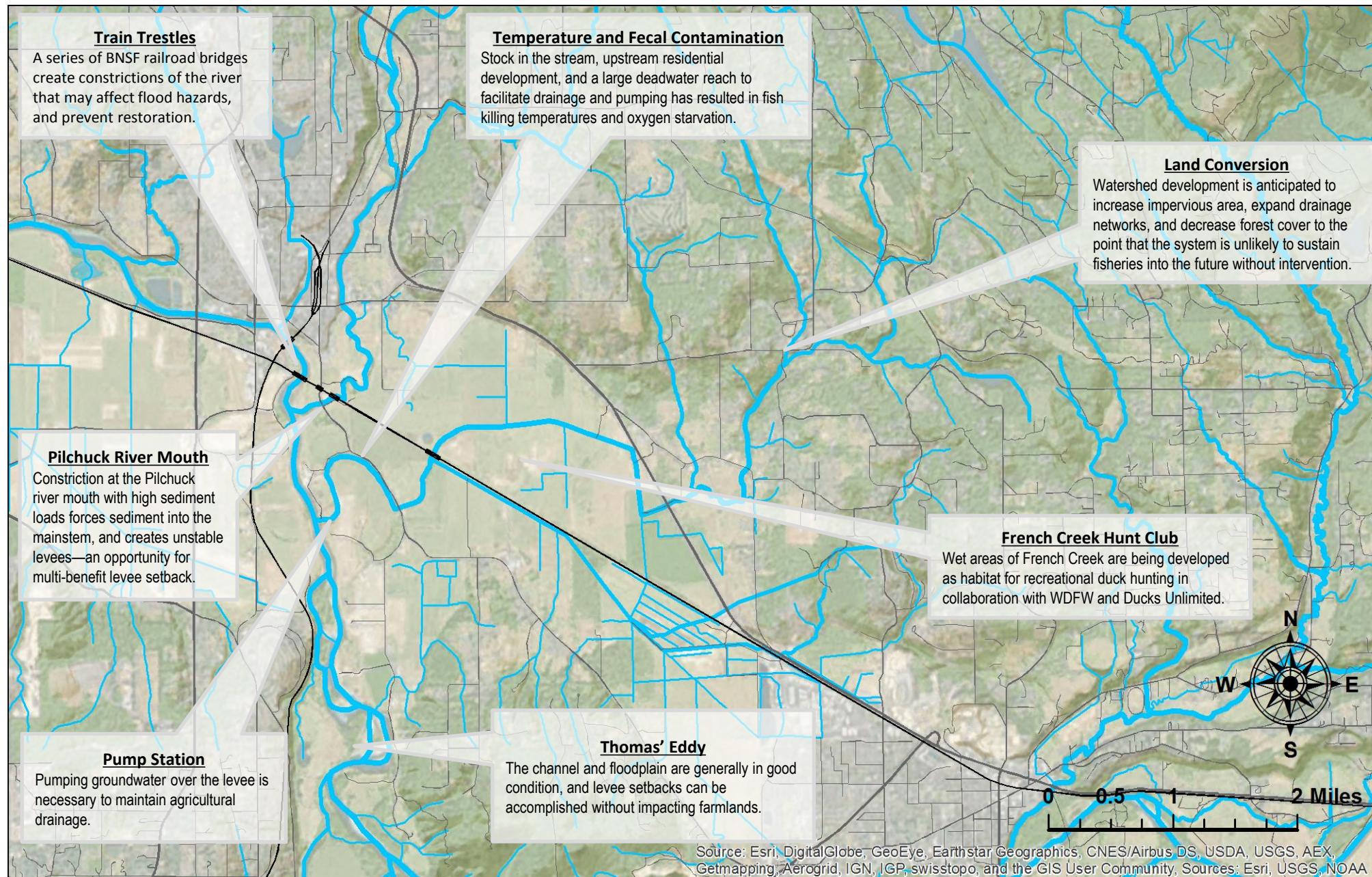
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2 French Creek Watershed/Floodplain

French Creek is a 28 square mile lowland watershed with 117 miles of channel, draining into a floodplain of the Lower Snohomish isolated by levees and a pump station with a partially functioning fish ladder. Watershed development is rapid. The floodplain has subsided, but supports agriculture through drainage and pumping. The watershed is at a development threshold where if crossed it will be unlikely to support a robust fishery.

Vision

Levees and drainage are realigned to reduce flood hazard by increasing flood storage in the lower Snohomish, while recovering stream health. Farmland and wetland base is increased by acquiring and enhancing the ecological functions of farm land islands in the suburbanizing watershed. Some of this work is supported by a robust transfer of development rights program in the cities of Monroe and Snohomish. Sub-urban land owners who clear forest support restoration of watershed hydrology through in lieu fees, matched by state and federal investments. Regulation is simplified and streamlined as the watershed develops local capacity to reach target future conditions.



Ecosystem Services

Agencies are broadly authorized to manage ecosystems to provide four highly valued ecosystem services:

Fisheries

The stream system historically produced coho salmon, and the floodplain provided rearing for Snohomish river chinook. The pump station now excludes chinook rearing, although a fish ladder passes some coho, threatened steelhead, and cutthroat trout, but is only functional as some flows. Land owners continue to cut streamside vegetation. Oxygen levels are low enough in summer to kill fish (<5.0 mg/l). Impervious surface and forest cover are approaching levels that are anticipated to permanently degrade stream conditions and cripple fish populations.

Water Supply

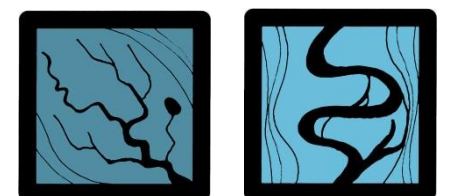
Loss of forest cover and wetland conversation is changing watershed hydrology, increasing winter storm water delivery to the floodplain and lower reaches and decreasing summer base flow. 60% of remaining wetlands are less that 1 acre in size. Livestock operators contaminate water with feces by allowing animals access to the creek. The lower reaches of the creek are exposed and slow moving, and have oxygen levels below 5.0 mg/l in summer, levels lethal to fish.

Flood Hazard

The French Creek levee is managed by the French Creek Levee District. There are repeat damage claims under the National Flood Insurance Program within this frequently flooded area. Levee height is set though an agreement among districts to allow flooding at roughly a 5-year event, to avoid a “levee war” among districts. French creek levee constrictions are part of a system the increases flood pressure.

Agriculture

The bottom lands are high value agricultural land, but are frequently flooded and depend on drainage and pumping. Historical forest and farmlands in the watershed are zoned for rural residential development, and the changing watershed hydrology has likely increased storm water flows to the floodplain.



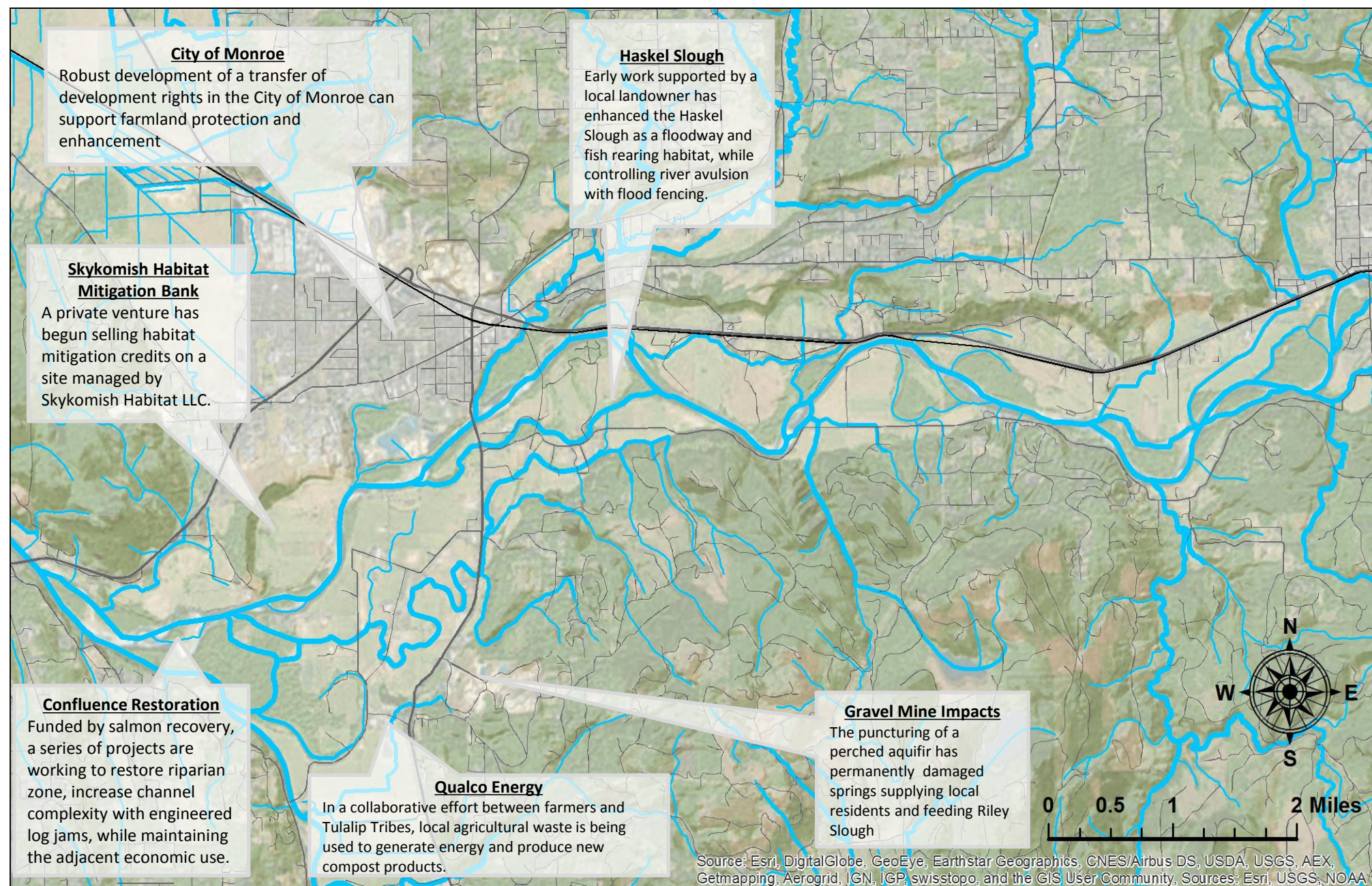
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3 Lower Skykomish Floodplain

The lower Skykomish Floodplain from the City of Sultan downstream, past Monroe and Tualco Valley, to the confluence with the Snoqualmie River, is a flood prone large river agricultural landscape. The Sultan River and Woods Creek are the two largest tributaries from the North.

Vision

This system provide the opportunity for developing a robust agricultural economy in a restored river floodplain. A variety of land uses fit the ecological landscape, with low wet areas and river banks reserved for non-timber forest products, fishery habitat, and floodways that protect farmlands. Nature recreation and agri-tourism combine to strengthen financial ties between a protected rural landscape and surrounding cities and towns.



Ecosystem Services

Agencies are broadly authorized to manage ecosystems to provide four highly valued ecosystem services:

Fisheries

This reach provides rearing for the strongest chinook spawning grounds in the basin. Restoration of complex river channel edge, and reconnection of side channels can provide increased rearing habitat. This system has been evaluated as part of the Sustainable Lands Strategy as a

Water Supply

The penetration of a perched aquifer through gravel mining has destroyed springs that provided water for some residents and farmers, and reduced water flowing into Riley Slough. Temperatures are high due to poor riparian zone conditions upstream.

Flood Hazard

The Skykomish is steeper and filled with sediment compared to the Lower Snohomish. Flood risk comes from channel migration and avulsion, rather than impounded floodwaters and poor drainage. River banks are often armored but there are few levees. Locals have learned how to live with the river. State highway 2 and highway 203 are vulnerable to flooding in places. Flooding is deeper and more sustained in the lower parts of the reach when channel slope decreases.

Agriculture

Agricultural lands are relatively well protected in the floodplains. The valley is a pilot area for using dairy waste for energy and organic matter production.



