

## SHORELANDS FLOODPLAINS BY DESIGN

Organization: Snohomish County - Public Works Department

SEAFBD-2019-SnCoPW-00051

### General Information

Project Title	Advancing Sustainable Lands Solutions in the Snohomish Basin
Project Short Description	<p>With this proposal, Snohomish County and Sustainable Lands Strategy (SLS) partners will build upon reach-scale work to provide immediate flood risk reduction benefits, address critical gaps in knowledge, and pilot reach-scale integrated floodplain management. Actions in the Sultan Reach of the Skykomish River will address chronic flooding issues; improve salmonid access to 3.1 miles of forested stream habitat; and protect 200 acres for future restoration of natural river processes and long term agricultural viability. Hydraulic/ hydrologic modeling and a geomorphic assessment will be completed to fill identified data gaps and improve understanding of current river conditions, flood hazard, avulsion and channel migration risks, and consideration of how river processes and habitat conditions may change due to climate change. Information will be shared with stakeholders in the floodplain to increase understanding of changing floodplain conditions. A Project Integration Team will use the analyses to inform designs for integrated floodway and agricultural resiliency projects. The proposal accomplishes the following:</p> <ul style="list-style-type: none"><li>- Construction of road elevations to reduce flood-related road closures and improve emergency access for 238 homes</li><li>- Acquisition, or protection through easements, of up to 200 acres of floodplain for future restoration of natural river processes</li><li>- Restoration of up to 30 acres of riparian area</li><li>- Correction of three private and one county fish passage barriers, improving salmonid access to a 3.1 miles of forested stream<ul style="list-style-type: none"><li>- Completion of hydraulic and hydrological modeling, geomorphic assessment and hazard mapping that will provide the technical basis for developing multi-benefit projects</li></ul></li><li>- Completion of 30 percent designs for integrated floodway project and 3 agriculture resiliency projects.</li></ul> <p>Design alternatives will explore side channel reconnections, removal of rip rap, habitat enhancements and measures to support agriculture viability</p>
Project Long Description	<p>In completing the Lower Skykomish River Reach-scale Plan (2017) (LSRRP), Snohomish County and partners have developed a strategy to carry out a coordinated set of multi-benefit projects that will improve natural functions within the Reach while generating flood hazard risk reduction benefits, restoring and protecting salmon habitat and supporting the agricultural sector. The proposed tasks are an important “next step” in demonstrating this coordinated implementation approach for the Lower Skykomish River, as described in the LSRRP.</p> <p>SULTAN REACH CURRENT CONDITIONS - TASK 2 actions are focused on the Sultan Reach (roughly subreach 4 in the LSRRP RM 9.7 – 15.7), a dynamic reach of the Lower Skykomish River. The Sultan Reach provides important rearing habitat immediately downstream from key spawning areas for Chinook (threatened), Pink, and Chum Salmon, as well as Steelhead (threatened) and is an important transition area for some salmon migrating through the Reach. The</p>

**General Information**

Reach has a history of flooding, lateral channel migration and avulsion, and hosts prime agricultural land with long-established farms of regional economic importance (see Attachments 1b & 2b). Flooding regularly forces closures of Ben Howard and Mann Roads, isolating 238 homes (about 670 residents) in the Skyline View Neighborhood. Repetitive loss properties dot the Sultan Reach. Over the last two decades, 100 properties subject to repetitive flooding have been acquired from willing landowners in the vicinity of Shinglebolt Slough and Sky River Slough (see RM 13 on 1d). Over twenty properties in the Reach are currently threatened by bank erosion; with some experiencing erosion rates of 9-25 feet per year (See 2b).

**SOLVING CRITICAL FLOODING PROBLEMS & IMPROVING FISH PASSAGE (TASK 2-PROJECT-SCALE ACTIONS)** Implementation of actions in this reach is ideal. Demand for multi-benefit opportunities is high, landowners are eager for options to reduce their flood risk, and work in this geography leverages substantial match dollars and builds upon past work. **TASK 2.1 - Road Elevations** - sections of Mann and Ben Howard Roads will be elevated at three "flooding hot spots" (see 1b); elevations will reduce flooding and substantially restore reliable access for the Skyline View Neighborhood by 75%, resulting in a cost savings of \$1,104,000 to the local residents. The removal of a fish passage barrier on Mann Rd. will increase access to about 0.5 miles of upstream habitat. The task leverages substantial County funds (\$1.231 million). Correcting three failing fish passage barrier culverts on Haystack Creek (**TASK 2.2**) will improve access to 2.6 miles of forested upstream habitat important for salmonids seeking refuge from winter flood flows. This action leverages grant dollars and complements a larger restoration effort on South Slough and Haystack Creek undertaken by the Snohomish Conservation District and partners.

**PROVIDING OPTIONS FOR LANDOWNERS AND ROOM FOR NATURAL RIVER PROCESSES** - Residents in the reach are concerned about avulsion, erosion, widening sloughs and the increased frequency and intensity of flooding. **TASK 2.3 ACQUISITIONS** -Working with willing landowners, County and partners will acquire up to 200 acres in the Sultan Reach. Currently, there is an opportunity to acquire two key parcels totaling 40 acres and other long-time residents have expressed an interest in selling. Acquisitions will allow for opportunities to enable natural river processes while supporting agricultural viability. Additionally, this proposal will fund the continuation of previous work with landowners in South Slough and Haystack Creek to plant at least 30 acres of riparian buffer.

**UNDERSTANDING CHANGING CONDITIONS (TASK 3 – PREDICT FUTURE CONDITIONS)** - With this proposal, Snohomish County aims to address gaps in knowledge and improve baseline information from which future multi-benefit decisions can be made. **TASK 3.1** – Hydraulic and hydrologic modeling will analyze future climate change scenarios to develop projections of future stream flows at individual locations and develop summary statistics of changing weather patterns. River runoff events from minor (2-year recurrence) to the catastrophic

**General Information**

(500-year recurrence) will be modeled; thereby providing information that can be used for project development in the Sultan Reach or elsewhere in the Basin. Analysis outputs will be used with the proposed Snohomish River model to accurately describe channel and floodplain conveyance characteristics across projected flow events extending to the year 2100. TASK 3.2 The geomorphology task will establish a comprehensive basis with three documents: a geomorphic analysis, hydrogeomorphic (hazard) mapping, and an infrastructure assessment. The geomorphic analysis will define the relationship between fish habitat limiting factors and primary fluvial processes of lateral channel migration, deposition, incision, aggradation, avulsion and previous anthropogenic influences such as gravel mining and bank armoring. The relationship between process and habitat will guide the actions needed to restore/sustain habitat and lower flood hazard risk. Complementary hydrogeomorphic (hazard) mapping would evaluate the spatial and temporal aspects of lateral channel migration, avulsion, and erosion. The geomorphic hazard analysis will be integrated with the flood inundation (hazard) mapping in Task 3.1 to create a comprehensive hydrogeomorphic (hazard) map to be used in planning sustainable multi-benefit projects in Task 4. Products from TASK 3.1 and 3.2 will be used in concert to educate landowners, stakeholder and decision makers of changing river and flooding conditions.

**ADVANCING INTEGRATED FLOODPLAIN MANAGEMENT (TASK 4)- TASK**

4.1 A Project Integration Team comprised of technical experts and project sponsors working within the Sultan Reach will consider acquisitions from TASK 2.3 and utilize products from TASK 3.1, 3.2 and TASK 4.2 as well as the strategies outlined in the LSRRP to develop 30% designs for an integrated floodway project within the Sultan Reach. The 30% designs alternatives will consider elements including removal of rip-rap, location of boating access, excavation and reconnection of side channels, riparian plantings/enhancement, instream structures and agricultural protection measures. Designs will be evaluated to consider changes in flood conveyance, reduction in hazard exposure and improvement of natural habitat-forming river processes.

**SUPPORTING AGRICULTURAL RESILIENCE – TASK 4.2 – Leveraging the** Snohomish Conservation District's Agricultural Resilience Plan (in development) and utilizing products from TASK 3.1, 3.2 as well as strategies outlined in the LSRRP, the Project Integration Team will work with agricultural landowners in the river basin to develop 30% designs for three projects that help maintain agriculture viability and address impacts on agriculture from changing climactic conditions (flood, groundwater, temperature).

**ADVANCING INTEGRATED FLOODPLAIN MANAGEMENT** The Project Integration Team (supported through TASK 4.1 and 4.2) aims to address capacity limitations that have impeded progress toward integrated floodplain management in the Snohomish Basin. As proof-of-concept, the team will develop 30% integrated floodway design focused in the Sultan Reach. The team will be comprised of technical experts and project sponsors convened to develop, evaluate, prioritize, and implement projects. The work of the Team is

## SHORELANDS FLOODPLAINS BY DESIGN

Organization: Snohomish County - Public Works Department

SEAFBD-2019-SnCoPW-00051

### General Information

expected to generate a future project pipeline of integrated floodway projects. The coordinated project development and implementation will, when completed, shift the future of floodplain to restore natural processes while reducing flood risk, improving habitat and supporting long term agricultural viability.

Total Cost	\$6,748,200.00*	Total Eligible Cost	\$4,812,200.00*
Effective Date	7/1/2019	Expiration Date	6/30/2021
Ecology Program	Shorelands		
Project Category*	✓ Floodplains by Design		

Will Environmental Monitoring Data be collected? No

**Overall Goal**

The overall goal of the proposal is to advance integrated floodplain management in the Snohomish Basin with immediate actions, the development of reach-scale multibenefit projects in the near term, and long-term (50-yr) planning. The project components include acquisition of key floodplain properties (many in repetitive loss areas) to reduce flood risks as well as lay the ground work for habitat restoration and agricultural resilience that support natural river processes and "give the river room" to lower flood hazard risk; riparian plantings to increase shade and habitat complexity; design and construction of road elevations to reduce flood frequency and improve emergency access for over 238 homes (about 600 residents); replacement and removal of fish passage barrier culverts to improve salmonid access to forested flood refugia; and modeling and hazards assessment to fill critical knowledge gaps related to flooding extent, flow pathways, and geomorphic risk. 2-D modelling and geomorphic assessments contribute to improved understanding of future conditions, support adaptive management of the Lower Skykomish River Reach-scale Plan, the County's Hazard Mitigation Plan, the Agricultural Resilience Plan, and the County's Climate Change Decision Support Tool. The modelling and assessment work can evaluate potential changes on the landscape of a given project alternative. An SLS Project Integration Team (of technical experts from a variety of disciplines that represent government, tribal, nonprofit and landowner interests) will collaboratively develop designs for integrated floodway and agricultural resilience projects. This Team will use the modelling and assessment information to evaluate the impacts of integrated project designs. These projects will set the stage for implementation of future coordinated multi-benefit projects to improve natural functions within the reach while delivering benefits for flood, fish and agricultural interests.

# SHORELANDS FLOODPLAINS BY DESIGN

Organization: Snohomish County - Public Works Department

SEAFBD-2019-SnCoPW-00051

## Project Characterization

### Project Themes

Select a primary and secondary theme that best describes the work to be achieved during this project.

Primary Theme:	Flood Hazard Reduction
Secondary Theme(s):	Land Acquisition
	Restoration
	Floodplains by Design
	Floodplains by Design

### Project Website

If your project has a website, please enter the web address below.

After entering a website and saving, another blank row will appear. Up to three websites may be provided.

Website Title/Name	Web Address
Biron et al. (2014)	<a href="https://www.researchgate.net/publication/265393019_Freedom_Space_for_Rivers_A_Sustainable_Management_Approach_to_Enhance_River_Resilience">https://www.researchgate.net/publication/265393019_Freedom_Space_for_Rivers_A_Sustainable_Management_Approach_to_Enhance_River_Resilience</a>
Sustainable Lands Strategy	<a href="https://snohomishcountywa.gov/3807/About-Sustainable-Lands-Strategy">https://snohomishcountywa.gov/3807/About-Sustainable-Lands-Strategy</a>
Lower Skykomish River Reach-scale Plan	<a href="https://snohomishcountywa.gov/DocumentCenter/View/45061/Lower-Skykomish-Reach-Scale-Plan?bidId">https://snohomishcountywa.gov/DocumentCenter/View/45061/Lower-Skykomish-Reach-Scale-Plan?bidId</a>

**SHORELANDS FLOODPLAINS BY DESIGN**

Organization: Snohomish County - Public Works Department

SEAFBD-2019-SnCoPW-00051

**Mapping Information**

Facility Site	Facility Site ID	Facility Site Link
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No location data currently exists for this project. To add location data, please click the map button below.

A Review Is Required on this Mapping Information

**Recipient Contacts**

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**Project Manager**

Erik Stockdale

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**Authorized Signatory**

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**Billing Contact**

Laura Brown

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**Recipient Contacts**

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laura.brown@snoco.org

**Other recipient signatures on printed agreement**

**Name**

**Title**

SHORELANDS FLOODPLAINS BY DESIGN

Scope of Work - Task 1 Project Admin: 1

Task Number	1		
Task Title	Project Administration/Management	Task Cost	\$100,000.00
Task Description	<p>A. The RECIPIENT will administer the project. Responsibilities will include, but not be limited to: maintenance of project records; submittal of requests for reimbursement and corresponding backup documentation, progress reports and recipient closeout report (including photos); compliance with applicable procurement, contracting, and interlocal agreement requirements; application for, receipt of, and compliance with all required permits, licenses, easements, or property rights necessary for the project; and submittal of required performance items.</p> <p>B. The RECIPIENT must manage the project. Efforts will include: conducting, coordinating, and scheduling project activities and assuring quality control. Every effort will be made to maintain effective communication with the RECIPIENT's designees; ECOLOGY; all affected local, state, or federal jurisdictions; and any interested individuals or groups. The RECIPIENT must carry out this project in accordance with any completion dates outlined in this agreement.</p>		
Task Goal Statement	Properly managed project that meets agreement and Ecology administrative requirements.		
Task Expected Outcomes	<p>* Timely and complete submittal of requests for reimbursement, quarterly progress reports and recipient closeout report.</p> <p>* Properly maintained project documentation</p>		
Recipient Task Coordinator	Erik Stockdale		

Deliverable #	Description	Due Date	Received?	EIM Study ID	EIM System Link	Latitude	Longitude	Location Address
			(ECY Use Only)					
1.1	Progress Reports	6/30/2021						
1.2	Recipient Closeout Report	6/30/2021						
1.3	Project Outcome Summary Report	6/30/2021						

SHORELANDS FLOODPLAINS BY DESIGN

Scope of Work - Additional Tasks: 2 - PROJECT-SCALE ACTIONS IN THE SULTAN REACH

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Task Number 2

Task Title PROJECT-SCALE ACTIONS IN THE SULTAN REACH Task Cost \$3,407,200.00\*

Task Description Three project-scale capital actions are planned to result in long-term flood risk reduction, restore natural river processes, and preserve the viability of agriculture in the Sultan Reach.

2.1 Construct elevated roadways for two sections of Mann Road and one section of Ben Howard Road, incorporating one fish passage culvert: These elevated roadways will immediately reduce the impacts of flooding and the need for road closures by 75%, saves \$1,104,000 to Skyline View Neighborhood (based on FEMA prevailing wage estimates), and replace a partial fish passage barrier thereby improving access to 0.5 miles of forested upstream habitat. The project has been vetted with and is fully supported by the Neighborhood, has been evaluated using the County’s Climate Change Decision Support Tool , will reduce flooding, improve public safety, and benefit fish passage.

2.2 Replace three culverts on Haystack Creek: This project will replace three fish passage barrier culverts on private property opening up salmonid access to 2.6 miles of mostly forested upstream habitat. Previous grant funding (NRCS and Department of Ecology) included the replacement of two barrier culvert crossings and the complete removal of a third, but funding is not sufficient to complete the entire project, which is why additional grant funds are being requested through this proposal. Replacement of the culverts will increase flood conveyance, replace failing infrastructure and allow salmonid access to off-channel forested refugia, especially important in winter high flow events.

2.3 Purchase up to 200 acres of floodway properties within the Area of Interest along the Sultan Reach of the Lower Skykomish River: These purchases will largely be acquisitions and include several properties that have filed repetitive flood claim losses, but easement options with flexible terms will be considered as well. This concept of acquiring at-risk properties has been vetted with landowners in the areas of interest, and many of them are willing to continue to engage in conversations about acquisitions opportunities. The County and SLS partners will complete purchase agreements only with willing sellers. Increasing the amount of acreage in public ownership in the Reach will protect existing habitat and agriculture from future development as well as allow natural processes to occur, opening up additional areas for future opportunities for fish habitat restoration. In addition, the acreage acquired and removal of existing structures/impervious surfaces will increase flood storage in the Reach; which will in turn, incorporate capacity to accommodate a changing climate. This task also includes up to 30 acres of riparian plantings in the South Slough and Haystack Creek area. Tree plantings will include 75% conifers, 25% deciduous in both mixed tree stands and single species plantings. Riparian shrubs will be planted within roughly 50 ft of

**Scope of Work - Additional Tasks: 2 - PROJECT-SCALE ACTIONS IN THE SULTAN REACH**

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the water's edge. In addition to the acquisition/easement opportunities in the frequently flooded areas of Shinglebolt, South and Sky River Sloughs, this proposal is meant to foster collaboration with other willing landowners in the Sultan Reach, including the Thunderbird Resort and River King Estates (two other areas that have repetitively flooded-see Sultan Reach Existing Conditions Map).

The fish passage culverts identified in Task 2 will be constructed in accordance with State of Washington specifications. Acquisitions/easements from willing landowners in key areas along the Reach will reduce flood impacts and shift land ownership patterns to support long-term river restoration and farm viability. The Task 2 projects are consistent with the Lower Skykomish River Reach-scale Plan, the Snohomish River Basin Salmon Conservation Plan, the LIO Ecosystem Recovery Plan, the Snohomish County Comprehensive Plan, and the Natural Hazard Mitigation Plan.

**Task Goal Statement**

The goal of Task 2 is to complete three high-priority capital projects that will reduce flood risks, preserve the viability of agriculture and improve riparian and forest health and natural functions in the Sultan Reach. The projects will significantly reduce future flooding and significantly reduce the need for road closures (by 75%) along Mann Road and Ben Howard Road, improving flood conveyance (via culvert replacements) and supporting public safety; reduce the number of fish-passage barriers; and restore salmon habitat in a key Reach of the Lower Skykomish River.

The overall goal of improving natural functions in the Reach also supports agricultural operations in a number of ways as well. Development pressure will be reduced and infrastructure impacts (i.e. traffic) will be limited. Newly acquired parcels maintained/returned to a natural state may offer protection (i.e. additional flood storage) for adjacent agricultural land. Acquisitions and riparian restoration will provide water quality and habitat benefits.

**Task Expected Outcomes**

2.1 ROAD ELEVATIONS - Total of 0.5 mile of roadway elevated, improving access during flood events for a community with over 238 homes, emergency responders, and others during flood events, increased community safety and economic security by reducing public and private costs (estimates at \$1,104,000 based on FEMA prevailing wage estimates) associated with repetitive flooding of rural county roads, increased flood storage for storms, reduced sediment, turbidity, one fish passage culvert installed, increased access for fish to 0.5 miles of upstream habitat.

2.2 Haystack Creek Improvements -Removed 3 fish blockage culverts, improved access to 2.6 miles of upstream habitat, river access improved on one site, magnitude of flooding downstream reduced, expected to promote groundwater recharge

**SHORELANDS FLOODPLAINS BY DESIGN**

Organization: Snohomish County - Public Works Department

SEAFBD-2019-SnCoPW-00051

**Scope of Work - Additional Tasks: 2 - PROJECT-SCALE ACTIONS IN THE SULTAN REACH**

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2.3 Acquisitions - Reconnect up to 200 acres of floodplain area and historic side channels, once property is acquired and removal of structures within acquisition area, restoration of up to 30 acres of South (Tychman) Slough, increased floodplain storage for storms, river access maintained at site, water quality increased, temperature decreased due to increased connectivity, up to 200 acres of productive floodplain agricultural land protected from development, up to 30 acres of riparian plantings along South Slough.

Recipient Task Coordinator      Erik Stockdale

Deliverables

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 After SAVE a new row will appear  
 Repeat these steps for each deliverable

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Deliverable #	Description	Due Date	Received? (ECY Use Only)	EIM Study ID	EIM System Link	Latitude	Longitude	Location Address
2.1	Road Elevations and Fish Passable Culvert – Flood risk reduction on 0.5 miles of roadway with at least water crossings, providing access to 0.5 miles of upstream habitat: 60%, 90%, and final designs (June 2020, June 2020, June 2021),	6/30/2021						

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 Scope of Work - Additional Tasks: 2 - PROJECT-SCALE ACTIONS IN THE SULTAN REACH
 

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As built plans  
(June 2021)  
Before and after  
photos of culvert  
replacement

- |     |  |           |
|-----|--|-----------|
| 2.2 | Haystack Creek<br>Improvements -<br>replacement of up<br>to three fish<br>passage barriers<br>and providing<br>access to about 2.6<br>miles of upstream<br>habitat:<br>Final Culvert<br>Designs,<br>Before and After<br>Photos   | 6/30/2021 |
| 2.3 | Acquisitions -<br>Complete<br>acquisition of up to<br>200 acres of<br>floodplain land for<br>habitat, flood<br>reduction, and<br>agricultural<br>benefits. Complete<br>up to 30 acres of<br>native plantings<br>along the South<br>Slough area:<br>Acquisition reports | 6/30/2021 |

Scope of Work - Additional Tasks: 2 - PROJECT-SCALE ACTIONS IN THE SULTAN REACH

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(including appraisals and purchase and sale agreements) (June 2021)  
Deed restrictions  
Before and after photos of South Slough riparian plantings (June 2020)  
Final planting diagram  
Quarterly Progress Report updates

2.4 Updates in 6/30/2021  
quarterly progress reports.

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**Scope of Work - Additional Tasks: 3 - PREDICT FUTURE HYDRAULICS/HYDROLOGY AND RISK**


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Task Number	3		
Task Title	PREDICT FUTURE HYDRAULICS/HYDROLOGY AND RISK	Task Cost	\$645,000.00*
Task Description	<p>Two projects are planned to provide the technical information needed to support the longer-term planning work, planned in Task 4, Integrated Floodplain Management.</p> <p>3. 1 Hydraulic and Hydrologic Modelling: The County will carry out regional hydrologic modeling of future scenarios, related to the changing weather patterns in the Snohomish River watershed, and develop projections of future regional weather patterns and stream flows. River runoff events from the everyday to the catastrophic (500-year recurrence) will be modeled; thereby providing information that can be used for project development in the Sultan Reach or elsewhere in the watershed. Analysis outputs will be used with the proposed Snohomish River model and previously completed Skykomish and Snoqualmie River models to accurately describe channel and floodplain conveyance characteristics across projected flow events extending to the year 2100. The hydraulic model of the Snohomish River system would extend from the confluence of the Skykomish and Snoqualmie Rivers at its upstream extent to Port Gardner Bay at its downstream extent. The Project Integration Team will develop 30% design alternatives for an Integrated Floodway and Agriculture Resiliency project. The 2-D model will assess the potential changes on the landscape from a particular project alternative which will inform the designs. The combination of the proposed hydraulic/hydrologic modeling work will improve the regional understanding of current river/habitat conditions as well as enable a better understanding of how regional river processes and habitat conditions may change in the future due to climate change. The water-shed scale approach to this analysis allows for the assessment of potential impacts on projects throughout the basin as opposed to one reach of a river.</p> <p>3.2 Geomorphic Assessment &amp; Risk Analysis: The County will complete a geomorphic flood hazard risk assessment on the Lower Skykomish River, RM 0-16, which includes the Sultan Reach. This task will establish a comprehensive foundation with three documents: a geomorphic analysis, hydrogeomorphic (hazard) mapping, and an infrastructure assessment. The geomorphic assessment will define the relationship between fish habitat limiting factors and primary fluvial processes of lateral channel migration, deposition, incision, aggradation, avulsion and previous anthropogenic influences such as gravel mining and bank stabilization. The relationship between fluvial process and habitat will guide the actions needed to restore/sustain habitat and lower flood hazard risk. Complementary hydrogeomorphic (hazard) mapping would evaluate the spatial and temporal aspects of lateral channel migration, avulsion, and erosion. The</p>		

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**Scope of Work - Additional Tasks: 3 - PREDICT FUTURE HYDRAULICS/HYDROLOGY AND RISK**

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geomorphic hazard analysis would be integrated with the flood inundation (hazard) mapping in task 3.1 to create a comprehensive hydrogeomorphic (hazard) map to be used by the County as well as the Project Integration Team in identifying and prioritizing sustainable multi-benefit projects. An infrastructure assessment would assess existing structures, levees and riprap areas and predict maintenance requirements. The assessments and mapping will be conducted with an analysis of the historical and current condition and focus on predicting the anticipated 50-year condition of the river and infrastructure. This task will prepare a Quality Assurance Project Plan (QAPP) or QAPP waiver for the collection and analysis of environmental data. The Task 3 projects are consistent with the Lower Skykomish River Reach Plan, the Snohomish River Basin Salmon Conservation Plan, the LIO Ecosystem Recovery Plan, the Snohomish County Comprehensive Plan, and the Natural Hazard Mitigation Plan.

**Task Goal Statement**

The goal of Task 3 is to develop accurate assessments of the hydraulic/hydrologic/geomorphic risks in the Reach to serve as the basis for facilitating a more sustainable economic and ecologic approach to river management and floodplain land uses, including agricultural operations and habitat.

The information generated and compiled in Task 3 will be useful to a wide range of stakeholders with fish-farm-flood interests, including landowners/farmers, regulators, and Tribes. With a better understanding of the risks in the Sultan Reach floodplain, multi-benefit projects can be developed to both prioritize flood hazard risk reduction and benefit agriculture and aquatic habitat for long-term success.

With this approach, multi-benefit projects will be developed to prioritize flood hazard risk reduction and then derive compatible agriculture and aquatic habitat benefits with sustainability concepts such as “Freedom Space for Rivers” (Biron et al. 2014) as opposed to bank stabilization. Identification of avulsion risks will inform acquisition priorities in the Reach. The risk assessment will also inform the primary locations for shoreline armoring removal and affirm the primary locations for sediment storage in the Reach (actions involving restoration of natural river processes have the potential to add more than 1 million cubic yards of sediment storage).

**Task Expected Outcomes**

3.1 2-D Hydraulic and Hydrologic Modelling - The hydraulic and hydrologic models will provide further detailed information on current hydrologic conditions in the Reach. The models will also provide a better understanding of how regional river processes and habitat conditions may change in the future due to climate change. The models and mapping will guide and assist in the development of large scale river and

**Scope of Work - Additional Tasks: 3 - PREDICT FUTURE HYDRAULICS/HYDROLOGY AND RISK**

estuary-based multi-benefit projects that lead to flood risk reduction, agricultural viability, and habitat restoration. These projects will make significant contributions to floodplains and estuary vital sign acre targets.

3.2 Geomorphic Assessment and Risk Analysis - The geomorphic risk analysis combined with the hydrologic model will enable the development of sustainable "room for the river" and floodplain corridor approaches (Biron et al.2014), and the design of project alternatives to reduce flood impacts on property and agricultural operations, while restoring salmonid habitat in a cost effective manner. The Project Integration Team will use this hydraulic and geomorphic information to develop multi-benefit project alternatives. Modelling and assessment will lead to 30% design alternatives for an integrated floodway project design, a landscape that promotes multiple benefits, and up to three agricultural resiliency projects, will inform planning for the future Steelhead County Park. These projects will make significant contributions to floodplains and estuary vital sign acre targets and accelerate Sustainable Lands Strategy (SLS) multi-benefit floodplain management actions.

Recipient Task Coordinator Erik Stockdale

Deliverables

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 After SAVE a new row will appear  
 Repeat these steps for each deliverable

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Deliverable #	Description	Due Date	Received? (ECY Use Only)	EIM Study ID	EIM System Link	Latitude	Longitude	Location Address
3.1	Two-dimensional hydraulic model of the Snohomish River, its distributary channels (Union,	6/30/2021						

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**Scope of Work - Additional Tasks: 3 - PREDICT FUTURE HYDRAULICS/HYDROLOGY AND RISK**

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Ebey, and  
Steamboat  
Sloughs) (June  
2021),  
Inundation Map,  
Report

3.2

Geomorphic Risk  
Analysis,  
Hydrogeomorphic  
Map; historical,  
present, future,  
Infrastructure  
Assessment,  
Geomorphic  
analysis, Flood  
hazard mapping,  
hazard mitigation  
mapping for  
channel migration  
zone analysis  
(hydrogeomorphic  
mapping),  
Infrastructure  
assessment,  
Outreach tools to  
increase  
understanding of  
flood and avulsion  
risks,changing  
conditions in the  
floodplain with  
landowners and  
agricultural

6/30/2021

Scope of Work - Additional Tasks: 3 - PREDICT FUTURE HYDRAULICS/HYDROLOGY AND RISK

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community (Sultan  
to mouth of  
Snohomish River)

3.3            Quarterly Project      6/30/2021  
                 Updates, QAPP or  
                 QAPP Waiver

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**Scope of Work - Additional Tasks: 4 - ADVANCING INTEGRATED FLOODPLAIN MANAGEMENT**


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Task Number	4		
Task Title	ADVANCING INTEGRATED FLOODPLAIN MANAGEMENT	Task Cost	\$660,000.00*
Task Description	<p>Despite years of building a shared understanding of the watershed, there has been a disconnect between planning and project development. To alleviate that gap, this task will establish a Project Integration Team that brings together project managers and planners from the three interests (fish, farm, and flood) to discuss, prioritize, and develop integrated projects. Two community engagement efforts will be key to the success of the Team – a broad community relations strategy and a focused reach-scale outreach effort. Broad outreach will include press releases, website updates, literature and video storytelling, and events such as Focus on Farming as well as the Farm and Fish Come Together dinner co-hosted by the Farm Bureau and SLS.</p> <p>Task 4.1 Integrated Floodway Design - The Project Integration Team will utilize hydraulic, geomorphic, and agricultural resilience modelling information to develop 30% designs for an integrated floodway project for the Sultan Reach. 30% designs alternatives will explore the following outcomes: excavation of about 2,600 lineal feet of historic side channel, restoration of 3,400 lineal feet of side channel, and rip rap removal. Site of design will likely focus on the Shinglebolt, South Slough area and include alternatives for the removal of rip-rap, location of boating access, excavation and reconnection of side channels, riparian plantings/enhancement, and instream structures. However, design locations will be determined by opportunities offered through acquisition (Task 2.3).</p> <p>Increased capacity to develop communication tools will promote shared understanding of flood and hazard risk, and future climate change impacts. Improve stakeholder understanding of current and future conditions will increase engagement of key floodplains stakeholders and lay the foundational support for integrated floodplain management approaches, exploration of flood and hazard risk reduction alternatives, and agreement on multi-benefit reach-scale project objectives. The Integration Team charter will outline the meeting frequency, locations, and operating principles.</p> <p>Task 4.2- Agricultural Resilience Plan and Project Designs - The Snohomish Conservation District, under advisement of the farmers comprising the Agriculture Resilience Plan Steering Committee, will identify priority agricultural resilience needs throughout the watershed. The Resiliency Plan helps the agricultural sector prepare for and adapt to changing climatic conditions by incorporating sea level rise, groundwater level, saltwater intrusion, flooding, and crop impact predictions into packages of landscape-scale resilience projects at high priority agricultural areas. This task will include working with landowners and the Project Integration Team to develop 30% designs for three projects that help address impacts on agriculture from</p>		

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**Scope of Work - Additional Tasks: 4 - ADVANCING INTEGRATED FLOODPLAIN MANAGEMENT**

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changing climactic conditions (flood, groundwater, temperature). At least one of these designs will be in the Sultan Reach.

**Task Goal Statement**

Inform safe and sustainable community choices through greater understanding of the Snohomish River Watershed's dynamic floodplain system. Hydraulic and geomorphic models will guide Project Integration Team and local stakeholder development of a vision for a sustainable river and floodplain corridor, and design project alternatives to reduce flood impacts on property and agricultural enterprises, while restoring salmonid habitats in a cost effective manner.

Goal of the SLS Project Integration Team and outreach capacity is to provide consistent and constant support to partners, ensuring progress on reach-scale plan deliverables, broadening engagement in SLS with additional project sponsors, technical interests, and landowners, and expanding understanding of integrated floodplain management principle/goals. The Team reports to SLS and will develop an integrated floodway design project for the Sultan Reach, specifically.

The task will develop agricultural infrastructure resilience projects and priorities through the Agricultural Resilience Plan effort. The goal is to engage both broad community support and reach-scale landowner buy-in for a climate resilient approach to floodplain planning/management.

**Task Expected Outcomes**

1. Acceleration of Sustainable Lands Strategy multi-benefit floodplain management actions. Project designs including side channel excavations, significant riparian planting, and installation of engineered log jams will alleviate erosion and flood risk by reducing velocity, diverting flow, and dispersing volume over a larger area of floodplain while improving habitat conditions in the reach. 30% designs evaluating excavation of about 2,600 lineal feet of historic side channel, restoration of 3,400 lineal feet of side channel, and rip rap removal. Project designs including removing armoring and enabling natural river processes to occur have the potential to add one million cubic yards of sediment storage.
2. Improved inter-organization communication and multi-benefit floodplain management action tracking. The development of communication tools to relay hazard risks, future climate change conditions and multi-benefit project implementation options to SLS stakeholders, decision makers and landowners within the focus reach.
3. Team charter and establishment of Project Integration Team with key stakeholders participating to prioritize and develop integrated projects.

SHORELANDS FLOODPLAINS BY DESIGN

Organization: Snohomish County - Public Works Department

SEAFBD-2019-SnCoPW-00051

Scope of Work - Additional Tasks: 4 - ADVANCING INTEGRATED FLOODPLAIN MANAGEMENT

Recipient Task Coordinator Erik Stockdale

Deliverables

**To Add a Row**

Enter a deliverable  
 When done, click the SAVE button  
 After SAVE a new row will appear  
 Repeat these steps for each deliverable

**To Delete a Row**

Delete data entered in a row  
 When done, click the SAVE button

Deliverable #	Description	Due Date	Received? (ECY Use Only)	EIM Study ID	EIM System Link	Latitude	Longitude	Location Address
4.1	Design Integrated Floodway Project Design- information for stakeholders 30% design alternatives for floodplain landscape with multiple benefits,	6/30/2021						
4.2	The SCD and the Project Integration Team, with landowners, will develop 30% designs for three projects that help maintain agriculture viability and address impacts on	6/30/2021						

Scope of Work - Additional Tasks: 4 - ADVANCING INTEGRATED FLOODPLAIN MANAGEMENT

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agriculture from changing climactic conditions (flood, groundwater, temperature).  
 Implement on-farm BMPs that improve agricultural resilience.  
 Quarterly progress reports

4.3 Project integration team Charter 10/31/2019

4.4 Web-based (SLS website), print products for education and outreach on channel migration and avulsion risks, video storytelling. Up to 3 SLS stakeholder workshops (e.g. Sultan Reach residents, SLS Executive Committee, and County staff Present at County Focus on Farming Conference in October 2020 and

2021.

**SHORELANDS FLOODPLAINS BY DESIGN**

Organization: Snohomish County - Public Works Department

SEAFBD-2019-SnCoPW-00051

**Scope of Work Summary**

<b>Task Title</b>	<b>Task Cost</b>
Project Administration/Management	\$100,000.00
PROJECT-SCALE ACTIONS IN THE SULTAN REACH PREDICT FUTURE HYDRAULICS/HYDROLOGY AND RISK	\$3,407,200.00
ADVANCING INTEGRATED FLOODPLAIN MANAGEMENT	\$645,000.00
<b>Total</b>	<b>\$4,812,200.00</b>

**Total Eligible Costs**  
(from the General Information Form)  
\$4,812,200.00

**SHORELANDS FLOODPLAINS BY DESIGN**

Organization: Snohomish County - Public Works Department

SEAFBD-2019-SnCoPW-00051

**Budget Summary**

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**Proposed Budget**

Total Eligible Cost represents the cost of work that will be supported by Ecology Funding, not to exceed \$250,000. Total Cost represents the full cost of the project.

**Total Eligible Costs (from General Information form)**

\$4,812,200.00

**Total Costs (from General Information form)**

\$6,748,200.00

**By Task**

<b>Task Title</b>	<b>Total Eligible Cost</b>	<b>Total Project Cost</b>
Project Administration/Management	\$100,000.00	\$150,000.00
PROJECT-SCALE ACTIONS IN THE SULTAN REACH PREDICT FUTURE HYDRAULICS/HYDROLOGY AND RISK ADVANCING INTEGRATED FLOODPLAIN MANAGEMENT	\$3,407,200.00	\$4,948,200.00
	\$645,000.00	\$795,000.00
	\$660,000.00	\$855,000.00
<b>Total</b>	<b>\$4,812,200.00</b>	<b>\$6,748,200.00</b>

If you receive a grant, you are responsible for procuring professional, personal, or other services using sound business judgment and good administrative procedures consistent with applicable state, and local laws, orders, regulations, and permits. This includes issuance of invitation of bids, requests for proposals, selection of contractors, award of sub-agreements, and other related procurement matters.

**Note:** Overhead cannot exceed 25% of salaries + benefits.

**Additional Comments**

The County does not bill grant funders for indirect costs (overhead).

## Task Cost General Questions

**Describe and provide calculations on how task costs were estimated. Explain how you calculated each task cost and why it is necessary for the project. Include steps taken to ensure the accuracy of cost estimates.**

TASK 2 - Cost estimates for road elevations (Task 2.1) are prepared by County Public Works engineers with experience developing and implementing flood infrastructure and roadway improvement projects. They are based on state standards for construction and materials quantities, current market values, anticipated methods to be used and labor required, professional experience, and contingencies to account for schedule and other unknowns. Costs for construction management, final design, permitting, and cultural resource work are also factored into these budgets. (See Attachment 4b)

Cost estimates for Haystack Creek Improvements (Task 2.2) were provided by the SCD and are based on experience completing similar bridge construction projects and recommendations provided by NRCS engineers. Recommendations include scoping 35-ft bridges for two replacement crossings (Peterson 1 & 3), rather than culverts and complete removal of the middle crossing (Peterson 2). The estimate for the Smith crossing is based on being similarly sized to Peterson 1.

Cost estimates for task 2.3 acquisitions are based on several potential avenues for land conservation, however it is premature to accurately estimate any purchase agreement(s) because of the unique nature of every purchase negotiation. Therefore, costs for acquisitions are based on assessed market value and recent listings. The budget includes contingency to account for the costs of appraisals, environmental site assessments, survey fees, and closing costs. Following acquisitions, riparian plantings (task 2.3) are based on the acreage estimate (up to 30 acres), planting materials, and labor costs. The estimated cost for this planting work assumes least expensive plant material types, primarily bareroot and live stake stock.

TASK 3 - The budget for the watershed scale hydraulic modelling work (task 3.1) has been estimated based on project management needs (calculated as 15% of the overall project cost), assumes a \$30,000 cost for field survey activities including bathymetric and ground based surveys, a \$10,000 cost for review, manipulation, cleanup, and QA/QC of field survey data and LiDAR data, and a \$10,000 cost for creation and QA/QC of a 2-d topographic surface to be used in the hydraulic analysis. The budget estimates for the watershed scale hydrologic modelling (Task 3.1) have been estimated by UW Climate Impacts Group, who will lead the effort, and are based on UW CIG salary, benefits, WWU subcontract, indirect costs, and travel expenses. The budget for task 3.2 was developed based on estimates for hydrogeomorphic mapping (\$125,000), informed by a geomorphic assessment (\$100,000); an infrastructure assessment (\$50,000) that will inform the mapping; and a stakeholder engagement process (\$25,000) to communicate the results of the assessment. All subtasks include standard contract estimates including administration, GIS services, QA/QC, field work, preparation, data reduction, and reports.

TASK 4 - The budget for task 4.1 is based on previous experience with similar complex landscape-scale projects. The Project Integration Team will use hydraulic, geomorphic, and agricultural resilience modelling information to develop 30% designs for a multiple benefit project in the Sultan Reach. Costs for the Team (\$100,000), include communications and outreach work, are based on salaries and benefits (60\$/hr. for planning and outreach staff) to conduct outreach to landowners, project scoping, travel time, equipment/materials, and meeting facilitation. Projects in the early stages of design are expected to refine construction cost estimates throughout the design process and so include less budget detail. The budget for task 4.2 is based on estimates from the SCD and include \$100,000 for the Project Integration Team (including communications and outreach), as well as a budget of \$150,000 (\$50,000/project) for the 30% agricultural resiliency project

Task Cost General Questions

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designs.

**Describe the process used to control costs and ensure that this is a cost-effective project. Show the relationship between the cost of the project and the floods benefit achieved.**

Project-scale components control costs by combining actions for long term flood hazard reduction, agricultural viability preservation, replacement of fish passage barriers and habitat enhancements to benefit ESA listed salmonids. Cost control measures employed by County staff include preparation of detailed consultant scopes of work and budgets, monthly review of invoices and tracking of subtask expenditures relative to subtask budgets, close coordination and regular progress reports and check-ins with consultants, and weekly cost tracking of constructions costs. Task 2.1 and 2.3 capitalize on work already underway, such as the acquisitions of the Skyview Tracts area (see Attachment 1d) and Mann Road/Ben Howard Road elevation designs, and in need of resources to bring to full completion.

The most cost effective measure to reduce flood hazards to the community is to remove people and structures from high hazard areas of the floodplain (task 2.3). The majority of the residents in the Area of Interest are located in the floodway and have experienced repetitive flood losses. In the case of property owners in repetitive loss areas, purchasing their property so they can divest from a high-hazard area is a long term solution to reduce risk to people and property, as well as flood insurance claims.

The hydrologic modelling and geomorphic assessment (task 3) work control costs by using 50-year projections to determine future conditions that might impact the landscape and inform cost control mechanisms during project design.

30% designs for Integrated Floodway Project and Agricultural Resiliency Projects (task 4 actions) control costs by incorporating the task 3 modelling and assessment information and using modelling landscape changes resulting from a particular project alternative. Designing resilient projects reduces the overall costs for long –term operations and maintenance in the future.

Collaboration and leverage will help contain costs for every task proposed. More integrated working relationships will also help ensure quality and cost control across County departments and external partners. Likewise, the Project Integration Team (task 4) approach reduces opportunity costs attributed to non-action, insufficient, and belated action and this two year grant period of performance offers a timeframe and benchmarks for institutionalizing this Project Integration Team approach across partnering entities.

Snohomish County as the project sponsor makes efficient and cost-effective use of the County’s considerable administrative resources (accounting, information management-sharing, contract management and compliance, legal, etc). Snohomish County Public Works expertise with construction (in-house and contracted) and construction management will ensure construction tasks 2.1 and 2.2 are

**Task Cost General Questions**

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completed to the highest standards and managed to minimize risk. Also, staff and contracted professionals involved with project management are outstanding in their respective fields and implementing industry-approved methods for estimating and controlling costs. South Slough riparian plantings (task 2.3) are based the acreage estimate (up to 30 acres), planting materials, and labor costs. The estimated project cost for this project is based on reliance on least expensive plant material types, primarily bareroot and live stake stock. Snohomish County Surface Water Management has an established floodplain and riparian plant community restoration program. The expectation is 80% survival over an establishment period of 5 years. Establishing planting projects are assessed using our established and published Vegetation Monitoring Protocol over regular intervals for at least 10 years post planting.

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**Project Description**

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**Narrative:**

**Please describe the overall goals for this floodplain area that is the focus of your proposal. Include in the description all major components of the project or activity such as breaching a levee, constructing a new levee, restoring a specific number of acres of floodplain, wetland creation or fill, restoration planting, project design planning, public process, or any other appropriate major component. Please indicate if funding is being requested for a phase of a larger multi-year project.**

Since 2011, the Sustainable Lands Strategy (SLS) has been building support among state and federal agencies, tribes, agricultural leaders, local farmers, and environmental advocates to develop and implement a broad and inclusive floodplain management strategy. We have identified shared interests in strengthening farming, recovering fisheries, and developing a collaborative approach to floodplain management and have identified the Sultan Reach as a prime opportunity to pilot an integrated floodplain management strategy.

**BUILDING ON PAST WORK** - Since 2015, Snohomish County staff have engaged in ongoing conversations with landowners in the reach related to flooding impacts and multi-benefit solutions. The issues are well documented and in 2016 the landowners were provided with a technical overview of engineered as well as process-based solutions that would reduce risk, provide habitat benefits, and give the river room to create self-sustaining habitat and lower geomorphic flood hazards.

In 2016, the SCD began a multi-part agricultural resilience plan to prepare local agriculture for population growth and climate change. In 2017, SLS completed the Lower Skykomish River Reach-scale Plan (LSRRP) that proposes strategies and actions for land uses and practices within the river reach, along with a coordinated set of multi-benefit restoration and improvement projects, that will allow stable agricultural uses to better co-exist with healthy fish habitat, while minimizing damage that could be incurred from flooding. Proposal efforts are focused on the Sultan Reach (roughly subreach 4 in the LSRRP RM 9.7 – 15.7).

**LOOKING FORWARD** - This proposal brokers key property transfers necessary to establish the footprint for integrated floodplain management, and includes improvements to fish passage, flood conveyance, and transportation infrastructure to bridge current uses with a longer-term vision for this landscape. It consolidates and protects priority farmlands and enterprises on defensible ground while giving the river increased room to move.

**Multiple Scales of Work and an Integrated Design Model**

SLS was developed to help flood, fish and farm interests understand each other, and to look together into the future for creative solutions. This requires that both communities and stakeholders maintain a shared context through a complex project development process.

The Sultan Reach effort will test a Project Integration Team model. This team is composed of key staff from multiple organizations that report to the SLS Executive Committee. They collaborate on acquisitions, facilitate and empower community collaboration, identify and prioritize integrated projects, and pursue stakeholder review at key junctures in project development. This role is essential for integrating an extremely complex partnership including public, private, NGO, and Tribal interests.

Our flexible and task-focused Project Integration Team approach will centralize and coordinate the flow of information among officials,

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**Project Description**

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stakeholders, and regulators. The model will be tested in the Skykomish and applied to other Snohomish SLS action areas. This model will preempt conflicts that are common when community involvement is absent. Instead, the Project Integration Team incorporates local knowledge and needs while maintaining perspective on the reach and basin-scale impacts from localized land use decisions. This project supports three scales of effort:

**PROJECT-SCALE ACTIONS (Task 2)** – Project-scale actions to reduce flood impacts and begin to shift land ownership patterns to support long-term river restoration and farm viability. This proposal includes three actions to take advantage of opportunities in the Sultan Reach.

**TASK 2.1 – Road Elevations and Fish Passable Culvert** – Within four months of the 2015-16 flood season six individual flood events occurred which resulted in roadway closures estimated at 67 hours. Based on prevailing wage estimates for delay of drivers, road closures cost the residents over \$1,000,000. Construction of elevations at three locations along Mann and Ben Howard Road (about 0.5 miles) will reduce road closures by 75%. The replacement of a fish passage barrier with a passable box culvert will improve access to about 0.5 miles of upstream habitat and provide additional flood conveyance benefit.

**TASK 2.2 Haystack Creek Improvements** –Actions include replacement of three fish passage barriers to improve access to 2.6 miles of forested upstream habitat important for salmonids seeking refuge from winter flood flows. This project leverages \$310,000 in match and complements a larger restoration effort on South (Tychman) Slough and Haystack Creek undertaken by the Snohomish Conservation District and partners.

**TASK 2.3 Acquire Properties** –The County and SLS Partners will complete acquisitions of up to 200 acres (the Area of Interest is shown in Attachment 1X and has an assessed market value of over \$2 million) for habitat restoration, flood reduction, and agricultural benefits. A number of willing landowners in the Reach have expressed ongoing interest to work with the County and partners on solutions. For example, one owner with 40 acres (see Attachment 1d ) that frequently floods has repetitive flood loss claims and continues to sustain damages including losing five cars during high flow events. They have approached the County to purchase the property. Once acquisitions are complete, this task will include up to 30 acres of riparian plantings along the South Slough area.

**PREDICT FUTURE CONDITIONS (EAGL Task 3)** – As noted in the LSRRP, information gaps related to geomorphic conditions and climate impacts impede progress toward the development of integrated project designs. This task will complete hydrologic, hydraulic, and geomorphic assessment and integrate into Floodway Project Design, Agricultural Resilience Plan, Reach Scale Plans, and a potential Watershed Restoration and Enhancement Plan for WRIA 7. This integration of this modelling and assessment work will increase the ability of the County and SLS partners to evaluate changes on the landscape of a given project alternative.

**Task 3.1 Hydraulic and Hydrologic Modelling** - Building off countywide flow extent modelling completed for the SCD and detailed 2-dimensional hydraulic modelling efforts on the Lower Skykomish and Lower Snoqualmie Rivers completed by the County, this task would develop a 2-D hydraulic model of the Snohomish River, its tributary channels (Union, Ebey, and Steamboat Sloughs) and the associated floodplains to better describe/delineate flooding extent across varying levels of flood events and better describe realistic flow pathways in the floodplains for both existing conditions and future conditions as described by the results of the proposed hydrologic modeling. The hydraulic

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**Project Description**

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model of the Snohomish River system would extend from the confluence of the Skykomish and Snoqualmie Rivers at its upstream extent to Port Gardner Bay at its downstream extent. This task also includes regional hydrologic modeling of projected future climate change scenarios to develop projections of future stream flows at individual locations and develop summary statistics of changing weather patterns. River runoff events from the minor (2-year recurrence) to the catastrophic (500-year recurrence) will be modeled. Analysis outputs will be used to accurately describe channel and floodplain conveyance characteristics across projected flow events extending to the year 2100. The combination of the proposed hydraulic/hydrologic modeling work will improve the regional understanding of current river/habitat conditions as well as enable a better understanding of how regional river processes and habitat conditions may change in the future due to climate change. (See Attachment 1f)

**Task 3.2 Geomorphic Assessment and Risk Analysis** - The County will complete a geomorphic flood hazard risk assessment on the Lower Skykomish River, RM 0-16, which includes the Sultan Reach. This task will establish a comprehensive foundation with three documents: a geomorphic analysis, hydrogeomorphic (hazard) mapping, and an infrastructure assessment. The geomorphic assessment will define the relationship between fish habitat limiting factors and primary fluvial processes. The relationship between fluvial process and habitat will guide the actions needed to restore/sustain habitat and lower flood hazard risk. Complementary hydrogeomorphic (hazard) mapping will evaluate the spatial and temporal aspects of lateral channel migration, avulsion, and erosion. The analysis will be integrated with the flood inundation (hazard) mapping in task 3.1 to create a comprehensive hydrogeomorphic (hazard) map to be used by the County as well as the Project Integration Team in identifying and prioritizing sustainable multi-benefit projects. An infrastructure assessment will assess existing structures, levees and riprap areas and predict maintenance requirements.

**ADVANCING INTEGRATED FLOODPLAIN MANAGEMENT (Task 4)** – Hydraulic modeling, geomorphic assessments, and hazard analysis will guide the design of an integrated floodway project, to reduce the impact on property and agricultural enterprises, while restoring salmonid habitats in a cost effective manner. To alleviate the disconnect between SLS Executive Committee planning and integrated project development, this task will establish a Project Integration Team to bring together project managers and planners from the three interests (fish, farm, flood) to discuss, prioritize, and develop multi-benefit project packages. Outreach and communication tools will be developed from the Task 3 2-D modelling, geomorphic assessment, and hazard mapping to increase understanding of flood and avulsion risks and changing conditions in the floodplain for target audiences such as local landowners and the agricultural community (Sultan to mouth of Snohomish River).

**TASK 4.1 – Design Integrated Floodway Projects** – Complete 30% design alternatives for a floodplain landscape that promotes multiple benefits. These alternatives will explore the following, likely in the Shinglebolt/South Slough area: excavation of about 2,600 lineal feet of historic side channel, restoration of 3,400 lineal feet of side channel, rip rap removal, location of boating access and habitat enhancements to improve habitat complexity. Footprint of the design locations will be determined by opportunities offered through acquisition (Task 2.3).

**TASK 4.2 – Design Agricultural Resilience** – The SCD is leading the development of an Agricultural Resilience Plan to assess the impact of changes in flooding, groundwater levels, sea level rise, land subsidence, weather patterns, and water availability. This information will help farmers plan for future climatic risk but also assist in development of landscape-scale resilience projects that support agriculture and habitat.

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**Project Description**

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This proposal will fund the final steps of this plan – working with the agricultural community to scope and design resilience projects.

The Project Integration Team will address capacity limitations that have impeded progress toward integrated floodplain management in the Snohomish Basin. The coordinated implementation of the project scale actions detailed in Task 2 and the development of the 30% designs of Task 4 will be the proof-of-concept outcomes undertaken by this coordinated team. The team, comprised of technical experts and project sponsors, will be convened periodically to support coordinated approach to developing, designing, evaluating, prioritizing, and implementing projects. The work of the Team is expected to generate a future project pipeline of integrated floodway projects (see 2c). The coordinated project development and implementation will, when completed, will restore natural processes while reducing flood risk, improving habitat and supporting long term agricultural viability.

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**Flood Hazard/Risk Reduction**

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**Scoring Information**

This section is worth up to 60 total points. There are 2 components to the Flood Hazard / risk reduction question. Each is worth up to 30 points. You must score at least 30 points in this section to qualify for funding.

**Guidance**

Describe your project and how it will reduce the magnitude or frequency of flood damages to people, structures or infrastructure. Projects will be evaluated on the significance of the flood hazard and the ability of the solution to address the hazard. Evidence of flood hazard reduction can be demonstrated via flood storage added (acre-feet), flood stage reduction [reduced BFE (base flood elevation)], conveyance increased (cubic ft/sec), sediment storage added or inputs reduced, number or value of structures and/or development rights removed from hazard area (# or areal extent), critical facilities removed from high hazard area, transportation and infrastructure facilities removed from high hazard areas, and other project-specific goals. Describe both upstream and downstream effects of your project.

**1. Describe the significance of the flood hazard and frequency of flood events. (0 – 30 points available)**

Flood damages in the Snohomish River watershed now rank among the highest in the state for their frequency, magnitude, and damage costs. The 29-mile Skykomish River mainstem is one of the most dynamic rivers in Snohomish County, with a long history of creating new channels in its floodplain and overflowing its banks. Repetitive loss properties dot the floodplain, and in the last two decades, the County has acquired 100 such properties (Attachment 1b). Flooding in this reach has caused millions of dollars in property damage, banks are rapidly eroding, and critical emergency access roads are blocked by floodwaters. The farmers in this reach are struggling to maintain their agriculture heritage, while staggering under the burden of flood management and threat of conversion. Climate change is both increasing flood risk in winter, and creating low-flow impacts to fish bearing waterways in summer. Evidence suggests that sloughs in the Reach are widening and reconnecting more often, and bank armoring from a generation ago is deteriorating. More frequent and severe flooding and migrating river channels exacerbate erosion and destabilize banks. Localized erosion in the Sultan Reach threatens more than twenty properties, with some parcels losing 9 - 25 feet/year.

Flooding regularly forces closures of Ben Howard and Mann Roads, isolating 238 homes (about 670 residents) in and around the Skyline View neighborhood. These low-lying neighborhoods are cut off from the main highway when floodwater covers in two-year events; resulting in lack of access for residents, emergency vehicles, and school buses that could become life-threatening. Between 1988 and 2015, three road sections were impassable an average of 32 hours each year. In recent years, flood events have been intensifying. Four separate 100-year flood events took place between 1970-2015; yet six such events occurred within four months of the 2015-2016 flood season, resulting in roadway closures for an estimated 67 hours. Based on prevailing wage estimates for delay of drivers, road closures cost the residents over \$1,000,000. Water covers roadways in 2-year events. Between 1988 and 2015 the road sections proposed for elevation with this proposal were impassable an average of 32 hours each year.

Flood events in the Sultan Reach are significant and intensifying. The area has experienced four separate 100-year flood events during the

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**Flood Hazard/Risk Reduction**

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past 45 years. Since 2006, flood damages to public and private property are conservatively estimated to cost nearly \$1.1 million per river mile; an average of \$108,000 per mile per year.

**2. Demonstrate ability of solution to address the flood hazard, while avoiding increasing development in flood hazard areas or adverse ecological impacts. (0 – 30 points available)**

It is ecologically harmful and cost prohibitive to manage flood hazard risk with traditional engineering solutions such as bank stabilization and dredging; therefore, this proposal favors preserving the river's natural ability to "heal itself" by "giving the river room." Specifically, the following tasks will implement this approach with stream crossing upgrades, property acquisitions/easements, defining flood (inundation and geomorphic) hazard zones, and initiating 30% designs to address the risk.

Looking ahead, changing climactic conditions are expected to exacerbate flood inundation and geomorphic hazards. As described below, each project component has been developed to integrate flood and fish interests in a manner that does not encourage more development in defined flood hazard zones of the floodplain or destruction of existing habitat.

TASK 2 – Project-scale Actions in the Sultan Reach – Road elevations (task 2.1) will alleviate frequently flooded conditions that cut off approximately 670 residents (238 homes) from safe passage out of the floodway, limit emergency services, and accrue increasing road repair and maintenance costs. The project concept was evaluated using Snohomish County's Climate Impacts Decision Support Tool in order to determine the potential flooding, temperature, water quality, and erosion impacts within the project area that should be taken into consideration during final design and implementation. The road elevation projects have been designed to accommodate frequently occurring high flow events. The ultimate elevations reduce the potential for unintended back-watering/downstream impacts that may be associated with changing local floodplain conveyance characteristics in the area. The new road elevation is anticipated to reduce road closure by 75%. Using the FEMA Benefit-Cost Assessment software, a 75% reduction in road closures at a rate of \$40/hour, the savings to the over 600 residents is significant at \$1,104,000. Project also saves the County and partners thousands of dollars per year responding to road closure and clearing debris. This task also proposed to restore up to 30 acres of South Slough which will slow and disperse side channel flows. The replacement of a fish passage barrier along Mann Road and failing culverts (task 2.2) in the Haystack Creek area will provide additional flood conveyance benefits.

TASK 2.3 – Sultan Reach Acquisitions – Higher intensity and more frequent flooding, coupled with a loss of riparian forest along riverbanks, has also led to rapid erosion of farmland in several parts of the Reach. Over the last two decades, 100 properties subject to repetitive flooding have been acquired from willing landowners in the vicinity of Shinglebolt Slough and Sky River Slough. (See Attachment 1b) We have established an Area of Interest, which includes an estimated 340 acres of land with an assessed market value of over \$3.7 million. (See Attachment 1d). Within that Area of Interest, the acquisition of up to 200 acres prone to repetitive flooding will enable willing landowners to divest from properties in the flood hazard zone. Acquisitions will reduce the potential to encourage new development in the

**Flood Hazard/Risk Reduction**

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floodplain while protecting existing infrastructure, create a buffer between the river and agricultural enterprises, and enabling consolidation of agricultural operations in defensible locations. One willing landowner in the Area of Interest owns about 40 acres that repetitively floods. Although their house is elevated, the barn located on the property continues to flood and they have lost about 5 cars during high flow events. In addition to the acquisition/easement opportunities in the frequently flooded areas of Shinglebolt Slough and Sky River Slough, this proposal is meant to foster collaboration with other willing landowners in the focus Reach, including the Thunderbird Resort and River King Estates which are two other areas that have repetitively flooded, to explore channel migration and flood risk reduction options.

**TASK 3 – Predict Future Hydraulics/Hydrology and Flood Hazard Risk –** Basin scale hydrologic modelling (task 3.1) will describe future river discharge/flow, allowing reach-scale hydraulic models and geomorphic assessments (task 3.2) to anticipate future threats that will be integrated into project design. Project alternatives identified in task 4 will be modelled to determine potential changes (i.e. flow patterns and extent) on the landscape. The geomorphic assessment and flood hazard risk analysis will show avulsion risks that will inform priority locations for acquisitions/easements and the removal/ of shoreline hardeningreduction of bank stabilization in the Sultan Reach as well as other subreaches along the Lower Skykomish River.

**TASK 4 – Advancing Integrated Floodplain Management– Integrated Floodway Design** (task 4.1) will select 30% designs that will reduce flood hazard risk to agricultural properties and civil infrastructure while also providing ecological benefits by reducing fish habitat limiting factors. for flood conveyance and river migration that prevents property damage through relocation of critical infrastructure, while identifying cost effective strategies for redirecting river channel evolution under increasing flood intensity. As outlined in the Lower Skykomish Reach Scale Plan, below is a list of potential actions that could be evaluated to reduce erosion and flood damage to farms/residences in the most appropriate locations within the Reach:

- Increase or strengthen riparian zone protection
- Add flood fencing and riparian re-vegetation
- Excavate Restore historic side-channels to provide flow conveyance and habitat
- Provide incentives in the form of property acquisitions/easements to landowners in order to reduce flood risk in high hazard areas
- Use large woody debris in mid-channel engineering log jams as opposed to bank revetments, bank stabilization, and rip rap

However, these projects also have risks to adjacent properties upstream or downstream that must be fully understood before implementing this type of action. The analysis of upstream and downstream impacts of project alternatives will take place during the design process and will be informed by the modelling deliverable proposed in Task 3.

**TASK 4.2 –** The Snohomish Conservation District, under advisement of the farmers comprising the Agriculture Resilience Plan Steering Committee and in coordination with the Project Integration Team, will identify priority agricultural resilience needs throughout the watershed. This will include working with landowners and the Project Integration Team to develop 30% designs for three projects that help address impacts on agriculture from changing climactic conditions (flooding, groundwater levels, and salt water intrusion) with the goal of reducing

additional costs (i.e. flood damages) in the future. The design life for large-scale projects is over 30 years.

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Floodplain Ecosystem Protection or Restoration

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**Scoring Information**

This section is worth up to 60 total points. There are 2 components to the Floodplain ecosystem protection question. Each is worth up to 30 points. You must score at least 30 points in this section to qualify for funding.

**Guidance**

Describe the ecological benefit of the project, its significance, and the ability of the solution to address the overall need in the project area or watershed. Examples include, but are not limited to, reconnecting floodplains, salmon recovery actions, habitat restoration, Channel Migration Zone protections, etc. Evidence of ecosystem benefits include floodplain (including estuary) habitat type (e.g., wetland, side channel, forest) and area restored (# acres), floodplain area protected from bank armoring (# of acres), floodplain area protected from development or other land use change (# acres), hardened bank removal or levee/riprap removal (linear feet), levee setbacks constructed (linear feet, # acres), new side channels or reconnection of old side channels (linear feet or storage volume), salmon species benefitted (# of listed, non-listed species). Secondary evidence includes culvert replaced to restore fish passage or increase conveyance, logjam and or wood structures installed, riparian area planted, and other project-specific goals.

**1. Describe the beneficial ecological impact provided by the project. (0 – 30 points available)**

This proposal combines actions to achieve immediate ecosystem benefits with those that are an important step to achieving a long range vision for restoration of habitat-forming natural processes.

EXISTING HABITAT CONDITIONS: Nine salmonid species live in the Snohomish basin: Chinook, steelhead, bull trout (ESA listed) and coho, chum, pink, riverine sockeye, rainbow, cutthroat trout and mountain whitefish. Of these, Chinook, steelhead and bull trout are threatened species under the Endangered Species Act. These species support Treaty-protected fisheries of the Tulalip Tribes for commercial, ceremonial and subsistence harvest, as well as non-Treaty commercial and recreational fisheries.

The Skykomish River hosts the highest concentrations of spawning Chinook in the Snohomish system and the Lower Skykomish River reach contains some of the best habitat in the Basin for Chinook and other salmonids. The Sultan Reach, immediately downstream from the multi-channel Braided Reach, a key spawning area for Chinook, pink, and chum salmon, as well as steelhead, provides important rearing habitat and is identified as a top-tier priority for increasing Chinook salmon productivity in the basin (SBSRF 2005). Capacity for rearing is limited as the reach has been significantly modified by and for human use. Transportation corridors, levees, bank revetments, undersized culverts and other floodplain modifications restrict the river and slough's natural movement across the floodplain, have simplified the river channel, disengaged side channels and removed or restricted features that contribute to habitat quality and complexity. Several indicators of habitat quality are rated as "not properly function" due to extensive bank modifications, sparse wood debris, and the resulting lack of suitable habitat. Progress on recovery goals identified in the Salmon Plan and adopted in the Puget Sound Action Agenda (2016) are lagging, particularly in the mainstem. Specifically, the 10-year habitat restoration targets (set in 2005) for restored edge and off channel habitat are

Floodplain Ecosystem Protection or Restoration

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severely lagging.

**CLIMATE CHANGE:** Overall, the Lower Skykomish River has met or exceeded water quality expectations and was of lowest concern for every year except 2015. 2015 was an extreme low flow and drought year, which may represent future conditions with climate change. Water temperature is a concerning criteria in the reach and may be (or become) a limiting factor for salmonids within the reach. Furthermore, changes in the frequency and intensity of flooding is anticipated to increase potential for redd scour. Juvenile salmon that emerge from redds in or upstream of the Lower Skykomish River Reach are also susceptible to high, flashy flows, which have the potential to flush juveniles downstream into larger waterbodies where their small size can decrease their chance of survival.

**RESTORING HABITAT & CONNECTIVITY and IMPROVING RESILIENCE:** The Salmon Plan outlines recovery strategies to restore natural river processes that create and maintain complex salmon habitat through the removal of human constraints and to reconnect the river to its floodplain and off-channel habitat. The reestablishment of native vegetation to provide natural bank edge and future shading and wood contribution as well as the introduction of woody debris to compensate for the lack of wood in the system and the time it will take for newly planted areas to grow and contribute wood to the system is also identified as important for improving salmon habitat. (SBSRF 2005) Providing flood refugia, restoring floodplain connectivity, restoring stream flow regimes and reconnecting side channels are most likely to ameliorate stream flow and temperature changes and increase habitat diversity and population resilience. (Beechie et al 2013)

**PRIMARY BENEFITS – Task 2.3 Acquisition - South/Shinglebolt Slough** acquisitions will focus in the Sultan reach. Acquisition opportunities will be pursued with willing landowners to protect riparian buffers and shift land ownership patterns that will create future opportunities to restore natural river habitat-forming processes. Immediate action on acquired properties to remove invasive species and improve floodplain and riparian health with native plantings will be pursued.

Task 4.1 Integrated Floodway Designs will incorporate elements focused on habitat improvement including: protection or promotion of natural processes to sustain, improve, or restore low flow; rip rap removal and excavation and reconnection of about 2,600 lineal feet of historic side channel at Shinglebolt Slough to provide high flow flood refuge, and improved floodplain connection and conveyance; and placement of woody debris to improve habitat conditions and complexity. Specific design elements will focus on restoration opportunities created through the completion of task 2.3 acquisitions. Improving fish access to diverse side channel habitat and improving the quality of that habitat will be a driving strategy. Side channels increase edge habitat, generally have good water quality, provide shallow water predation refugia, flood refugia, and provide diverse food sources. WRIA 7 salmon recovery technical committee members will engage in the Project Integration Team to support the development of the integrated floodway designs and ensure that designs incorporate elements that improve salmonid habitat and address limiting factors in the reach.

**SECONDARY BENEFITS - TASK 2.1** Replacement of the undersized culvert at Devil's Elbow with a 12 ft box culvert will improve fish passage to about .5 miles of forested stream with documented chum, Chinook, coho, steelhead, bull trout use. During high flows,

**Floodplain Ecosystem Protection or Restoration**

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backwaters and small streams such as the one at Devil's Elbow provide valuable habitat for salmonids seeking refugia.

**TASK 2.2 Replacement/removal of three undersized and failing culverts.** Based on data from WDFW's Salmonscape database, the proposed project would open up over 2.6 miles of potential forested habitat for Steelhead, Coho, Chinook, Pink, and Chum Salmon. Replacement of the fish passage culverts will improve access to varied and complex habitat. Upstream of Mann Road, Haystack Creek is entirely forested. These robust streamside forests provide extensive thermal cover to Haystack Creek, and contribute greatly to in-stream habitat complexity through the input of large wood, overhanging vegetation, and finer scale organic matter. The proximity of the culverts to the mouth of South (Tychman) Slough, a side channel of the Lower Skykomish River, makes the habitat affected by these barriers important winter refugia. During high flows, Haystack Creek backwaters, and provides valuable habitat for salmonids seeking refuge from flood flows.

**Task 2.3 Riparian Buffer Planting and Floodplain Forest Health Restoration - 30 acres of invasive removal and riparian buffer plantings on South (Tychman) Slough and the remaining unforested length of Haystack Creek will introduce increased shade, ensuring the stream and slough remain cool in the summer and moderate in the winter. Eventually woody debris will be introduced to support increased habitat complexity. Note that these plantings will complement previous plantings on the entire length of Haystack Creek from the outlet to South (Tychman) Slough upstream to the eastern end of the culvert G, re-forested through the Conservation Reserve Enhancement Program and with DOE funding (within the last five years (DOE G1200206).**

**2. Describe the completeness & durability of restoration/protection/floodplain function the project provides. (0 – 30 points available)**

This proposal combines actions to achieve immediate ecosystem benefits with those that are an important step to achieving a long range vision for restoration of habitat-forming natural river processes.

**TASK 2.1 Replacement of the undersized culvert at Devil's Elbow site c (see 2d) with a 12 ft concrete box culvert meeting fish passage requirements will be installed at site C (see 2d). The estimated lifespan of the structure is 50 years. Polyethylene culverts will be installed at other sites, with estimated lifespans of approximately 50 years as well. Upstream habitat will be opened up into perpetuity.**

**TASK 2.2 Replacement of the undersized culverts at site C and E (see 2b and 2d), with a 35 ft bridge have an estimated lifespan of 50 years. Removal of the culvert at site D will return natural condition in to perpetuity.**

**TASK 2.3 Restoration of floodplain and riparian buffer is expected to remain in a natural condition into perpetuity. Acquisitions and conservation easements will provide protection of restored riparian buffer and floodplain into perpetuity. The acquisitions will enable eventual implementation of floodway designs that restore natural processes, allowing the river room to move in to perpetuity. Riparian plantings - Snohomish County has a well-established floodplain and riparian plant community restoration program. 100s of thousands of native trees and shrubs have been planted on successful restoration projects across the county over the last 20 years. The**

**Floodplain Ecosystem Protection or Restoration**

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expected survival is 80% survival over an establishment period of 5 years. Completed planting projects will be assessed using an established and published Vegetation Monitoring Protocol over regular intervals for at least 10 years post planting. Methods and strategies are modified through adaptive management strategies

Task 3.1 The hydraulic and hydrographic modeling intended to project impacts of changing climatic conditions. TASK 3.2 The geomorphic assessments intended to project potential change and hazard conditions 50 years out. The modeling and assessment will inform effects of reach scale processes on channel morphology and will be utilized to inform TASK 4.1 integrated floodway designs. The floodway designs will incorporate changing conditions, intending to promote long term ecosystem health and hazard and habitat resilience on the landscape. The formation of the coordinated Project Integration Team members will support projects emerging from the integrated floodway designs work together in a complementary fashion. The team will also help prioritize and sequence habitat actions along the reach to maximize efficient and effective use of available resources.

Additionally activities focused on outreach and education of landowners, decision makers and key stakeholders will lay the groundwork for improved community understanding of changing climatic and river systems, setting stage for increased understanding, engagement and support for integrated floodplain management.

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**Demonstration of Need and Support**

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**Scoring Information**

This section is worth up to 60 total points. There are 2 components to the demonstration of need and support section. Each is worth up to 30 points. You must score at least 30 points in this section to qualify for funding.

**Guidance**

Projects shall be consistent with existing plans or planning efforts (e.g., floodplain management plans and habitat recovery plans. Applicants need to demonstrate that project is consistent with the sequencing of local work plans and priorities and aligned with watershed discovery work. Integrated floodplain projects, by their nature, require that a variety of interests and organizations coordinate and collaborate to develop projects. All project proponents must engage the relevant entities responsible for both flood risk management and ecosystem recovery. Projects opposed one or more of these entities will not be considered for funding. Please describe the process you use to engage stakeholders. More points are awarded for supported and prioritized projects in adopted plans and strategies and for which letters of support are provided. For more detail, please see the link above to the Scoring Guidance document.

Upload Letters of Support at the END of the application in the Uploads Form, NOT WITHIN THIS QUESTION.

**1. Describe how this project is consistent with existing plans or planning efforts for the watershed. (0 – 30 points available)**

This project builds upon years of planning and collaboration by SLS partners within the Snohomish River basin and is highly consistent with key plans and planning efforts for the watershed. If funded, the project will implement project-scale actions recommended in the Snohomish River Basin Salmon Conservation Plan (Salmon Plan, 2005), the Restoration Element of the Snohomish County Shoreline Management Program (SMP, 2010), the Snohomish County Hazard Mitigation Plan (HMP, 2015) and the Lower Skykomish River Reach-scale Plan (LSRRP, 2017). It will also implement watershed-scale modeling and assessment activities that will fill important data gaps identified in the LSRRP, consistent with recommendations in the Snohomish Basin Protection Plan (SBPP, 2015), the HMP and the Snohomish-Stillaguamish LIO Ecosystem Recovery Plan (LIO Plan, 2016). Data generated by these activities will inform designs – by assessing and modelling potential changes to the landscape of a given action – for several multiple-benefit floodplain management projects in the Sultan Reach and will support ongoing development of the Agricultural Resilience Plan (Ag Plan, in progress) and future updates of plans such as the Snohomish River Comprehensive Flood Control Management Plan (CFCMP, 1999). Finally, the project will advance key components of the LIO Plan, the 2016 Puget Sound Action Agenda, and the regional Floodplains Implementation Strategy.

Below is a summary of how components of the proposed project are consistent with or supportive of existing plans and planning processes for the Snohomish River watershed.

**ROAD ELEVATIONS (TASK 2.1) and HAYSTACK CREEK IMPROVEMENTS (TASK 2.2)**

– Salmon Plan. The Salmon Plan identifies the reconnection of off-channel habitat as a top-tier priority for ecological recovery in the Lower

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**Demonstration of Need and Support**

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Mainstem Skykomish. The plan also recommends a strategy of scoping/completing habitat restoration elements on farmland in order to showcase benefits for the agricultural community.

– HMP. Objectives of the HMP include reducing the adverse impacts of disasters on isolated communities, reducing the adverse impacts of natural hazards to resource lands, and increasing the resilience of roads and other critical infrastructures to hazards. High-priority county-wide mitigation strategies in the HMP include elevating structures prone to increased frequency of flooding, providing emergency access within flood-prone areas, and improving stormwater management (e.g., replace undersized culverts) to prevent land use-caused increases in flood levels and to restore floodplain function.

– Ag Plan. The Ag Plan, which is currently under development, encourages the implementation of projects that improve drainage, reduce erosion, and increase flood conveyance on farmland.

– LSRRP. Tasks 2.1 and 2.2 are consistent with the LSRRP, which proposes strategies and actions that will allow stable agricultural uses to better co-exist with healthy fish habitat while minimizing potential flood damage.

#### SULTAN REACH ACQUISITIONS (TASK 2.3)

– Salmon Plan. The Salmon Plan identifies land preservation and riparian enhancement as top-tier priorities for ecological recovery in the Lower Mainstem Skykomish. In addition, the plan recommends a strategy of protecting and preserving current intact habitat on agricultural lands by using tools such as conservation and channel migration zone easements.

– SMP. The South Slough riparian restoration project, which will be partially implemented under Task 2.3, is listed as a high-priority restoration project in the 2010 Restoration Element of the SMP. Shinglebolt Slough restoration actions are also referenced in this element.

– SBPP. The SBPP recommends permanently preserving farmland within the Snohomish River basin as well as using acquisitions to decrease the number of private inholdings surrounded by public lands in the Lower-Middle Skykomish.

– HMP. Objectives of the HMP include acquiring high-risk parcels that could provide significant open space benefits such as the attenuation of the impacts of floods and beneficial environmental functions. High-priority county-wide mitigation strategies in the HMP include preserving and restoring floodplain and watershed ecosystem functions and services.

– LSRRP. The LSRRP identifies South/Shinglebolt Slough riparian restoration actions as key components of a multiple-benefit reach project package for the Sultan Reach.

– LIO Plan, 2016 Puget Sound Action Agenda, and regional Floodplains Implementation Strategy. The proposed project components are consistent with the Floodplains Implementation Strategy and regional and local priorities associated with the Puget Sound Action Agenda, specifically regional priorities FP1 and FP3 and local strategies SSLIO 2.1, SSLIO 10.1 and SSLIO 10.2. The project area is located in one of the 17 priority river floodplains and will contribute gains toward the floodplain recovery target for restoration and protection. Additionally, numerous NTAs proposed for the 2018 Action Agenda directly support activities outlined in this proposal, including NTA #'s 2018-0097, 2018-0399, 2018-0613, 2018-0623, 2018-0715, 2018-0741, 2018-0872, and 2018-0873.

#### MODELING (Task 3.1) and RISK ANALYSIS (Task 3.2)

– SBPP. The SBPP recommends conducting new hydrologic studies and geomorphic assessments in the Snohomish River basin to guide

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 Demonstration of Need and Support
 

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- salmon recovery planning. The plan also recommends integrating data on potential climate change impacts into project designs.
- HMP. High-priority county-wide mitigation strategies in the HMP include updating county flood hazard risk assessment data and methodology and considering best available climate science modeling in planning efforts. Information generated by Tasks 3.1 and 3.2 will feed into future updates of the HMP and CFCMP.
  - LIO Plan. The modeling (2018-0399) and geomorphic assessment (2018-0623) tasks are both NTAs that have been submitted as part of the 2018 Action Agenda and have been ranked highly by local reviewers.
  - LSRRP. Recommended next steps in the LSRRP include hydraulic modeling, a geomorphic assessment, and channel migration zone mapping in the Lower Skykomish Reach. The geomorphic assessment conducted in the Reach is almost ten years old and in need of an update, particularly in light of the significant high flows that occurred in the basin since the assessment was conducted. More recent technical analysis have improved the spatial and temporal accuracy of the fluvial geomorphic processes between RM 9.7 to 16. These results should be documented, applied to over RM 0 to 16, and integrated with an evaluation of floodplain hazards to provide a comprehensive basis for implementing multi-benefit projects.
  - Ag Plan. Modeling and assessment results will inform the development of the Ag Plan as well as designs for climate-resilient multiple-benefit projects.

## INTEGRATED FLOODWAY DESIGN (Task 4.1) and AGRICULTURE RESILIENCY (Task 4.2)

- SBPP. The SBPP recommends a strategy of scoping/completing habitat restoration elements on farmland in order to showcase benefits for the agricultural community.
  - HMP. Objectives of the HMP include reducing the adverse impacts of natural hazards to resource lands. High-priority county-wide mitigation strategies in the HMP include preserving and restoring floodplain and watershed ecosystem functions and services.
  - LIO Plan. Tasks 4.1 and 4.2 are consistent with local and regional strategies for designing integrated projects that promote community resilience as well as restore floodplain acreage.
  - LSRRP. The LSRRP identifies potential actions that could strengthen and support agricultural viability while reducing flood risks and improving floodplain habitat.
  - Ag Plan. Task 4.2 will implement the Ag Plan through the 30% design of three projects that will help landowners improve the agricultural resilience of their properties.

**2. Describe level of engagement with, and support of, relevant stakeholders. If attaching letters of support, provide context (not just “see attached”). (0 – 30 points available)**

The seven project tasks involve various levels of stakeholder engagement and support, all of which are beneficial to help preserve agricultural viability, improve ecological function and reduce flood loss in the Sultan Reach of the Skykomish River (RM 9-15). Successful implementation of the three early action tasks (2.1, 2.2 and 2.3) is dependent upon the site-specific engagement and participation of local stakeholders (landowners) while tasks 3.1, 3.2, and 4.1 rely upon the support and engagement of engineers, planners and resource

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**Demonstration of Need and Support**

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specialists from regional government agencies, tribes and NGOs. The completion of task 4.2 will occur as a culmination of efforts, derived from the modeling and analysis efforts in tasks 3.1, 3.2 and 4.1 and the local landowner engagement in tasks 2.1, 2.2 and 2.3.

Task 2.1 - Ben Howard/Mann Road elevation: Snohomish County held a public meeting on 2/13/15 with the residents of the Skyline View neighborhood (over 238 homes) to address the issues of road flooding and closures. Since then, Snohomish County has secured temporary construction easements from the residents along Ben Howard/Mann Road to complete the proposed road elevations.

Task 2.2 – Haystack Creek Culvert fish passage improvements: The SCD has undertaken a large restoration and conservation effort in the Haystack Creek area. With CREP and WDOE funding, the SCD has installed livestock exclusion fencing, a riparian buffer along the creek and an off-stream watering system. The local landowners are extremely interested in addressing fish passage barriers on their properties. Three culverts need to be replaced and a fourth needs to be removed. One landowner received RCPP funding through NRCS to replace 2 barrier culverts and remove a third but sufficient funding is not available to replace the last culvert.

Task 2.3 – Sultan Reach Acquisitions: Since 2015, Snohomish County has engaged Sultan reach landowners in ongoing conversations related to flooding impacts and multi-benefit solutions. In August of 2016 landowners were provided with a technical overview of engineered and process-based solutions that would reduce risk, provide habitat benefits, and give the river room to create self-sustaining habitat and lower geomorphic flood hazards. Between May and July of this past year County staff and partners met with individual landowners within the Sultan Reach to ensure they are personally informed about this grant application, and that their issues and needs have been verified. Nine landowners (15 parcels) within the acquisition area of interest were visited (see Attachments 1d and 3b). We have a SIGNED landowner acknowledgment form from one property owner (about 40 acres) within the area of interest (Attachment 1d and 3b). In the fall of 2018, the County is planning a “Floodplain Sultan Reach Workshop” with project partners and landowners. Topics of the workshop will include: an introduction to the 2-D modeling map series of the Lower Skykomish, the Snohomish River basin FbD grant goals and elements, and broader services currently available from SWM, SCD USDA, PCCFT and PUD.

Tasks 3.1 and 3.2 –2-D Modeling & Geomorphic Assessment - The Lower Skykomish River Reach-scale Plan outlines the importance of having better information regarding climate impacts and geomorphic risks. This modelling and assessment work will provide the County and SLS stakeholders with information to evaluate changes on the landscape with a given project alternatives. Project partners are supportive of this project element as evidenced by the letters of support. Both of these efforts are also NTAs and have been tiered highly following regional review, thereby exemplifying the regional importance of this work.

Task 4.1 – Integrated floodway design: The proposed modeling, geomorphic assessment and risk analysis, and integrated floodway design will benefit communities within the Snohomish River basin. The products of these tasks will increase residents’ understanding of current and future floodplain risks; stimulate land-use that incorporates a more natural river function; and build partnerships amongst landowners, agencies and organizations in order to preserve agricultural viability, improve ecological function and reduce flood loss. As such the

**Demonstration of Need and Support**

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proposed project has received letters of support from the Snohomish-Stillaguamish Local Integrating Organization, Washington State Department of Agriculture, the Snohomish Conservation District, the Snohomish County Sustainable Lands Strategy, the Tulalip Tribes, and the City of Sultan (see Attachment 3a).

Task 4.2 – Agricultural resilience design: In collaboration with the local farming community, the SCD will develop a strategy for farming in the floodway—such as a pattern of flood fencing that reduces flood impacts to fields—while maintaining inputs of fine sediments, and development of agricultural infrastructure and land ownership patterns that support long-term production farming. In order to implement the strategy the SCD will need to build upon the local stakeholder engagement that was established during the early action tasks (2.1, 2.2 and 2.3) and collaborate with agencies and organizations—such as those within the SLS Project Integration Team—to incorporate components that will be beneficial for farm, fish and flood elements.

During the development of the proposed project, the County engaged the Snohomish Sustainable Lands Strategy to include elements from their Lower Skykomish reach-scale plan (<https://goo.gl/9s37yJ>) as well as to incorporate identified gaps within the reach-scale plan and the Snohomish River Basin Salmon Conservation Plan (SBSRF 2005). In addition to SLS, the County collaborated with many entities including Snohomish Conservation District, Snohomish-Stillaguamish Local Integrating Organization, Snohomish Basin Lead Entity, Sound Salmon Solutions, Snohomish Farmland Protection Working Group, the City of Sultan, and the Washington State Departments of Natural Resources and Fish & Wildlife, as well as Floodplains By Design leaders at The Nature Conservancy, Puget Sound Partnership and Department of Ecology.

**Agricultural Benefits (AG Areas Only)**

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**Scoring Information**

This section is worth up to 30 total points.

**Guidance**

Floodplains by Design projects may be part of a reach or watershed strategy to address flooding, ecosystem benefits and agriculture. Agriculture areas are defined as areas where lands are in active production. Applicants should describe how they engaged agricultural interests, and how ag input was incorporated. Provide documentation of support for the project, (opposed projects will be removed from consideration). Provide evidence of such agriculture benefits such as flood-safe areas for livestock and equipment during floods and protection from development.

Projects that accommodate future anticipated changes to land use, river flows, sea level rise and sediment delivery, and/or include a drainage improvement element in addition to flood risk reduction will receive higher scores than those that do not.

If your project is taking farmland out of production, you must demonstrate how the project will provide other means for a net gain to the local ag community in order to gain points in this category.

**1. This question is only for projects with direct benefits to agriculture. Please describe your projects benefits to agriculture. (0 – 30 points available)**

Farming and salmon productivity play a valued role in the history, culture, and economy of Snohomish County. The Sultan Reach includes multi-generational dairy operations, including an anchor business in the Lower Skykomish farm landscape, providing milk for Seattle-based Beecher's Handmade Cheese. Farmers depend on a critical area of field space within the floodplain to maintain operations and a network of community relationships that enable farming.

Snohomish county farmlands are zoned for development of a housing unit every 10 acres, creating continuous pressure for the subdivision of farming landscapes. Maintaining farm economies is a critical element of long-term floodplain management and regional food security. Floodplain open space in the Sultan Reach, maintained by farming economies, provides a potential for \$1 million a year in public ecological benefits such as water filtration, flood attenuation, fisheries habitat, and recreational opportunities.

Within the SLS forum, organizations and stakeholders have organized to create a joint approach to farmland conservation that will increase the number of voluntary transactions (easements and fee acquisitions) on priority Snohomish County farmlands. PCC Farmland Trust is leading this effort in collaboration with Snohomish Conservation District, Forterra, The Nature Conservancy, WDFW, and Snohomish County. The Farmland Conservation Strategy has been drafted and is currently being vetted prior to being approved by each partner organization. With input from local farmers and SLS, PCCFT has completed a countywide GIS prioritization of farmland for agriculture.

**Agricultural Benefits (AG Areas Only)**

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Attachment 1c displays the farmland conservation priorities along the Lower Skykomish River, including the Sultan Reach.

**TASK 2.1 Road elevations** – The road elevations will improve access to local farmers such as those identified within the Area of Interest in Attachment 1d. The County has secured temporary construction easements from impacted farmers in the Reach. The replacement of undersized culverts will also improve the conveyance of floodwaters and reduce flooding on adjacent properties, including farming operations.

**TASK 2.2 Haystack Creek Improvements** - This project will replace three fish passage barrier culverts on private property. Part of a larger restoration and conservation effort that the Snohomish Conservation District (SCD) has undertaken in the area over the past several years. Through the Conservation Reserve Enhancement Program (CREP) and Department of Ecology funding, SCD has installed livestock exclusion fencing, installed a riparian buffer along Haystack Creek, and installed an off-stream watering system to remove any need to water animals in the creek. The landowners are extremely interested in addressing the fish passage barriers on their property. One landowner with 3 culverts has been awarded \$207,000 funding through the Natural Resource Conservation Service's (NRCS) Regional Conservation Partnership Program (RCP). SCD and an additional \$250,000 through the Family Forest Fish Passage Program (FFFPP). Funding for a fourth private culvert in adjacent landowner has not been secured. Grant funding includes the replacement of two barrier culvert crossings and the complete removal of a third, but is not sufficient to complete the entire project, which is why additional grant funds are being requested through this proposal.

**TASK 2.3 – Acquisitions/Easements** – the acquisition of up to 200 acres in the South Slough/Shinglebolt Slough protects properties critical for the protection of agricultural enterprise in the valley. It provides a tool for providing compensatory land (i.e. swapping) that will allow for consolidation of agricultural lands in the most defensible landscape position. A variety of mechanisms will be employed. In addition to conservation easements and CREP buffers, some examples include:

- Fee simple acquisition with a buy- protect-sell option; a strategy designed to purchase farmland to get it off the market quickly, remove development potential through a conservation easement, then lease or resell back to farmers at a more affordable rate. This strategy, or variations on it, can ensure that key local producers maintain the land base their operations require to remain viable. Building in flexibility through leasing and lease-to-own options is also responsive to financial constraints of many small producers.
- Channel migration zone easement- a strategy designed to enable large rivers and their floodplains to function at their fullest potential (USACOE 2015). This pragmatic tool can help achieve conservation at larger scales by compensating landowners in return for giving up their right to install or maintain features that restrict a river's ability to naturally migrate and access floodplain areas.

**TASK 3 Predict Future Conditions** – The hydraulic/hydrologic models and geomorphic information will document the current and future flood hazard risks to agricultural land. It will also provide detailed information on climate impacts to our river system, allowing the Project Integration Team and local stakeholders to design projects that reduce flood impacts on property and agricultural land while restoring

**Agricultural Benefits (AG Areas Only)**

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salmon habitat in a sustainable and cost-effective manner.

**TASK 4.1 Integrated Floodway Design** – The Project Integration Team will consider design approaches that result in benefits to flood risk reduction, habitat restoration, and agricultural viability. The task will deliver 30% designs for an integrated project that maintains or enhances the viability of agriculture in the Sultan Reach.

**TASK 4.2 – Agricultural Resilience** – In collaboration with the local farming community the Snohomish Conservation District will develop a strategy for farming in the floodway, such as a pattern of flood fencing that reduces flood impacts to fields, while maintaining inputs of fine sediments, and development of agricultural infrastructure and land ownership patterns that support long-term production farming. These components and objectives will be integrated into the Integrated Floodway design. This includes working with landowners and the Project Integration Team to develop 30% designs for three projects that help address impacts on agriculture from changing climate conditions (flooding, groundwater, and temperature). At least one of these designs will be in the Sultan Reach.

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**Other Relevant Benefits**

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**Scoring Information**

This section is worth up to 30 total points.

**Guidance**

A successful project will offer additional compatible community benefits, such as improved water quality, increased public access and recreation, or other needs to a particular community. The additional benefit will be measured by strong links to relevant plans and demonstrated involvement of relevant stakeholders. Applicants should document the importance of the result produced, the ability of the solution to address the overall stakeholder need and the long-term improvement resulting from the project. More points will be awarded for significant beneficial impact on needs to recreation, open space and water quality improvement identified in adopted plans, than for other benefits with lower magnitudes of beneficial impacts or unclear impacts.

**1. Describe how your project maintains or improves water quality, public open space/recreation access, economic development, or other important local benefits or values which are compatible with the program intent. (0 – 30 points available)**

This project offers a wide variety of compatible community benefits, such as improved water quality, increased public access and recreation, and other needs. This additional benefit can be measured by strong links to relevant plans (i.e. the 2017 Lower Skykomish River Reach-scale Plan, 2010 Restoration Element of Snohomish County's Shoreline Management Program, and the 2005 Snohomish River Basin Salmon Conservation Plan) and can be demonstrated by the active involvement of many relevant stakeholders. The outcomes produced by this proposal provide important benefits and address many stakeholder needs related to sustainable improvements. These proposal components provide a significant beneficial impact on needs to recreation, open space and water quality improvement, as identified in adopted plans.

**RECREATIONAL BENEFIT**

Snohomish County is committed to a broad-based community partnership to develop a multi-purpose design for Steelhead County Park (see attachment 1d). Plans for the park are in conceptual phase. Task 3 will inform design for the park. The County and Project Integration Team will coordinate with Park planners to share Task 3 products and inform park design. Design of future Steelhead County Park will be incorporated into Task 4.1 integrated floodway design; designs include an alternative that would include side channel restoration. The scale of side channel restoration could lead to improved salmon and steelhead habitat. Snohomish County is among the top four counties in Washington State for outdoor recreation. Recently the County Parks and Tourism Department has convened the Skykomish-Snohomish Rivers Coalition to consider recreation access, safety, education on the Skykomish and Snohomish Rivers. Work performed under task 3 could inform the work plan for the.

**WATER QUALITY/TEMPERATURE IMPROVEMENTS**

Overall, water quality data show that the Lower Skykomish River met or exceeded expectations and was of lowest concern for every year except 2015. However, from 2005 to 2015, temperature exhibited less than favorable conditions more than 80% of the time. Water

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**Other Relevant Benefits**

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temperature is the most concerning criteria in the reach and is the primary focus of this section. Benefits from restoration elements such as riparian plantings and other south slough restoration elements. Easements offer sustainable roughness in primary areas that allow the river to naturally store sediment. Removal of shoreline hardening features and installation of riparian plantings reduce the erosive impacts to the shoreline while supplying the river with natural wood recruitment and shade for ESA listed salmon.

**SAFETY BENEFITS**

First responder access during a flood is a big concern for numerous citizens in the Sky Line View community. Both young and older families are cut off during a flood. Desperate community members sometimes try to cross these flooded roads -- there were at least three stranded vehicles in 2016 alone. Safety concerns are the highest priority. Actions proposed with Task 2.1 will also increase community access via reduction in annual road inundation events. Not only does the Mann Road elevations project increase emergency access and reduce road inundation by 75%, but the project also reduces the amount of income lost from access issues to the Skyline View Neighborhood.

**ADAPTIVE MANAGEMENT BENEFIT**

Work proposed in task 3 will inform updates to the Hazard Mitigation Plan, the Lower Skykomish River Reach-scale Plan, Snohomish County Climate Change Decision Support Tool, the Agricultural Resiliency Plan, the County's Comprehensive Flood Hazard Management Plan, and the County's Real-time Flood Warning System. The proposal elements further the regional floodplain restoration and protection goals identified in the 2016 Action Agenda. The proposal also supports Snohomish County's Puget Sound Initiative.

**COMMUNITY / STAKEHOLDER ENGAGEMENT BENEFITS**

- Increased capacity to develop communication tools will promote shared understanding of flood and hazard risk, and future climate change impacts. Improved stakeholder understanding of current and future conditions will increase engagement of key floodplain stakeholders and lay the foundation for stakeholder support for integrated floodplain management approaches, exploration of flood and hazard risk reduction alternatives, and agreement on integrated floodway design project alternatives. Attachment 1f illustrates the visually compelling product possible with 2-d modeling; a highly effective stakeholder communications tool.

- Increased capacity to facilitate an SLS Project Integration Committee and coordinate inter-organizational activities will improve collaboration and ensure timely progress on project deliverables.

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**Cost Effectiveness**

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**Scoring Information**

This section is worth up to 30 total points.

**Guidance**

Project will be awarded points for cost-effective projects that represent a good investment of public funds to achieve flood risk reduction, ecosystem benefits and compatible community benefits. Higher scores will be awarded to projects that are clearly and appropriately scoped and budgeted, minimize or eliminate future costs for maintenance, operation or emergency response.

a. Provide a detailed budget consistent with and appropriate for the scope and location. Any budget documentation may be uploaded at the END of the application in the Uploads Forms, not within this question. Describe the methods used to develop the budget, and details to show the benefits are significant relative to the cost.

b. Demonstrate how you have a clear and appropriate scope of work, all necessary project work has been incorporated and contingencies are identified and planned for.

c. Include post-project considerations, such as anticipated reductions in infrastructure maintenance and flood damage costs under future conditions.

**1. Describe how your project represents a good investment of public funds to achieve multiple benefits.**

Individual proposed tasks were identified as priorities within existing plans and are developed to offer the largest possible return for public investment.

Task 2.1 Mann Road and Ben Howard Road Elevations - Project has been evaluated using Snohomish County's Climate Change Decision Support Tool and a cost benefit analysis to determine the design that would provide the most community benefits without increasing risk. The project will reduce road closures as well as associated maintenance/clean-up costs by 75%, and improve emergency access to Skyline View Neighborhood. Based on a 75% reduction in road closures, at a rate of \$40/hour (prevailing wage estimates in FEMA Benefit-Cost Assessment software), the savings to over 600 residents is significant at \$1,104,000. Project budget is based on standard engineering cost estimates at the 30% design stage and include contingencies through final design and construction. The County has completed a hydraulic study, the project will be at 30% design in 2018, and it is anticipated to be at the 60% design stage at the time of potential FbD funding award.

Task 2.2 Haystack Creek Improvements – The estimated project costs are based on Snohomish Conservation District (SCD) experience completing similar bridge construction projects and information provided by NRCS engineers. The estimated project cost is based on the

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**Cost Effectiveness**

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engineer recommendation of a 35-foot bridge for the downstream crossing, and complete removal of the middle crossing (Peterson 2). The upstream crossing is fully funded for replacement through FFFPP. The estimate for the Smith crossing is based on the fact that it will be sized similarly to the Peterson 1 crossing, if not slightly smaller. This project is part of a larger restoration and conservation effort that SCD has undertaken in the area over the past several years and has received funding from several sources including Ecology funding (see Attachment 4a). Existing funding resources already allocated to this project make it a great return on investment and ensure that the process of designing, permitting, and contracting for the projects prior to FbD funds is well under way before FbD funds would be available. This expedited timeline will allow project completion to occur quickly and efficiently once funds are made available. SCD's replacement and removal of 4 culverts in the Haystack Creek will improve fish passage to 2.6 miles of forested stream.

Task 2.3 Sultan Reach Acquisitions - Budget estimate are based on assessed market values and landowners in the Sultan Reach have been consistently engaged since 2014/2015. Snohomish County utilizes acquisition assessments such as the Skykomish Basin Land Protection Assessment and Mapping Project led by Forterra. South Slough riparian plantings are based on the acreage estimate (up to 30 acres), planting materials, and labor costs. The estimated project cost for this project is based on reliance on least expensive plant material types, primarily bareroot and live stake stock. The County has an established floodplain and riparian plant community restoration program. The expectation is 80% survival over an establishment period of 5 years. Establishing planting projects are assessed using the County's established and published Vegetation Monitoring Protocol, over regular intervals for at least 10 years post planting.

Task 3.1 2-D Hydraulic and Hydrologic Modelling - The modeling project will identify floodplain conveyance pathways during a wide range of flow events and enable more accurate delineation of flood hazard areas. This information will update and increase the sophistication of the flood hazard information available for the Snohomish Basin which can then be used to inform floodplain stakeholder conversations, negotiations, and actions, aid in the development and implementation of long term land use, hazard mitigation, and salmon recovery plans, as well as support future restoration project siting and design. Ultimately reducing costs due to flooding issues, all while achieving multiple benefits to the public. The combination of the proposed hydraulic/hydrologic modeling work will improve the regional understanding of current river/habitat conditions as well as enable a better understanding of how regional river processes and habitat conditions may change in the future due to climate change. The water-shed scale approach to this analysis allows for the assessment of potential impacts on projects throughout the basin as opposed to one reach of a river.

Task 3.2 Geomorphic Assessment and Risk Analysis – The scope of the geomorphic assessment and risk analysis of the Lower Skykomish River has been expanded beyond the Sultan Reach down to river mile 0. This scope expansion allows the use of this information for multi-benefit project development along additional sub-reaches of the Lower Skykomish River. Assessing the entire river as opposed to only a reach of the river saves time and money as the County and partners begin to look at other multi-benefit solutions to build from work in the Sultan Reach. The County has experience conducting and budgeting for geomorphic assessments, having successfully completed the geomorphic assessment for the Lower Snohomish River with a previous Floodplains by Design grant. Filling these 2-D modelling and risk assessment gaps will inform resilient project designs that control long-term maintenance costs. Analyses improve hazard mitigation planning

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**Cost Effectiveness**

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and will inform resilient designs for the Steelhead County Park.

Task 4.1: Integrated Floodway Design - Led by the Integration Team Coordinator, the County and SLS partners will perform a broad collaborative outreach soliciting and affirming the interest of willing landowners, and will be evaluating and prioritizing projects that emerge from the task 3 modelling and assessment efforts. The modelling and assessment work (task 3) can be used to assess changes on the landscape, to prioritize actions, and will lead to the identification of an Integrated Floodway Project as well as up to three agriculture resiliency projects and the associated 30% design plans. Collaboration and leverage (match and people) will help contain costs for every task proposed. More integrated working relationships will also help ensure quality and cost control across County departments and external partners. Likewise, the Project Integration Team (task 4) approach reduces opportunity costs attributed to non-action, insufficient, and belated action and this two year grant period of performance offers a timeframe and benchmarks for institutionalizing this Project Integration Team approach across partnering entities.

Task 4.2: Designing agriculture resiliency projects is cost effective because they allow farmers to plan for the future and manage risk in ways that will sustain the viability of their operation. The resiliency planning effort involved acquiring cost-effective and scale-appropriate climate modeling data, disseminating this information to decision makers and the public, and scoping climate-resilient multi-benefit projects to build agricultural resiliency in the County.

Cost breakdowns for these tasks have been attached to this application (see Attachment 4c).

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**Readiness to Proceed**

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**Scoring Information**

This section is worth up to 30 total points.

**Guidance**

Projects are scoped to do the next logical step(s) that can be completed in a 2-year timeframe, are ready to proceed immediately upon notification of funding and sponsors/partners have the capacity to complete the project successfully and maintain it over time. Applicants with current FbD funded projects which are not considered to be moving forward in a timely fashion cannot score higher than 10 points in this category.

Please describe the overall project process, and how the steps proposed fit into the larger life of the project. Include information on the skills and experience of the project team and the ability to complete the work and complete the project. Provide and describe schedules and deliverables, and if project is acquisition only, a clear plan outlined for successful subsequent floodplain restoration. Also depict a long-term maintenance plan.

Demonstrate a certain level of readiness to proceed for their project by addressing the following criteria in this section:

- a. Is the project shovel ready? (Significant engineering and design work can be completed and permits in place so the construction can commence within one year of grant award or the next available fish window).
- b. Is the project acquisition ready? (Do you already have an appraiser's estimate of value?)
- c. Is the project design ready? (Do you have a completed conceptual and preliminary design by the time of grant award).
- d. Is the project appraisal ready? (Have you had positive discussions with landowners and secured a signed Land Owner Acknowledgement form?)

**1. Readiness to proceed as soon as funded, with necessary capacity in place, and clearly described project schedule and deliverables. (0 – 30 points available)**

This project builds upon years of planning and collaboration by SLS partners within the Snohomish River basin and is highly consistent with key plans and planning efforts for the watershed including the Snohomish River Basin Salmon Conservation Plan (2005, SRBSCP), the Restoration Element of the Snohomish County Shoreline Management Program (2010, SMP), the Snohomish County Hazard Mitigation Plan (2015) and the Lower Skykomish River Reach-scale Plan (2017, LSRRP). Additionally, the project will advance key components of the Snohomish-Stillaguamish LIO Ecosystem Recovery Plan and the Puget Sound Action Agenda 2016 Puget Sound Floodplains

## Readiness to Proceed

## Implementation Strategy.

The County and SLS partners (e.g., SCD) have significant experience in implementing projects with acquisition and restoration, and planning components. Examples of similar completed and ongoing projects include:

- Moga Back-Channel Connection, Snohomish Conservation District (PRISM #s 14-1404, 15-1198)
- South Fork Skykomish Acquisitions, Forterra (PRISM #16-1632)
- Culvert replacements, Dubuque Creek and Evans Tributary, SCD (PRISM #s 12-1816, 12-1927)
- Lower Skykomish River Restoration Project, Snohomish County (PRISM #10-1338)
- Skykomish River Braided Reach Restoration Assessment, Snohomish County (PRISM #02-1609)
- Riley Slough Restoration Project, SCD (PRISM #99-1402)
- Tychman (South) Slough Riparian Enhancement, SCD (DOE Grant #G120026)
- Integrated Floodplain Management, Snohomish County (NEP Grant NTA 2016-0310)
- Agricultural Resilience Plan, SCD (Partial award from NEP Grant NTA 2016-0074, remaining funding requested as part of this grant application)

The current status of each task and the expected progress achieved with 2019-2021 Floodplains by Design funding are described below:

Task 2.1 – Ben Howard/Mann Road Elevations: The County will have completed conceptual and preliminary designs by the time of the grant award announcement (30% designs are expected in October of 2018). Additionally, the County has secured temporary construction easements from all property owners impacted by project construction. The project design schedule, detailed in the scope of work section, outlines the completion of 60% designs prior to the grant award in May of 2019. Task deliverables are 60%, 90% and final designs; as built plans; and before and after photos of culvert replacement.

Task 2.2 – Haystack Creek fish passage improvements: Haystack Creek Improvements are part of a larger restoration and conservation effort that the Snohomish Conservation District has undertaken in the area over the past several years. Through the Conservation Reserve Enhancement Program (CREP) and Department of Ecology (DOE) funding, SCD has installed livestock exclusion fencing, installed a riparian buffer along Haystack Creek, and installed an off-stream watering system to remove any need to water animals in the creek. The landowners are extremely interested in addressing the fish passage barriers on their property. One landowner with 3 culverts has been working with the SCD to secure grant funding. All three crossings were surveyed by WDFW in January 2018 and determined to be fish passage barriers. Partial funding for the culverts has been secured - \$60,000 funding through the Natural Resource Conservation Service's (NRCS) Regional Conservation Partnership Program (RCPP) for 2 culverts and an additional \$250,000 through the Family Forest Fish Passage Program (FFFPP) for a third culvert. Funding for a fourth private culvert for an adjacent landowner has not been secured. Grant funding includes the replacement of two barrier culvert crossings and the complete removal of a third, but is not sufficient to complete the entire project, which is why additional grant funds are being requested through this proposal. No design work has yet been completed for

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**Readiness to Proceed**

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two NRCS sites, although they have been assessed and evaluated by engineers and biologists from NRCS, WDFW, and SCD. The current plan is to complete the replacement of the Peterson 3 crossing in 2019 with FFFPP funds, and also replace and remove Peterson 1 and 2, respectively, at the same time if funding allows. NRCS funds can be used to begin the design and permitting processes prior to the availability of FbD funds for construction.

Task 2.3 – Sultan reach acquisitions – This effort builds upon several years of County and SLS partners engaging with landowners in the reach (Attachment 3b). During the summer of 2018, County staff visited the majority of the landowners in the area of interest (Attachment 1d) to notify them of the grant opportunity and to verify issues/needs. We have a signed landowner acknowledgement form (Attachment 3b) from a property owner who owns about 40 acres in the South Slough area. The County and SLS partners are working on acquiring the funds to purchase the property prior to a potential FbD grant award.

Task 3 – 2-D Hydraulic/hydrologic modeling & Geomorphic assessment and risk analysis: Implementation of modeling and assessment activities that will fill important data gaps identified in the Lower Skykomish River Reach-scale Plan, consistent with recommendations in the Snohomish Basin Protection Plan (2015), the Snohomish County Hazard Mitigation Plan and the Snohomish-Stillaguamish LIO Ecosystem Recovery Plan (2016). Data generated by these activities will inform designs (by assessing and modelling potential changes to the landscape of a given action) for several multiple-benefit floodplain management projects in the Sultan Reach and will support ongoing development of the Agricultural Resilience Plan and future updates of plans such as the Snohomish River Comprehensive Flood Control Management Plan (1999). The County has completed modelling and design work that will be integrated with the new modelling and assessment information to tell a watershed story about current and future conditions.

Task 4.1 – Integrated floodway design – The South Slough and Shinglebolt Slough projects have been identified in the LSRRP. They are also identified in the SRBSCP and the Restoration Element of the County SMP. Acquisition and easement opportunities create the foundation for implementation of these projects. This proposal will provide 30% designs for an integrated project that balances the needs of the fish, farm, and flood community. Snohomish County and SLS partners have been working toward an integrated vision by building trust among the floodplain community. The Integration Team is essential to ongoing identification and prioritization of multi-benefit projects.

Task 4.2 – Agricultural resilience design – Through a funded Near Term Action (EPA NEP funds), SCD has been meeting with farmers through established organizations to learn more about the types of information farmers need to plan for the future and manage risk, and to help develop an approach for the Agriculture Resilience Plan effort. The effort will involve acquiring cost-effective and scale-appropriate climate modeling data, disseminating this information to decision makers and the public, and scoping climate-resilient multi-benefit projects to build agricultural resiliency in the County. This proposal finalizes this work culminating in 30% designs for three resiliency projects.

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**Leverage Opportunities**

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**Scoring Information**

This section is worth up to 10 total points.

**Guidance**

Projects are scored on demonstrated coordination of other funding programs and investments, such as SRFB, FCZDs, Dike Districts, TMDLs, WWRP, ESRP, NEP, and other funding sources as applies. Evidence of this will be based on the amount and diversity of the leveraged funding sources.

**1. Describe how your project leverages existing investments. (0 – 10 points available)**

Matching contributions from federal, local and private sources total more than \$1.9 million and represent 29% of this project budget.

**TASK 2.1 ROAD ELEVATIONS** - This project leverages over \$1 million in County funds. The project has secured temporary construction easements and is moving toward completion of 30% designs in Fall 2018.

**TASK 2.2 HAYSTACK CREEK FISH PASSAGE IMPROVEMENTS** - Project will replace 4 privately owned failing culverts. One of the culverts being replaced is funded by Family Forest Fish Passage Program (FFFPPP) (Attachment 4a). They are part of a larger restoration and conservation effort that the Snohomish Conservation District has undertaken in the area over the past several years. Through the Conservation Reserve Enhancement Program (CREP) and Department of Ecology funding, SCD has installed livestock exclusion fencing, installed a riparian buffer along Haystack Creek, and installed an off-stream watering system to remove any need to water animals in the creek. The landowners are extremely interested in addressing the fish passage barriers on their property. One landowner with 3 culverts has been awarded \$207,000 funding through the Natural Resource Conservation Service's (NRCS) Regional Conservation Partnership Program (RCPP). Funding for a fourth private culvert in adjacent landowner has not been secured. Grant funding includes the replacement of two barrier culvert crossings and the complete removal of a third, but is not sufficient to complete the entire project, which is why additional grant funds are being requested through this proposal.

**TASK 2.3 ACQUISITIONS** – The County has acquired over 100 properties in the South/Shingle Bolt Slough location. That area will be the site of the future Steelhead County Park. Although not included in the match, many of those properties would count as “historic match.”

**PREDICT FUTURE RISK (TASK 3 ACTIONS)** – This work leverages existing, County (Floodplains by Design/Coordinated Investment Grant from 2014) and SCD led, 2-D modelling work and geomorphic assessments completed elsewhere in the Snohomish Basin. Modeling outputs and risk analysis can be used to inform land use planning, refine existing hazard mitigation plans, and generally result in long-term cost savings by account for future conditions in a rapidly changing climate. This work leverages \$150,000 of County funds. The modelling and assessment work are both Near Term Actions and could receive federal (EPA) funding prior to a potential FbD grant award and that funding could be used as match.

**Leverage Opportunities**

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ADVANCING INTEGRATED FLOODPLAIN MANAGEMENT (TASK 4 ACTIONS) - Implementation of Task 4 and subtask 2.3 elements relies on the Project Integration Team involvement leveraged from project partners. Funding requested for the Project Integration Team Coordinator, as part of the Integrated Floodway Designs, will leverage the resources and staff capacity of multiple partners and allow them flexibility to work on this specific Sultan Reach effort. The finalization of the Agricultural Resiliency Plan and development of up to three 30% designs for agricultural resiliency projects leverages funding from EPA's National Estuary Program for the development of most of the Agricultural Resiliency Plan (Attachment 4a). This task also leverages County funds.

**Scoring Information**

This section is worth up to 5 total points. (0 points are awarded for projects NOT in Puget Sound Priority Floodplains)

**Guidance**

Projects are scored if they are in the following areas:

- Nooksack
- Samish
- Skagit (includes Sauk/Suiattle)
- Stillaguamish
- Snohomish-Snoqualmie (includes Skykomish)
- Lake Washington / Cedar Sammamish
- Green / Duwamish
- Puyallup
- Nisqually
- Deschutes
- Skokomish
- Mid-Hood Canal: Dosewallips, Big Quilcene, Duckabush and Hamma Hamma
- Elwha
- Dungeness

**1. Is the project located in a Puget Sound Priority Floodplain?**

Yes

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**Small Projects**

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**Scoring Information**

This section is worth no additional points, but a response is required.

**Guidance**

Projects with a total grant amount less than \$500,000 can qualify for consideration in a small projects category. Please indicate below whether this project meets that criteria.

**1. Does this project fall within the Small Projects category? (0 points available)**

Yes

No