SKAGIT BASIN 2008 THREE-YEAR WORK PROGRAM
DRAFT May 2, 2008

Overview

The *Skagit Basin Three-Year Work Program (3 Year Project List)* identifies a comprehensive set of actions targeted at the recovery of Chinook salmon populations in the Skagit watershed. This 2008 draft updates the Habitat Capital Projects and Research portions of the list. Updates related to Harvest and Hatchery operations from the co-managers were not received in time to review or include, and those portions are unchanged from last year. Only this and the following section (pages 1-3) of the supporting narrative have been updated. Once all the parts have been received, the information will be compiled and checked and the entire narrative updated and the updated cost estimates received will be used to inform the regional 2009-2011 biennial request.

Habitat capital projects were updated by the Skagit Watershed Council, the lead entity for WRIAs 3 and 4, through the Restoration and Protection Committee, and a research group was convened to update the Research project list. Updates on the 2007 draft were developed by the Skagit Watershed Council (Watershed Council), working with the Department of Fish and Wildlife, Skagit River System Cooperative and Seattle City Light. The 2006 draft was prepared by the Watershed Council with assistance from the Washington Department of Fish and Wildlife and Seattle City Light and with information provided by Skagit River System Cooperative, The Nature Conservancy, Skagit Land Trust, Skagit Fisheries Enhancement Group, Skagit Conservation District, Skagit County, US Forest Service and Western Washington Agricultural Association.

This Work Plan takes as its foundation the *Skagit Chinook Salmon Recovery Plan*, which was developed by the Skagit River System Cooperative (SRSC) and Washington Department of Fish and Wildlife (WDFW). Additional habitat and research projects, as well as community-building, capacity-building and outreach programs, have been added. The proposed actions also provide valuable habitat benefits to non-listed species including pink, chum, and coho salmon.

Changes to the Three Year Habitat Capital Project List for 2008

Several changes were made in the format of the list to facilitate review and comply with the regional template:

1. Habitat Work Schedule reporting codes were added
2. Projects are color-coded by status:
   - New for 2008
   - Funded and removed from 2008 list
   - In progress phased implementation and funding
   - Post-project construction monitoring needs only
   - Multiple projects under single project title
3. Descriptions for all projects and programs on the list will be included when the Hatchery and Harvest parts are updated.

We made the assumption that cost estimates include any project or project phase not currently funded. Cost estimates for those projects currently under consideration for 2008 SRFB grants or any other grant source were included in the 2009 cost column. Project cost estimates were updated based on new or better information. Where projects are informed by feasibility studies, cost estimates are more accurate. Others are based on the cost of similar work. Cost estimates for projects in the feasibility or concept stages are rough estimates. Cost estimates for projects representing a focus area of multiple projects are based on the next expected phase to be implemented.

Thanks to the influx of PSAR funds last year, we were able to fund 13 projects last year including a large floodplain acquisition project, two additional protection acquisitions and a floodplain acquisition/restoration project. We also funded feasibility/design work on 4 larger projects and continued to support restoration work targeted throughout priority areas in the watershed, from road sediment reduction in the upper watershed to removal of dredge fill in Swinomish Channel. A number of projects are being held on the list as opportunities dependent on the resolution of implementation issues. A handful of completed projects have been held on the 2009-2011 Habitat Capital Projects List for funding of post-project monitoring. A planned review of monitoring needs, left blank in the 2007 update, may also consolidate post-construction project effectiveness monitoring design and funding needs into one location.

We removed 3 projects that had been funded and needed no additional funding. These include the Morgan Creek fish passage project, sediment erosion control on Bacon Creek Roads, and the Cascade River Land Acquisitions. We added the following nine new projects. Project descriptions are located in related worksheet in the file.

1. Smokehouse Floodplain Restoration, Phase 2 restoration of former emergent tidal marsh on Swinomish Channel
2. South Fork Pole Yard, a dike set-back project in the lower river
3. Cascade Trail Relocation, a levee set-back project in the middle river
4. Debays Slough Restoration, a reconnection project beginning with a feasibility study

5. Finney Creek Supplemental LWD Treatment, continuation of restoration in lower Finney Creek
6. Middle Skagit Floodplain Restoration, small-scale restoration work on lands purchased for conservation in the floodplain of the middle Skagit Watershed Council
7. Lower Cascade Roads, road deconstruction and treatment for high risk roads on former timberland purchase by the City of Seattle
8. Upper Skagit Floodplain Restoration, small-scale restoration work on lands purchased for conservation in the floodplain of the upper Skagit Watershed Council
9. Upper Sauk Erosion Control, sediment reduction and fish passage work on forest roads in the upper Sauk River

We continue to hold some projects on the list as "placeholders" or umbrellas for ongoing work in our targeted priority areas. These include projects such as acquisitions, floodplain riparian plantings and the like, and road sediment reduction in the upper watershed areas. Substantial restoration projects in the middle Skagit, such as the Hamilton PDA and Cockreham Island, are less well defined as projects in the delta.

Not all projects or project concepts have defined performance goals yet. This will be resolved with the implementation of the Habitat Work Schedule this year, which will enable us to gauge progress from restoration actions toward recovery goals.

There are plans to do more focused project development this year to refine priorities for significant gains toward recovery goals. In the interim, the list remains organized by focus/population areas with projects distributed among them.

Background for Habitat Capital Program

The Work Plan is based upon recognition that the Skagit watershed possesses the largest and most diverse landscape for salmon in the Puget Sound. It can be divided into several key ecological areas (ecoregions) that possess unique topographical, geological, hydrological, and vegetative characteristics. The recovery strategy recognizes that the independent populations of chinook salmon have evolved with and are adapted to the unique habitat conditions, including flow patterns, water quality characteristics, and channel characteristics present in each area. Protecting and restoring the unique habitat characteristics in each sub basin or ecoregion, including those ecological processes that form and maintain habitat, is the fundamental goal of this Work Plan.

There are seven ecoregions delineated within the Skagit watershed based upon physiography (topography, geology, and vegetation) characteristics, hydrology, and the spatial distribution of chinook pulations in the watershed. These are:

- Marine nearshore areas including Skagit Bay;
- Skagit River delta including estuary and freshwater tidal areas;
- Lower and Middle Skagit River;
- Upper Skagit River;
- Sauk River;
- Suiattle River; and
- Cascade River.

The Skagit basin possesses 6 independent populations of chinook salmon, with a total of 22 independent chinook populations present in the Puget Sound. The Skagit chinook populations are comprised of a single fall stock (lower Skagit River), two summer stocks (upper Skagit and lower Sauk Rivers), and three spring stocks. The six populations are genetically unique, and have different spawning migration timings, habitat requirements, and life history traits. In setting chinook recovery objectives for the Puget Sound, the Puget Sound Technical Recovery Team (TRT) specified that all 22 populations of chinook "must improve from current conditions". The TRT has identified that one of the Skagit early-run (i.e. spring) chinook populations needs to achieve low risk status to meet ESU recovery goals.

There are two basic life-history forms (or guilds) of salmonid fish in the Skagit watershed. The first are called "ocean-type" fish, and spawn in the main stem and tributary areas of the Skagit but rear in these areas for only a relatively short time (days to weeks) before migrating downstream as fry. Ocean-type fish include summer and fall chinook salmon, chum salmon, and pink salmon. Because ocean-type juveniles spend relatively little time in their natal streams, they are dependent upon channel margin habitats of the lower and middle main stem Skagit, and the distributary channels and blind sloughs of the Skagit delta and Skagit Bay, for foraging and rearing. The second basic life-history form are called "stream type" fish because they spawn in the middle reaches and headwater areas of the watershed, and then rear as juveniles in these areas for one or more years before migrating. Stream-type fish present in the Skagit watershed include spring chinook salmon, bull trout, and steelhead trout.

Stream-type fish are better adapted to the habitat conditions present in the headwater areas of the watershed, including the cold winter temperatures and highly variable flows characteristic of snowmelt and glacial streams. Coho salmon also have a stream-type life history, but spawn and rear mainly in the floodplain areas of the watershed where they are the dominant fish species.

There is high degree of variability in life-history traits of Skagit salmonids that extend far beyond the basic delineation of "ocean-type" and "stream-type" fish. This variability is most evident in chinook salmon. Ocean-type Chinook employ several life-history strategies in the Skagit, including parr migrants (rearing in mainstem river and freshwater tidal areas), estuary users (rearing in estuary sloughs and distributaries), and fry outmigrants (very limited freshwater and estuary rearing). Bull trout have four different life-history forms in the Skagit: stream resident (adults remain in headwater streams), fluvial (adults reside in mainstem rivers), adfluvial (adults reside in lakes), and anadromous (adults migrate into Puget Sound).

The fundamental objectives of this Work Plan are:

1) Improve the abundance of those species that are listed under the ESA. This will be achieved by protecting and restoring those areas most important to the survival of these fish during critical periods in their life-history, including migration and foraging habitat in the middle and lower Skagit, and brackish water habitat important to growth and smoltification (i.e., physiological transition from freshwater to saltwater) provided the Skagit Delta, Skagit Bay, Swinomish Channel, and pocket estuaries.
2) Improve the strongest populations of chinook salmon to sustainable and harvestable numbers.
3) Sustain and improve life history variability and genetic diversity of chinook salmon throughout the watershed. Protecting and restoring rearing habitat in the streams and rivers of the upper watershed areas will improve the abundance of stream-type fish including spring chinook. Restoring a broad range of historically important habitats will improve the life history diversity of chinook salmon life by providing a wider variety of habitats to these species. Improving habitat diversity is the most important step towards improving life history diversity.
4) Develop and implement a set of rapid recovery actions that reduce the extinction risk of the weakest populations in the watershed.
5) Build organizational capacity among project sponsoring organizations.
6) Develop broad-based partnerships and community support for salmon recovery through public outreach and education.
7) Improve the watershed's capacity to fund and complete large-scale protection and restoration projects by fostering long-term partnerships among agencies, tribes, conservation groups, and other local stakeholders.
8) Support a strong research and monitoring program that will guide the recovery process in the future.
9) Implement an adaptive management process that will continually refine and redirect recovery actions.

The combined set of actions included in the Work Plan is targeted at meeting the Viable Salmon Population (VSP) recovery elements established by the Puget Sound Chinook TRT. The objectives outlined above are intended to meet the recovery goals defined for the Skagit watershed by the TRT.

Hatcheries

The Skagit River hatchery at Marblemount produces spring, summer, and fall chinook for indicator stock purposes only. Indicator stocks are important to evaluate where harvest is occurring and to help evaluate marine survival of wild chinook stocks. Natural origin recruits (NORs) and hatchery origin recruits (HORs) are integrated in the summer and fall stocks, meaning that natural origin brood stock are introduced into the hatchery egg take. Integrated stocks are maintained to mimic natural stocks as closely as possible and to preserve the native gene pool. In light of the sensitivity of the spring stocks the spring chinook program is segregated, meaning that the stock is maintained purely as a hatchery stock in order to reduce HOR and NOR interaction on the spawning grounds. There are no proposed plans to modify or create new chinook hatchery programs on the Skagit; however, a contingency conservation plan is proposed. This plan will specify: the population-specific criteria under which artificial production programs would be initiated to rebuild or preserve the populations; the scope of the programs; the criteria for determining whether artificial production releases would be on-station or off-station; the need for the construction of additional artificial production facilities; and other factors related to the initiation of conservation hatchery programs.

Additionally funds are needed for capital improvements at the Marblemount hatchery and to support ongoing operations and maintenance.

Harvest

Historically, Skagit chinook harvest has taken place locally in the terminal areas of Skagit Bay and the Skagit River, and in the off-shore areas in Canadian waters. In light of the diminishing stock, the terminal fishery has been reduced to tribal ceremonial fisheries and research related fisheries. During years when a large return of hatchery origin fish are expected, recreational fishing has been allowed but tailored specifically to the harvest of the hatchery recruits. Exploitation of Skagit chinook is in large part conducted in Canadian waters thus harvest management of Skagit River chinook is primarily dictated by the Pacific Salmon Treaty (PST) between the US and Canada. The PST depends upon information collected in the affected watersheds and information on harvest. With this information the treaty is negotiated and modified to accommodate harvest while preventing the over-exploitation of the stocks. Harvest related funding identified on the three year plan is intended to fund staff to participate in the PST negotiations, to fund staff to implement PST recommendations and to enforce chinook harvest regulations.

Habitat Projects

Habitat projects identified in the Work Plan are ordered geographically from the nearshore and estuary to the mountainous headwaters. The narrative below describes the relative importance of each of the geographical categories and is not intended to imply that work done in one habitat type will provide recovery on its own. On the contrary, habitat work from the bay to the mountains is key to reestablishing viable Skagit chinook populations and ensuring their viability into the future.

The estuary and nearshore habitats have been identified as key to the recovery of Skagit chinook. Research studies and smolt outmigration monitoring indicate that the greatest portion of chinook in the watershed have an ocean type life history. The brackish estuary and nearshore areas have been found to be extremely productive areas, crucial to the success of Skagit chinook. As juveniles, the fish spend a period of weeks to months gradually adapting to the saltwater and foraging, gaining strength for their next life stage in the saltwater environment. Observations indicate that the estuary areas are filled to capacity and that a portion of the broods are forced to bypass the Skagit delta and seek rearing habitats elsewhere. Although a saltwater fry life history type has been shown to be present, information on the origin of returning adults confirms that individuals able to rear in the brackish delta areas are much more likely to return successfully. Skagit scientists has discovered that the smaller nearshore embayments associated with small freshwater systems provide an alternate rearing area to fish that are unable to find room in the estuary – and have termed these areas "pocket estuaries."

<u>Nearshore</u>

Projects planned in the nearshore are intended to restore and retain pocket estuary habitats, and to restore and preserve the natural geological beach processes that create and maintain nearshore forage fish habitats. Research studies have found that the nearshore areas of the Skagit watershed provide important migratory and foraging habitat to chinook salmon juveniles and bull trout. A Spartina eradication project is also included.

The proposed nearshore projects are intended to protect and restore key ecological processes to nearshore habitats, including:

- Restore connectivity among nearshore areas and marsh habitats ;
- Address water quality and ditching in the headwater wetlands;
- Protect sediment source beaches;
- Restore inter tidal pocket estuary habitat by removing fill and creating a new outlet channels
- Protect and restore sediment source beaches.

<u>Estuary and Freshwater Tidal Area</u>

The estuary and freshwater tidal areas of the Skagit watershed include the Skagit River delta, Skagit Bay, and Swinomish channel. These habitat areas have been a central focus of protection and restoration efforts within the Skagit watershed. The estuary represents the most productive and one of the most ecologically diverse habitat areas in the watershed. Freshwater tidal areas in the Skagit delta represent historically abundant habitat that provides rearing and refuge habitat to out-migrating chinook. Ocean-type chinook salmon juveniles are dependent upon these habitats for growth and survival. The estuary and freshwater tidal areas of the Skagit are also used as foraging habitat by anadromous bull trout, which are a dominant life history form of this listed species in the Skagit.

Projects planned in the estuary and freshwater tidal areas are aimed at restoring access to isolated habitats, re-establish migration pathways among existing habitats, and restoring the hydrological and ecological processes that form and maintain these habitat areas. Specific estuary and tidal wetland project objectives include:

- Removing hydraulic controls that limit the development of channel networks and native vegetation;
- Improving habitat connectivity and capacity (e.g., restoring the connectivity between the Swinomish Channel and the North Fork of the Skagit River);
- Restoring riverine tidal wetland habitats for juvenile rearing;
- Expand estuarine emergent marsh rearing habitat.

Many of projects estuary and freshwater tidal projects identified in the Work Plan are presently underway, and have been successfully developed through the partnership of organizations including SWC, SRSC, WDFW, TNC, Western Washington Agriculture Association, and U.S. Fish and Wildlife Service.

Lower / Middle Skagit

Historically the lower Skagit River migrated and flowed across a wide floodplain characterized by diverse off channel wetlands, complex side channels, and low energy sloughs. Since about the turn of the last century efforts have been made to confine the river into a single channel thereby completely eliminating off channel habitat or cutting off migration to that which remained. Observations show that these lost habitats are important to many of the life history types of each of the Skagit chinook stocks. Life history types that depend on the estuary have been observed to migrate between the estuary and upriver to productive off channel areas. Juvenile chinook, juvenile steelhead, and sub adult bull trout depend on the productive slow-velocity margin, side-channel, and off channel habitats for feeding, and as refuge habitat from the high velocities found in the main stem river. Adult bull trout actively forage in main stem margin and side channel habitats of the main stem Skagit. The primary strategy for habitat restoration in the middle and lower Skagit is to re-establish hydraulic connectivity to disconnected side-channel habitats, to re-establish access to off-channel habitats, and to restore the habitat quality of main stem margin habitats.

The latter habitats have been widely impacted by diking and bank armoring in the lower and middle Skagit.

Proposed projects seek to:

- Restore historic riverine wetland to increase the availability of floodplain rearing, foraging, and refuge habitat;
- Set back major sections of levees to re-establish floodplain habitats;
- Restore riparian corridors and floodplain corridors by planting native vegetation and removing noxious weeds;
- Restore hydraulic connectivity to artificially isolated side-channels and off-channel areas.
- Remove fish barriers to tributaries and off-channel floodplain habitats;
- Remove bank hardening and restore natural hydraulic process that form and sustain side channels;
- Improve habitat complexity within islanded (multiple channels) areas of the river;
- Reduce sediment and temperature impacts to major tributaries (e.g., Finney Creek and Day Creek) through improved forest practices and road stabilization projects, re-establishing native vegetation, a restoring natural channel processes;
- Protect and restore alluvial fans.

Partner organizations involved in restoration projects in the lower and middle Skagit include the Skagit River System Cooperative, Upper Skagit Tribe, Skagit Fisheries Enhancement Group, U.S. Forest Service, Skagit County, Washington Dept. of Fish and Wildlife, the Skagit Watershed Council and Seattle City Light.

The lower and middle Skagit is a key focus area of protection projects including conservation land purchases and easements. Protection will remain a central component to the three-year recovery plan in this area of the watershed. The area of the watershed is more impacted by land-use disturbance, channel modifications, and hydrological modifications than the sub basins in the upper parts of the watershed. Consequently, most of the protection projects in the lower and middle Skagit will become restoration projects over time. Partner organization active in conservation land acquisitions and easements in the lower and middle Skagit include the Skagit Land Trust, U.S. Forest Service, The Nature Conservancy, and the Washington Dept. of Fish and Wildlife.

The capital cost in lower and middle Skagit is the highest of the Skagit watershed sub basins. This area of the Skagit possess the greatest amount of main stem habitat area in the watershed (i.e., over 60 river miles), and has been one of the most impacted areas of the Skagit by human disturbance. The lower and middle provides critical spawning habitat to fall chinook, rearing habitat to most life history forms of chinook, steelhead spawning and rearing habitat, and serves as migration and foraging habitat for fluvial and anadromous trout.

<u>Upper Skagit Sub basin</u>

The upper Skagit Sub basin includes a 26-mile section of the main stem Skagit River that provides supports the greatest number of native chinook salmon, chum salmon, and pink salmon spawners in the Puget Sound. This sub basin possesses some of the most important bull trout spawning streams in the Skagit watershed, including Bacon Creek and Illabot Creek. Much of the upper sub basin is in excellent condition due to protections provided by wilderness designations in North Cascades National Park and National Forest lands. Habitat protection has been also been a focus along the main stem section of the river adjacent land holdings. The partner organizations involved in protection projects in the upper Skagit sub basin include Seattle City Light, The Nature Conservancy, and the U.S. Forest Service. Protection projects remain a key component to the three-year recovery plan.

High quality spawning habitat is abundant for chinook salmon and steelhead along the 26 main stem river miles in the upper Skagit Sub basin. This section of the river supports the upper Skagit summer run of chinook salmon, which is the most abundant and healthiest population of chinook in the watershed. This area of the river now supports over 80 percent of the total chinook spawning in the Skagit watershed. Although spawning habitat is abundant for chinook and steelhead, rearing habitat for these species is considered to be limiting because of the relative scarcity of low-velocity main tem margin, side-channel, and off-channel habitat. Restoration projects in this area of the watershed focus on improving juvenile salmon and steelhead rearing areas. Specific restoration objectives in the upper Skagit Sub basin include:

- Restoring hydraulic connectivity to side-channel and off-channel habitats;
- Constructing new ground-water fed channels to compensate for reductions in the natural formation of these channels by flood-control and hydroelectric operations;
- Restoring low-velocity rearing areas along the main stem margin by removal of bank armoring;
- Maintaining a flow-management program developed by SCL and coordinated with the Tribes and federal and state fish management agencies to minimize flow impacts of the Skagit Hydroelectric Project on spawning and rearing fish.

Partner organizations involved in restoration projects include the Skagit River System Cooperative, Upper Skagit Tribe, Seattle City Light, U.S. Forest Service, and Washington Dept. of Fish and Wildlife.

<u>Sauk River Sub basin</u>

The Sauk River sub basin includes two independent chinook salmon populations: lower Sauk summer chinook and upper Sauk spring chinook. The Sauk River has been a key area for protection projects in the Skagit watershed. Protection efforts will continue to focus on the spawning areas for summer chinook and diverse rearing habitat for spring chinook located on the main stem Sauk between the confluence of the Suiattle River and the town of Darrington. This sub basin also provides important spawning and rearing habitat to

steelhead and bull trout. Partner organizations involved in habitat protections projects in this sub basin include The Nature Conservancy, Seattle City Light, and U.S. Forest Service. The restoration projects in the three-year plan are sediment reduction projects. High sediment loads are a major threat to salmonid populations and habitat quality in the Sauk sub basin.

Suiattle River Sub basin

The Suiattle River possesses one of the three independent spring chinook populations in the Skagit watershed. This sub basin provides is extensively used as spawning and rearing habitat by bull trout and steelhead. Glaciers in the upper watershed result in high levels of flow variability as well as high sediment loads to this system. Sediment resulting from forest land-management impacts combined with major flooding events in recent year represents the major threat to chinook, bull trout, and steelhead populations in this sub basin. For this reason, the restoration projects included in the three-year plan focus of sediment reduction. Partner organizations that have been involved in protection and restoration actions in this sub basin include the U.S. Forest Service, Skagit River System Cooperative, Sauk-Suiattle River Tribe, The Nature Conservancy, and Seattle City Light.

Cascade River Sub basin

The Cascade River Sub basin is the least impacted of the major sub basins in the Skagit River due to long-term protections afforded by wilderness designations by the U.S. Forest Service in the headwater areas. This sub basin supports one of the three independent spring chinook salmon populations in the Skagit, and is extensively used for spawning and juvenile rearing by bull trout and steelhead. Resident forms of bull trout are likely present in this sub basin. Proposed recovery actions for the three-year plan include a major protection project (1000+ acres) involving the partnerships of the U.S. Fish and Wildlife Service, Washington Dept. of Natural Resources, Seattle City Light, and The Nature Conservancy. The U.S. Forest Service has been the leader for restoration efforts in this watershed, and will sponsor sediment control projects proposed in the three-year plan.

Monitoring

Monitoring forms an essential component of the three-year recovery plan, and will provide information critical to the adaptive management process and guiding future recovery actions. Monitoring efforts will continue to represent "vital pulse measurements" for chinook salmon, bull trout, and steelhead populations in the Skagit. The Skagit monitoring program include continued spawning surveys for chinook salmon, bull trout, and steelhead trout, smolt outmigration monitoring by screw and incline traps for all three species, and beach-seine sampling of juveniles and adults in the estuary and marine nearshore areas of the watershed. In terms of cost, the most substantive monitoring effort is the indicator stock programs for fall, summer, and spring chinook. Indicator stock programs are critical for monitoring the survival and

managing the harvest of chinook in ocean waters. Monitoring efforts of coded-wire tagged chinook in most Puget Sound watersheds involve hatchery fish, but must rely on wild fish tagging in the Skagit due to the focus on wild fish production in this watershed.

Research (Skagit Watershed)

The Skagit Watershed is home to some of the pre-eminent estuary researchers of the Pacific Northwest. Research conducted in the Skagit has dictated the direction of chinook and bull trout recovery both locally and region wide. Continued research in the Skagit is crucial to our understanding of what it will take to recover the species and to adapt our efforts to ensure their effectiveness. The proposed research in the three-year plan will help fill major gaps in our understanding of the life-history, migration behavior, habitat use, and spatial survival patterns of chinook salmon, bull trout, and steelhead among the ecoregions of the Skagit identified in this plan.

Regional Research (Whidbey Basin)

We are including the estimated costs of inter-watershed research programs that should be conducted within the Whidbey basin. These project focus on understanding the importance of estuary, nearshore, and open-water marine habitats throughout the basin that are critically important to chinook salmon, steelhead, anadromous bull trout in the Skagit and other watersheds. These wide-scale research efforts are intended to improve our understanding of the relationship between climate, food resources, habitat conditions and constraints, and migratory behavior on the survival of juvenile chinook salmon, juvenile steelhead, and anadromous bull trout in the northern Puget Sound.

Watershed-Wide Capacity

Over the next three years the Watershed Council will undertake the task of operationalizing and coordinating the implementation of this Work Plan. The Watershed Council will do so by drawing in all the key players, facilitating their participation and together developing the framework and processes necessary for effective interaction. It is anticipated that the collaborative model used over the past 7 years by the Watershed Council in fulfillment of its lead entity functions will serve as the foundation for this expanded role and revised as necessary to accommodate the additional considerations of the Recovery Plan. This section of the Work Plan addresses the question of capacity: 1) that of individual organizations to undertake projects of the volume, scale and complexity necessary for the recovery effort; 2) that of collective capacity to work together as a team in a collaborative partnership; 3) that of the community-at-large to understand and support an effort of the magnitude proposed and 4) that of the various regulatory agencies to develop and enforce the necessary regulations.

For the purposes of this Work Plan we have chosen to meet the question of capacity through funding for the equivalent of 14 additional FTEs: 2 for project development and review functions; 2 for coordinating and facilitating the

recovery process; 2 for project-sponsor functions such as landowner contact, project scoping and project management; 2 for community outreach and education; and 6 for regulatory program development and enforcement. This funding would underwrite: 1) existing staff in participating/responsible organizations; a centralized team of experts charged with providing specialized technical assistance; and new positions. Also proposed is an independent auditor, hired from outside this area, to develop a Report Card process that would allow for a bi-annual progress report, issued in 2008 or 2009. While information would need to be collected from the key players, an "arms length" accounting by an individual not associated with any of the "sides" would be politic and provide a trust-building opportunity.

There are also funds to underwrite the task of reviewing permits and implementing the Forest and Fish Agreement.

Three-Year Implementation Salmon Plan for the Skagit Basin 2009-2011

							HWS Reporting Codes				2009		2010		2011				For Habitat projects (see key for categories)			
Priority Tier	Limiting Factors	Action name and description	Total cost of first three years	Proposed SRFB (or grant) share	Local share or other funding	Source of other funds	Habitat Type	Activity Type	Species Benefiting	Species Benefiting	Year 1 Scope	Year 1 Cost	Year 2 Scope	Year 2 Cost	Year 3 Scope	Year 3 Cost	Likely End Date	Additional funds needed after 2011	Acquisition	type, if applicable	Location w/in watershed	Performance
CAPITAL PROJECTS Habitat Capital Projects																						
Nearshore																						
	2	Lone Tree lagoon	$30,000	$10,000	$20,000		Nearshore embayments	Estuary or nearshore	Chinook	Bull Trout	Monitoring	$10,000	Post-restoration Monitoring	$10,000	Post-restoration Monitoring	$10,000	2010			M	Marine Shorelines	6.4 acres
	2	Turners Bay	$200,000	$125,000	$75,000		Nearshore embayments	Estuary or nearshore	Chinook	Bull Trout	Permitting		Construction	$400,000	Construction	$400,000	2011			M	Marine Shorelines	8.7 acres
	2	Similk Bay	$75,000	$75,000			Nearshore embayments	Estuary or nearshore	Chinook	Bull Trout			Feasibility	$75,000						M	Marine Shorelines	23.6 acres
		TOTAL NEARSHORE CP	$305,000	$210,000	$95,000							$10,000		$485,000		$410,000		$0				
Estuary / Tidal Delta																						
	2	Milltown Island	$150,000	$0	$150,000		Estuary river delta	Estuary or nearshore	Chinook	Chum			Post-restoration Monitoring	$75,000	Post-restoration Monitoring	$75,000	2011	$75,000		E	Estuaries	212 acres
	2	Rawlins	$573,440	$573,440	$0		Estuary river delta	Estuary or nearshore	Chinook	Chum			Acquisition	$140,000	Design/Permitting	$180,000	2013	$2,000,000		E	Estuaries	28 acreas +
	2	Wiley Slough	$875,000	$680,000	$195,000		Estuary river delta	Estuary or nearshore	Chinook	Chum	Construction		Project Shortfall	$800,000	Monitoring	$75,000	2012	$255,000		E	Estuaries	160.6 acres
	2	McGlinn Causeway	$1,200,000	$1,020,000	$180,000		Estuary river delta	Estuary or nearshore	Chinook	Chum	Feasibity/90%Design		Design/Permitting		Construction	$1,200,000	2012	$150,000		E	Estuaries	
	2	Fisher Slough	$2,800,000	$0	$2,800,000	NRCS	Estuary river delta	Estuary or nearshore	Chinook	Chum			Construction	$2,800,000			2011	$200,000		E	Estuaries	68 acres
	2	Swinomish Channel Restoration (Smokhouse Floodplain)					Estuary river delta	Estuary or nearshore	Chinook	Chum	Design/Planning		Construction		Construction		2012	$150,000		E	Estuaries	?
	1	South Fork Off Channel	$195,000	$175,000	$20,000		Estuary river delta	Estuary or nearshore	Chinook	Chum			Design/Permitting	$20,000	Construction	$175,000	2011			F	Mainstem	40 acres
	2	Swinomish Channel Fill Removal					Estuary river delta	Estuary or nearshore	Chinook	Chum	Construction		Construction		Post-restoration Monitoring	$60,000	2012			E	Estuaries	2.45 acres
	2	Telegraph Slough Reconnection	$250,000	$250,000	$0		Estuary river delta	Estuary or nearshore	Chinook	Chum			Feasibity	$125,000	Design	$125,000	2015	$4,500,000		E	Estuaries	80 acres
	2	Dry Slough Tidegate (Goose Reserve)	$800,000	$725,000	$75,000		Estuary river delta	Estuary or nearshore	Chinook	Chum	Feasibity/30%Design	$175,000	Design	$125,000	Construction	$500,000	2011	$500,000		E	Estuaries	
	2	South Fork Pole Yard	$2,200,000	$2,200,000	$0		Estuary river delta	Estuary or nearshore	Chinook	Chum			Design/Planning	$100,000	Acquisition/Permitting	$600,000	2011	$1,500,000	AR	E	Estuaries	40 acres
		TOTAL ESTUARY/TIDAL CP	$9,043,440	$5,623,440	$3,420,000							$175,000		$4,185,000		$2,990,000		$9,330,000				
Lower / Middle Skagit (Burlington to Sauk River confluence)																						
	1	Cascade Trail Relocation	$625,000	$625,000	$0		Instream	Instream	Chinook	Steelhead			Acquisition/Design	$325,000	Construction	$300,000	2012			F		30 acres
	1	Cockreham Island	$3,550,000	$3,100,000	$450,000		Instream	Floodplain Restoration	Chinook	Coho	Design/Construction	$400,000	Acquisitions	$3,000,000	Design/Permitting	$150,000	2012	$1,000,000		F	Mainstem	1334 acres, 5 km sloughs
	1	Cottonwood Island	$2,990,000	$2,570,000	$420,000		Instream	Instream	Chinook	Coho			Design/Permitting	$190,000	Construction	$2,800,000	2012	$30,000		F	Mainstem	
	1	Day Creek	$688,000	$510,250	$177,750		Instream	Instream	Chinook	Steelhead	Design/Construction	$213,000			Design/Construction	$475,000	2012	$45,000		F	Tributaries	
	1	Debays Slough Feasibility & Design	$475,000	$415,000	$60,000		Instream	Instream	Chinook	Coho	Feasibility	$125,000	Design/Planning	$75,000	Construction	$400,000	2014			F		
	5	Finney Creek Supplemental LWD treatement					Instream	Instream	Chinook	Steelhead			Design/Planning	$45,000	Construction	$200,000	2013	$15,000		I		
	3	Finney Riparian	$175,000	$175,000	$0		Riparian	Riparian	Chinook	Steelhead			Site Planning	$35,000	Construction	$140,000	2012	$75,000		R	Tributaries	
	1	Gilligan Floodplain	$500,000	$400,000	$100,000		Instream	Instream	Chinook	Coho			Construction Design/Permitting	$100,000	Construction	$400,000	2014	$90,000		F	Mainstem	170 acres
	1	Hamilton PDA	$1,350,000	$1,350,000	$0		Instream	Floodplain Restoration	Chinook	Coho	Feasibility/Design	$350,000	Acquisition/Permitting	$1,000,000			2016	$1,500,000		F	Mainstem	
	1	Hansen Creek Alluvial Fan	$3,758,000	$1,000,000	$2,758,000		Instream	Floodplain Restoration	Chinook	Coho	Construction Design	$120,000	Permitting		Construction	$3,638,000	2012	$90,000		F	Tributaries	145 acres
		Middle Skagit Acquisitions	$600,000	$510,000	$90,000		Instream	Land Protected/Aquired/Leased	Chinook	Chum	Acquisitions		Acquisitions	$300,000	Acquisitions	$300,000	2012	$300,000	AP		Mainstem	
	5	Middle Skagit Floodplain Restoration	$130,000	$110,500	$19,500		Instream	Floodplain Restoration	Chinook	Coho			Construction Design/Permitting	$65,000	Construction Design/Permitting	$65,000					Mainstem	
	7	Morgan Creek Fish Passage																				
	1	Skiyou Slough	$175,000	$160,000	$15,000		Instream	Instream	Chinook	Coho			Design/Permitting	$75,000	Construction	$100,000	2010	$30,000		F	Mainstem	
	3	Upper Skagit Floodplain Riparian	$5,000	$5,000	$0		Riparian	Riparian	Chinook	Steelhead					monitoring/ maintenance	$5,000	2013			R	Mainstem	
		TOTAL LOWER AND MIDDLE SKAGIT CP	$15,021,000	$10,930,750	$4,090,250							$1,208,000		$5,210,000		$8,973,000		$3,175,000				
Upper Skagit (Sauk River confluence to Newhalem)																						
	1	Illabot Creek	$405,000	$380,000	$25,000		Instream	Instream	Chinook	Steelhead	Design		Construction	$200,000	Construction	$750,000	2012	$45,000		I	Tributaries	440' of channel bank
	4	Lower Cascade Roads	$50,000	$50,000	$0		Uplands	Sediment Reduction	Chinook	Steelhead			Construction	$45,000	Monitoring & Maintenance	$5,000				U	Tributaries	
	1	Car Body Hole	$350,000	$350,000	$0		Instream	Floodplain Restoration	Chinook	Coho			Feasibility Design/Permitting	$100,000	Construction	$250,000	2012	$45,000		F	Mainstem	550' of channel bank,
	4	Bacon Creek Roads																				
	5	Upper Skagit Floodplain Restoration	$355,000	$301,750	$53,250		Instream	Floodplain Restoration	Chinook	Coho	Construction Design/Permitting	$225,000	Construction Design/Permitting	$65,000	Construction Design/Permitting	$65,000				R		
	4	Diobsud Roads Erosion Control	$395,000	$335,000	$60,000		Uplands	Sediment Reduction	Chinook	Steelhead	Construction	$395,000					2010			U	Tributaries	
	1	Upper Skagit Acquisitions	$660,000	$561,000	$99,000		Instream	Land Protected/Aquired/ Leased	Chinook	Steelhead	Acquisition		Acquisition	$330,000	Acquisition	$330,000	2010	$330,000	AP		Mainstem	
		TOTAL UPPER SKAGIT CIP	$2,215,000	$1,977,750	$237,250							$620,000		$740,000		$1,400,000		$420,000				
Sauk River																						
	4	Sauk Roads	$200,000	$200,000	$0		Uplands	Sediment Reduction	Chinook	Steelhead	Data Collection	$15,000	Final Design	$20,000	Construction	$165,000	2009			U	Tributaries	25 miles of roads
	3	Sauk River Land Acquisitions	$660,000	$561,000	$99,000		Instream	Land Protected/Aquired/ Leased	Chinook	Coho	Acquisition		Acquisition	$330,000	Acquisition	$330,000	2010	$330,000	AP		Mainstem	
	4	Upper Sauk Erosion Control	$400,000	$400,000			Uplands	Sediment Reduction	Chinook	Steelhead			Design/Planning	$50,000	Consstruction	$400,000	2011			U	Tributaries	7 Miles
		TOTAL SAUK RIVER CIP	$1,260,000	$1,161,000	$99,000							$15,000		$400,000		$895,000		$330,000				
Suiattle River																						

	1	Downey Creek Crossing	$300,000	$300,000	$0		Instream	Instream	Chinook	Bull Trout			Design/Permitting	$75,000	Construction	$225,000	2012			I	Tributaries	3 acres of alluvial fan
	1	Boundary Bridge	$275,000	$275,000	$0		Instream	Instream	Chinook	Steelhead			Design	$100,000	Construction	$500,000	2012			F	Tributaries	43 acres of floodplain
	4	Suiattle Roads	$395,000	$335,000	$60,000		Uplands	Sediment Reduction	Chinook	Steelhead			Construction	$395,000						U	Tributaries	
	1	Dearinger Campground	$375,000	$375,000	$0		Instream	Instream	Chinook	Steelhead			Feasibility/Permitting	$100,000	Construction	$275,000	2011			I	Tributaries	
		TOTAL SUIATTLE CP	$1,345,000	$1,285,000	$60,000							$0		$670,000		$1,000,000		$0				
Cascade River																						
	7	Cascade River Trib Fish Passage	$100,000	$85,000	$15,000		Instream	Instream	Chinook	Coho			Design	$20,000	Construction	$80,000	2011			P	Tributaries	
		Cascade River Land Acquisition																				
		TOTAL CASCADE RIVER CP	$100,000	$85,000	$15,000							$0		$20,000		$80,000		$0				
Hatchery Capital Projects																						
		Implement HSRG Capital Improvement recommendations	$512,000	$512,000	$0						Design	$75,000	Permitting	$37,000	Construction	$400,000	2009					
		TOTAL HATCHERY PRODUCTION	$512,000	$512,000	$0							$75,000		$37,000		$400,000						
TOTAL CAPITAL PROJECTS AND PROGRAMS			**$29,801,440**	**$21,784,940**	**$8,016,500**							**$2,103,000**		**$11,747,000**		**$16,148,000**		**$13,255,000**				
NON-CAPITAL PROGRAMS																						
Harvest Management support																						
Harvest Management																						
		Renegotiate expiring PST annexes	#REF!	#REF!	$125,000						Staffing (.5FTE)	$62,500	Staffing (.5FTE)	$65,000	Staffing (.5FTE)	$67,500	Ongoing	Ongoing				
		Implement 1999 PST annex	#REF!	#REF!	$125,000						Staffing (.5FTE)	$62,500	Staffing (.5FTE)	$65,000	Staffing (.5FTE)	$67,500	Ongoing	Ongoing				
		Implement Comprehensive Chinook Plan	#REF!	#REF!	$30,000						Staffing	$10,000	Staffing	$10,000	Staffing	$10,000	Ongoing	Ongoing				
		Enforcement Support	#REF!	#REF!	$200,000						Staffing	$100,000	Staffing	$100,000	Staffing	$100,000	Ongoing	Ongoing				
		TOTAL HARVEST MANAGEMENT	#REF!	#REF!	$480,000							$235,000		$240,000		$245,000						
Future Habitat Project Development																						
Watershed-wide capacity																						
		Project Development & Review	$480,000	$480,000	$0						Staffing (2 FTEs)	$160,000	Staffing (2 FTEs)	$160,000	Staffing (2 FTEs)	$160,000	Ongoing	Ongoing				
		Sponsor Capacity	$960,000	$960,000	$0						Staffing (4 FTEs)	$320,000	Staffing (4 FTEs)	$320,000	Staffing (4 FTEs)	$320,000	Ongoing	Ongoing				
		TOTAL WATERSHED WIDE CAP	$1,440,000	$1,440,000								$480,000		$480,000		$480,000						
Assessments																						
		Thein Farm	$50,000	$50,000	$0										Feasibility assessment	$50,000	2011	$100,000				
		Skagit Delta Hydraulic Model	$350,000	$300,000	$50,000						Study design/Data Collection	$75,000	Data Collection & Analysis	$200,000	Final Report and Conclusions	$75,000	2012	Ongoing				
		Mainstem Floodplain Assessment	$50,000	$50,000	$0						Assessment	$50,000					2010	Ongoing				
		Riprap inventory	$50,000	$50,000	$0						Assessment	$50,000					2009	Ongoing				
		Floodplain Productivity Assessment	$150,000	$150,000	$0						Study design/Data Collection	$50,000	Data Collection & Analysis	$50,000	Report and Conclusions	$50,000	2009	Ongoing				
		TOTAL ASSESSMENTS	$650,000	$600,000	$50,000							$225,000		$250,000		$175,000						
Regional Research Studies (Whidbey Basin)																						
		Trophic relationships Juvenile Salmonid Origin																				
		Global Warming Impacts	$1,200,000	$1,200,000							Implementation	$400,000	Implementation	$400,000	Implementation	$400,000	Ongoing	Ongoing				
		Chinook use of pocket estuaries																				
		SRT Evaluation	$300,000	$200,000	$100,000						Implementation	$150,000	Implementation	$150,000			2011	Ongoing				
		Nutrient Dynamic and salmon food Research Forage Fish ecology Nearshore / Offshore salmon and bull trout migration study																				
		TOTAL REGIONAL STUDIES	$1,500,000	$1,400,000	$100,000							$550,000		$550,000		$400,000						
Research (Skagit Watershed)																						
		Yearling Chinook Research	$500,000	$500,000							Study design / Data Collection	$200,000	Data collection	$150,000	Reporting	$150,000	2012					
		Chinook Life Histories & Marine Survival	$300,000	$300,000							Implementation	$100,000	Implementation	$100,000	Implementation	$100,000	2012					
		Hatchery/Wild Fish Interactions	$100,000	$100,000	$0						Implementation	$50,000	Implementation	$50,000			2010					
		Salmon habitat and agriculture research	$450,000	$450,000	$0						Implementation	$150,000	Implementation	$150,000	Implementation	$150,000	2008	Ongoing				
		TOTAL SKAGIT RESEARCH	$1,350,000	$1,350,000	$0							$500,000		$450,000		$400,000						
Habitat protection -- monitoring of habitat quality																						
Habitat protection -- monitoring of regulatory programs																						
		Independent Environmental Auditor	$80,000	$80,000	$0								Consultant	$80,000				-				
		Regulatory Protection Programs	$1,440,000	$1,440,000	$0						6 FTEs	$480,000	6 FTEs	$480,000	6FTEs	$480,000	Ongoing	Ongoing				
		Review of Permits	$240,000	$240,000	$0						Staff support	$80,000	Staff Support	$80,000	Staff Support	$80,000	Ongoing	Ongoing				
Habitat protection -- participation in policy or regulatory updates																						
Watershed Plan Implementation																						
		Forest & Fish Agreement Implementation	$300,000	$300,000	$0						Staffing	$100,000	Staffing	$100,000	Staffing	$100,000	Ongoing	Ongoing				
Outreach & Education -- stewardship																						
		Community Outreach and Education	$300,000	$300,000	$0						Staffing (2 FTEs)	$100,000	Staffing (2 FTEs)	$100,000	Staffing (2 FTEs)	$100,000	Ongoing	Ongoing				
		Graduate Fellowships	$75,000	$75,000	$0						Fellowships	$25,000	Fellowships	$25,000	Fellowships	$25,000	Ongoing	Ongoing				
		TOTAL LOCAL CAPACITY	$12,315,000	$12,015,000	$300,000							#REF!		$4,295,000		$4,325,000						
Instream Flow protection																						
		Instream Flow Evaluation & Planning	$90,000	$90,000	$0							$30,000		$30,000		$30,000	Ongoing	Ongoing				
Salmon Recovery coordination/implementation																						
		Lead entity Functions	$675,000	$285,000	$390,000						Staffing	$225,000	Staffing	$225,000	Staffing	$225,000	Ongoing	Ongoing				
Habitat Project Monitoring																						
		Develop project eff monitoring framework	$150,000	$0	$150,000						Study Design	$150,000										

Pilot implementation of project eff. Monitoring program	$100,000	$0	$100,000			Data Collection	$100,000			On-going	On-going
Stock Monitoring Support											
Hatchery Production											
Hatchery Operations	$450,000	$0	$450,000	O&M	$150,000	O&M	$150,000	O&M	$150,000	Ongoing	Ongoing
Hatchery Contingency Plan	$30,000	$30,000	$0	Staffing	$15,000	Staffing	$15,000		$0	2008	Ongoing
TOTAL HATCHERY PRODUCTION	$480,000	$30,000	$450,000		$165,000		$165,000		$150,000		
Stock Monitoring and Research											
Adaptive Mngt.	$720,000	$720,000	$0	3 FTEs	$240,000	Staffing	$240,000	Staffing	$240,000	Ongoing	Ongoing
Delta nearshore chinook monitoring (IMW)	$350,000	$41,000	$309,000	Staffing	$125,000	Staffing	$125,000	Staffing	$100,000	2015	Ongoing
Screw Trap Operations	$700,000	$400,000	$300,000	O&M	$225,000	O&M	$225,000	O&M	$250,000	Ongoing	Ongoing
Stream gauge O&M	$90,000	$90,000	$200,000	O&M	$30,000	O&M	$30,000	O&M	$30,000	Ongoing	Ongoing
Annual Chinook Spawner Surveys	$75,000	$75,000	$75,000		$25,000		$25,000		$25,000	Ongoing	Ongoing
Catch Sampling / monitoring / reporting	$171,000	$21,000	$150,000	Staffing	$55,000	Staffing	$57,000	Staffing	$59,000	Ongoing	Ongoing
Summer Indicator Stocks	$165,000	$6,000	$171,000	Staffing	$55,000	Staffing	$55,000	Staffing	$55,000	Ongoing	Ongoing
Fall Indicator Stocks	$165,000	$7,000	$153,000	Staffing	$55,000	Staffing	$55,000	Staffing	$55,000	Ongoing	Ongoing
Spring Indicator Stocks	$450,000	$0	$450,000	Staffing	$150,000	Staffing	$150,000	Staffing	$150,000	Ongoing	Ongoing
FERC Compliance	$60,000	$0	$60,000	Staffing	$20,000	Staffing	$20,000	Staffing	$20,000	Ongoing	Ongoing
TOTAL MONITORING	$2,946,000	$1,360,000	$1,868,000		$980,000		$982,000		$984,000		
TOTAL NON-CAPITAL NEED:	**#REF!**	**#REF!**	**$4,688,000**		**#REF!**		**$8,342,000**		**$8,189,000**		
TOTAL CAPITAL & NON-CAPITAL NEED:	**#REF!**	**#REF!**	**$12,704,500**		**#REF!**		**$20,089,000**		**$24,337,000**		

KEY FOR

Habitat Capital Projects

- New for 2008
- Funded and removed from 2008 list
- In progress phased implementation and funding
- Post project construction monitoring needed
- Multiple projects

Primary Limiting

1 - Degraded floodplain and in-river channel structure
2 - Degraded nearshore and estuarine conditions and loss of associated habitat
3 - Riparian area degradation and loss of in-river large woody debris
4 - Excessive sediments in spawning gravels
5 - Degraded water quality and temperature
6 - Impaired instream flows
7 - Barriers to fish passage

Acquisition

AP- Acquisition for protection
AR-Acquisition for restoration
R -Restoration

Restoration Type & Performance

I - Instream habitat projects (stream miles treated)
W - Wetland habitat projects (acres created/treated)
E - Estuarine habitat projects (acres created and treated)
L - Land acquisition projects (acres/ miles acquired for protection and/or restoration)
R - Riparian habitat projects (stream miles/acres treated)
U - Upland habitat projects (acres treated)
P - Fish passage projects (barriers removed/stream miles opened/fish screens installed)
M - Marine shoreline projects (miles/acres) (pocket estuaries and shorelines outside of natal delta areas and tributaries to Puget Sound)
F - Floodplain reconnection projects (miles/acres)

Research Project Descriptions

ASSESSMENTS

Delta Hydraulic Model

geomorphic delta of the Skagit River. The FVCOM hydrodynamic model has been used on smaller project scales in selected locations across the delta, however large gaps exist in the extent of its coverage. We would use to extended model coverage to evaluate the synergy between proposed projects and their affects on geomorphic evolution across the delta, especially in relation to flood dynamics.

Mainstem Floodplain Assessment

This study proposes to develop tools and methods by which Skagit mainstem floodplain habitats can be spatially evaluated, prioritized and ranked relative to their contributions to recovery of wild Chinook stocks. Using existing data sets we propose to collect field data that will provide updates to key data layers, improve our understanding of floodplain habitat use by wild Chinook (distinguished by life history type) , and develop a methodology by which floodplain habitats can be

Thein Farm

This project proposes to evaluate alternative approaches to estuarine project development by maintaining landowner involvement in restoration. Rather than approaching all sites with fee simple acquisition this project would explore various market incentives and long term real estate agreements to secure landowner approval for

Rip Rap Inventory Update

This proposal seeks to update an essential dataset. The hydromodification inventory conducted in 1998 is now a decade old and needs to be updated so we can better evaluate floodplain impacts over time. This project would also attempt to conduct a sensitivity analysis of ecosystem response to hydromodification on a spatial and

REGIONAL RESEARCH STUDIES

SRT Evaluation

This project would conduct a comparative study of effectiveness between different fish friendly Tidegate Designs. Several design ideas have been implemented in the region over the past several years allowing us to evaluate these structures in situ. The evaluation will focus on utilization by fish and hydraulic response on both temporal

Global Warming Impacts

[1] SRSC would coordinate and contract with Alan Hamlet at the University of Washington's Climate Impact Group to develop, assemble, and integrate hydrological models (including temperature and precipitation forcing data sets, a physically-based hydrologic model, a water temperature model, a dam reservoir simulation model, and a dam reservoir optimization model) for the Skagit Watershed that can be used to evaluate climate change impacts to basin hydrology and adaptive responses through dam reservoir management. The model would evaluate salmon impacts related to increased water temperatures, increase tidal marsh salinities, increased redd scour,

at the WSU Extension Unit in the Skagit Delta and with USGS researchers (including economists and coastal geologists) to model climate change impacts (particularly sea-level rise) to agricultural drainage and dike infrastructure, and to the agricultural economy of the Skagit Delta, with the goal of determining whether there are particularly vulnerable agricultural areas that could be logical candidates in the future for restoration to historical tidal marsh habitat. This effort would provide a planning tool for both the agricultural community and the restoration community, and provide a

SKAGIT RESEARCH STUDIES

Yearling Chinook Research

during the one plus year period spent in freshwater habitat yet we know each of the six wild Skagit Chinook spawning populations produce at least some yearling smolts and that freshwater habitat is limiting their production. In order to better analyze and propose recovery actions that protect or restore yearling Chinook salmon populations, we need studies that identify the:

1. life stages of yearling Chinook within one plus year they spend in
2. habitat types used (and not used) by yearlings for each life stage
3. capacity and survival associated with each habitat type for each life

We also need to know the spatial arrangement of habitats within the Skagit River Basin used by (or have the potential to be used by) yearlings for each of the six wild Chinook populations that have significant yearling components. Answering these question will enable us to target restoration and protection actions that recover the yearling life history type. A pilot study to develop methods and a robust statistical design has been funding and will be completed the

Chinook Life History and Marine Survival

oceanographic conditions. We need to monitor marine survival over time to refine our understanding of the relationship between life history strategies and marine survival and to identify when marine survival regimen is changing. This project would use otolith data from adults and juveniles collected in existing monitoring programs to determine the marine survival of various life history types of Skagit Chinook. We will determine potential historical measures of marine conditions, such as oceanographic and marine productivity indices, and look for relationships between these indices and marine survival of

Hatchery and Wild Fish Interactions

origin Chinook salmon co-mingle in nearshore and offshore habitats and not in tidal delta habitat. Because of the co-mingling there is a possibility of interaction in habitat areas with limited prey resources or if hatchery fish are preying on wild Chinook. In the Skagit, hatchery practices are used to rear indicator stock groups that are used to monitor harvest rates of all wild Chinook life history strategies. It is unknown whether the indicator stock releases represent all or any wild Chinook life history strategies. Understandings of both issues are important for implementing this recovery plan and the focus of this study. Methods include examining (1) predator and prey data from hatchery and wild salmon, (2) frequency of co-mingling of wild and hatchery salmon, as well as (3) differences in growth, timing, habitat

Salmon Habitat and Agricultural Research

Ag accord, the Drainage and Fish Agreement and the EPA Targeted Watershed s Project . Components include WQ investigations in conjunction with Washington State University, habitat improvement projects generated under the DFI, evaluations of pump station impacts, the impact of sustainable agricultural practices, the utility of development right transfers, mitigation banks and landscape scale

Restoration Project Descriptions

Lone Tree Lagoon
This project involved restoring fish access, improving habitat conditions, and increasing tidal flow in Lone Tree Creek and an associated tidal wetland on the Swinomish reservation. The project included moving ~150' of the creek from a roadside ditch to a natural channel, installing spawning gravel and large woody debris, installing 4 culverts and a 40'

Turners Bay
2007 SRFB funded for design and permitting. Project will 1) Restore connectivity for the upper marsh area by removing road fill or improving the crossing structure. 2) Address water quality and ditching in the headwater wetlands. 3)Protect existing sediment source beaches in adjacent the

Similk Bay
Characterize the restoration potential for this site.
Restore intertidal pocket estuary habitat by removing fill to open up the outlet channel to the marsh, replacing the road fill with a bridge, and constructing channels in the existing Protect and restore sediment source beaches in the adjacent drift cell that historically maintained the lagoon spit

Milltown Island
SRFB funded in 2004 grant round. Milltown Island (212 diked acres) was sold to WDFW after farming was deemed impractical in this area. The site has lain fallow and restoration efforts have been minimal, consisting of several ad hoc dike breaches in 2000. On-site tidal channel abundance is much less than in nearby reference areas. Dikes were extensively breached to restore tidal and riverine

Rawlins Road
Based on a feasibility study involving hydrologic and hydrodynamic modeling conducted by Battelle in 2006, this project encompasses several alternative actions that can be implemented in the vicinity of the terminus of Rawlins Road and Blake's marina complex. Each action seeks to setback levees in such a way as to create additional emergent marsh and riverine wetlands. There is potential synergy between this project and the concept of a North Fork Levee setback. The projects footprint would vary substantially based on the willingness of private landowners to engage and the institutional incentives provided for their consideration. The alternatives evaluated include: Thein Farm, Rawlins Road

Wiley Slough

Design funded in 2003, construction funded in 2005. Set back dikes to the pre-1956 footprint of the levee system along Wiley Slough. The property is currently in public ownership. Details are available in a recently published

McGlinn Causeway
Improve hydraulic connection between the North Fork of the Skagit and Swinomish Channel north of McGlinn Island. This action is expected to improve access by juveniles to estuarine rearing habitat in Padilla Bay. The current access, through a small opening in the rock jetty (known as the “Fish Hole”) is limited because river flow is directed away from

Fisher Slough
This project acquires ~50-80 acres of farmland within the riverine tidal zone and restores agricultural land to channel, scrub-shrub, forested wetland, and tributary junction habitats. In addition, this project assesses ecosystem functions supplied by the Fisher Slough sub basin, including hydrology and geomorphology, and provides conceptual

Swinomish Channel Restoration
This project was added to the 2008 3 Year List as the Smokehouse Floodplain Phase Two (Phase 1 was Fornsby/Smokehouse) and subsequently selected as a replacement project for the Swinomish Channel Restoration Project after the Telegraph Slough site across the channel could not move forward due to the landowner changing their mind. Due to the proximity of the Smokehouse project, the orginal project title was retained. This project proposes to excavate approximately 2.5 acres, or ~9000 linear feet of channel habitat on tribal land within the reservation boundaries. It also proposes to create approximately 20 acres of improved floodplain connections within the Smokehouse floodplain project area. This proposal will accomplish these objectives through floodplain and channel excavations guided by FVCOM modeling work within the

South Fork Off Channel
This project will restore forest vegetation and enhance salmonid access to a ~40 acre riverine tidal wetland. The project area includes one of the largest and last remaining tracts of intact riverine tidal forest or riparian habitat left in the Skagit delta between Burlington and Conway, providing critical food resources, LWD, rearing and refuge habitat in the most modified section of the Skagit. Portions of the project area have been used in the recent past as pasture and for off-road motorcycle racing. Sediment deposition has impaired connectivity to an off-channel wetland. Acquisition will protect the area from further degradation and will allow

Swinomish Channel Fill Removal

This 2007 SRFB funded project will remove Swinomish Channel dredge spoils from 10 acres of historical tidal marshes at up to six sites along the Swinomish Channel, on Swinomish Indian Tribal Community property. Additionally, one tidal channel will be excavated on each site to create a total of 0.5 miles of channel, each 3-6 ft wide and 3-4 ft deep. Channel design was based on a channel geometry model that uses marsh size as the predicting variable, developed with data from Skagit Delta tidal marshes (Hood 2007). A baseline study (n = 250 data points) of the elevation distributions of native marsh vegetation along the Swinomish Channel was used to determine restoration site design elevations. Restored marsh vegetation will likely These sites, while relatively small, are strategically located along a salmonid migratory corridor connecting the natal Skagit River with the extensive juvenile Chinook and other salmon rearing habitat of the Padilla Bay eelgrass meadows. Rearing and refuge habitat along the Swinomish Channel is currently severely reduced compared to historical conditions. The type of habitat proposed for restoration has been identified as a critical limiting factor in the Skagit Chinook Recovery Plan (SRSC and WDFW 2005), and this project will

Telegraph Slough Reconnection

This project seeks to re-establish connectivity and estuarine marsh habitat through the historic footprint of the former Telegraph slough corridor. This project will necessitate concurrence from the WSDOT and local landowners. Isolation of this historic slough pathway was the direct result of State actions through the construction of the Highway 20 corridor. Therefore, restoration will require significant resources to

Dry Slough Tidegate (Goose Reserve)

Negotiations are underway that include DD22, WDFW and WW Ag Association in the context of the Drainage and Fish Initiative, and a settlement may be reached that results in restoration actions within three years involving private landowners and portions of the WDFW snow goose reserve. This could include SRTs and setback berms or substantial dike relocation. While there is some risk that there will not be a project in the near term, SRSC believes that the potentially very high value of this restoration outcome

South Fork Pole Yard

This project will address the limiting factor of lack of rearing habitat for Skagit chinook fry as described in section 5.3.10 (Loss of Delta Habitat) of the Skagit Chapter of the Puget Sound Chinook Recovery Plan. The objective of this project is to restore tidal and riverine processes that will scour and maintain on-site tidal channels providing rearing habitat for juvenile chinook and other salmonids. Similar projects

Restoration of the tidal wetland will be accomplished by moving the Skagit River Dike east to Pioneer Highway. The project will reconnect approximately 40 acres of floodplain

Cascade Trail Relocation

This project involves relocating a portion of the Cascade Trail on the right bank of the Skagit River just downstream from Lyman Slough. It would include purchasing land and/or easements from adjacent property owners and relocating approximately one mile of trail to the edge of the adjacent floodplain. This will involve the removal of approximately 2500' of rip-rap currently degrading the mainstem Skagit River and restoring 30 acres of floodplain to natural river processes. The Skagit Chinook Recovery plan specifically calls for removal or modification of rip-rap structures in the mainstem and relocation of roads or other infrastructure to restore floodplain functions in this reach of the river. The existing rip-rap structure has had some existing threat of

Cockreham Island

Evaluate and implement habitat restoration for Etach Slough and Cockreham Island on the right bank of the Skagit River between just downstream from the town of Hamilton. Approximately 2,470 linear meters of bank armoring on the right bank limits connectivity between the river and floodplain on the north side. There are a number of houses in this area that are prone to flooding, and the large bank protection structures are routinely damaged or threatened by the river, so Skagit County is completing assessment work The floodplain between Lyman-Hamilton Highway and the river in this location is 540 hectares (1,334 ac) and there are over five kilometers of sloughs and channels that would benefit from increased connectivity with the river. Restoration actions could include removing or setting back bank protection structures, relocating homes, removing or relocating roads, and planting native vegetation in the floodplain. These may be expensive and difficult measures, but it makes sense to pursue ambitious restoration in this area because the habitat value is very high, flood risks and

Cottonwood Island

A SRFB funded feasibility study is underway and will provide project options at the Cottonwood Island site. Likely project alternatives will include dike setbacks, the reconnection of an historic side channel of the lower Skagit River and access to floodplain habitat on the forested island. The resulting tidal wetland habitat is of critical need for Skagit River Chinook.

Day Creek

A study conducted by Skagit Fisheries Enhancement Group identified a variety of restoration and protection options to enhance the production of salmonids in the lower Skagit. All species of salmonids are known to exist in the study area. Chinook and steelhead would greatly benefit from creek restoration efforts, while rearing coho and spawning pink and

Debays Slough Feasibility & Design

This project would evaluate the feasibility of reestablishing hydraulic, sediment and fish access connections to the mainstem river throughout the historic oxbow now called Debay's Slough in the vacinity of Sterling. This oxbow would could be reconnected such that mainstem flows could re-establish or reoccupy historic channel networks. Conceptually this would require partial removal of dikes established by the Army Corps of Engineers south of Highway 9 and the excavation of historic channels in the present day floodplain. Compeating land uses do present constraints that will need to analyzed include impacts to and from agriculture, urban infrastructure and wildlife management areas. Debay's slough is publicly owned but currently managed as a Swan reserve. Efforts to re-establish flow within this relic oxbow Impacts to flood management strategies will also need to be considered. Especially in the vicinity of Hart's Slough and its interface with urban infrastructure. The northern end of Harts slough meets Highway 20 at a location that historically fed the development of Gages Slough during flood events. Albeit atrophied, this intersection between Hart's Slough and Gages Slough is still a focal point of flood management efforts is large events. Restoration efforts could increase the likelihood

Finney Creek Supplemental LWD treatement

Install supplemental log jams in Lower Finney Creek as indicated by monitoring efforts being conducted by SFEG/USFS with DOE funds. Previous treatements used both un-ballasted and ballasted log jams that focused on improving channel conditions for temperature moderation. Supplement work would involve placing ballasted log jams over the lower two reaches of Finney Creek to to create holding water for Chinook and other salmon. Log placement would be designed to create localized scour, deepen pools, sort gravel and provide cover. Unlike previous the treatements that target the margins of the active channel, Appendix C of the Skagit Chinook recovery plans suggests that complex wood habitat is a preferred rearing habitat for chinook parr migrants. The proposed supplement LWD placement in Finney would promote formation and

Finney Riparian

The purpose of this project is to restore the conifer species such as Western Red Cedar and Western Hemlock to the Finney Creek riparian forest. Historically, Finney Creek was a highly productive tributary to the Skagit River, supporting almost all native salmonid species. In past decades timber harvest activities have degraded habitat conditions by increasing sediment supply and degrading riparian forest conditions. An extensive field inventory has documented that the Finney Creek riparian forest is currently dominated by young stands of hardwoods. While hardwood species are generally well represented in natural floodplain forests, regular observations of cut conifer stumps, the presence of conifer stands on historic aerial photographs, and other Large woody debris recruited from the riparian forest creates pools, anchors logjams, and provides other benefits to all species that use Finney Creek. In a channel as large as Finney, conifers are needed to form pools and anchor log jams. Conifer species grow to much larger sizes and also decay slower, so they provide functions in the channel for Restoration activities will include planting shade tolerant conifers in the existing forest, to eliminate competition from shrub species, and to remove some of the smaller existing alders to provide growing space for conifers.

Gilligan Floodplain

Restore side channel and floodplain habitat in the Skagit River downstream from Gilligan Creek by removing 170 linear meters of a flood control dike and associated riprap bank protection, which will restore function to approximately 69 hectares (170 acres) of floodplain. Floodplain vegetation will be improved by removing non-native vegetation and

Hamilton PDA

The Town of Hamilton is situated on an historically very active and complex section of the Skagit River Floodplain such that it is often inundated when the Skagit River floods; most recently in the 2003 and 2006 flood events. Town establishment and subsequent flood prevention efforts have altered the complex floodplain habitat. The intention is to partner with a process that is currently underway to move the Town of Hamilton and other residents of the floodplain to a new town site. The removal of infrastructure will allow the full restoration of the historically altered floodplain including,

Hansen Creek Alluvial Fan

The Hansen Creek Alluvial Fan & Wetland Complex project will result in design, permitting, and construction for the reactivation of a 65-acre alluvial fan, restoration of an associated 80-acre wetland complex including possible additional connections to downstream habitat through SR20, and the development of a planting plan for the entire project site. The project primarily targets Coho salmon, but Hansen Creek is also used by Chinook, Coho, Chum, & Pink Salmon, Steelhead & Cutthroat Trout. In addition, Bull Trout and other Ultimate construction of these projects will result in a significant increase in the amount and variety of habitat types in the Hansen Creek Watershed. Reactivating the alluvial fan and restoring the associated wetland complex will result in a dramatic increase in the amount and complexity of spawning and rearing habitat in the Hansen Creek Watershed. Reconnecting the alluvial fan floodplain to the

Middle Skagit Acquisitions

This project will result in systematic and permanent protection of the highest-quality chinook and coho rearing and spawning habitat remaining in this portion of the Skagit Properties considered for acquisition were chosen for their quality and quantity of functioning fish habitat. Adjacency to existing protected areas and threat of increased development were also considered. By focusing on properties with the best remaining habitat and building on existing protected areas, this project will result in permanent protection of significant The side-channels, sloughs and low-gradient tributaries in this section of the Skagit River are situated immediately upstream of the most populated reaches of the watershed. They provide the last opportunities for coho and chinook rearing before fish enter the urban and agricultural zones of Population growth in Skagit County is rapidly reducing the availability of relatively undisturbed large parcels of key habitat. Deferral of a focused protection effort will preclude a significant opportunity for salmon recovery.

Middle Skagit Floodplain Restoration

The Middle Skagit Aquisitions Project already on the 3 year list uses a systematic method to permanently protect the highest-quality chinook rearing and spawning habitat remaining in this portion of the Skagit River. The focused Middle Skagit protection effort represents a significant opportunity for salmon recovery that could be lost otherwise. As most of the pristine properties have already been protected in the Middle Skagit floodplain, more and more of the lands prioritized for purchase through the assessment work requires some sort of restoration work. This project proposes to conduct small scale restoration work on lands purchased for conservation purposes in the floodplain of the Middle Skagit River, tributary streams, alluvial fans and upland riparian areas. Small scale restoration will primarily mean riparian restoration with Chinook benefit including revegetation using native plants, removal of invasive plants and repairing or building fences to exclude livestock (or humans) and protect riparian areas and may include removal of culverts or improving fish passage for Chinook benefit.

Skiyou Slough

Skiyou Island was recently acquired by the USFS as a part of the Wild and Scenic River Corridor. Over 243 hectares (600 ac) in size, the island was intensively farmed and managed for agricultural purposes. Surrounded by a relic slough channel the site has been the focus of considerable restoration activity aimed at re-establishing the riparian functions of the floodplain and channel corridor. However, little attention has been focused on removing hydraulic restrictions near the upstream inlet to the slough channel. Much of this armoring work has been a direct by product of the Gilligan Dike construction, which forced hydraulic forces toward established landowners at the slough inlet. If the

Upper Skagit Floodplain Riparian

The objective of this project is to restore riparian areas along the main stem Skagit River. Trees and shrubs will be planted on the left bank of the Skagit just downstream of its confluence with the Sauk River and on properties in the middle Skagit area recently acquired by The Nature

Illabot Creek

Illabot Creek is a highly productive tributary that enters the left bank of the Skagit River shortly upstream from Rockport. The associated alluvial fan and floodplain area totals over 520 hectares (1300 acres). Over 400 meters of Illabot Creek have been straightened and armored with riprap to protect a bridge crossing and powerline corridor. As a result, a historic secondary channel was abandoned and current primary channel is steeper, shorter, and disconnected from the surrounding floodplain. Riprap bank armoring and channel straightening have decreased channel complexity and changed the channel type from a forced pool-riffle reach to a plane-bed reach, decreasing the available habitat.

Lower Cascade Roads

This sediment reduction project would result in the removal of a 1.1 mile section of forest road, revegetation of the obliterated road surface, and the treatment of approximately 10 water bars (abandoned culvert crossings) that pose a mass wasting hazard in Cascade River subbasin. Poorly designed and abandoned forest roads are a major source of sediment in forested watersheds due to surface erosion. These roads can trigger mass wasting events (landslides) that can substantially fine sediment loads to stream channels. These fine sediments can subsequently be routed into large stream and river channels downstream, resulting in the degradation of Chinook spawning, incubation, and juvenile rearing habitat over large areas. The Skagit Chinook The Jordan-Boulder Creek watershed unit area (WUA) in the lower Cascade River was identified as one of four areas in the Recovery Plan that impacted upper Skagit Summer Chinook salmon due to sediment impairment by the Recovery Plan (Section 5.3.5). Sediment and mass wasting degrades spawning habitats of upper Skagit Chinook salmon, and can substantially increase the mortality of incubating Chinook eggs. The lower Cascade River is also used as a migration and rearing area for upper Cascade Spring Chinook Salmon, bull trout, and steelhead trout. Sediment production can seriously impact the juvenile rearing habitat of all three species. Hydrological impairment (specifically peak flows or flooding) resulting from forested land-use practices in the

Seattle City Light (SCL) purchased 1,100 acres in the Boulder Creek watershed in late 2007 in partnership with Wash. Dept. of Natural Resources and U.S. Fish and Wildlife Service. This area will be permanently protected and managed as conservation area. The majority of this land now poses a low risk to sediment production and mass wasting since logging will be eliminated. However, the lower 1.1 miles of the main access road through this property remains unvegetated, and this area of the road continues to produce sediment through surface erosion. Erosion of the road has been increasing due to unauthorized use by All-Terrain Vehicles. We are proposing to rip the surface of the road using a excavator, and recontour the road cut areas within some steep side-slope areas to natural grade using existing road fill materials. Following surface ripping and recontouring, we would treat
All culverts have been removed from the road and replaced with water bars by the previous owner. However, approximately 10 of the water bars pose a risk to mass wasting due because they are hydrologically active and adjacent to steep slopes. These specific areas would be treated to reduce water concentration during rainstorms, and would be reinforced with boulders and other suitable
The present Three-Year Plan includes a the "Suiattle Roads" project, which will reduce sediment delivery to stream by upgrading and decommissioning forest roads in WUAs that have identified as sediment-impaired in the Recovery Plan. This petition will add a similar project in the Cascade River subbasin that addresses the same concerns with a sediment-

Car Body Hole

This project would be to remove approximately 550 linear meters of riprap bank armoring (and associated car bodies) at Car Body Hole, which is located on the right bank of the Skagit River across from Illabot Creek. This section of the Skagit River was identified in the floodplain analysis as having a gap in off-channel habitat and there are a number of historic channels on this parcel that would likely become wetted if the bank armoring were removed. Riparian and floodplain vegetation has been cleared on most of the parcel, so this project would also restore native vegetation to the site. The purpose of this project is to restore natural channel migration and the development of off-channel habitat and

A feasibility study was completed that examined the effect of human modifications to the alluvial fan and floodplain of Illabot Creek. This study will identify multiple alternatives that will restore channel complexity to the compromised reach and select one based on potential costs and benefit to habitat. Restoration alternatives include: 1) relocating the road and bridge to the historic crossing further upstream on Illabot Creek and removing all riprap bank armoring in the floodplain reach, 2) constructing an additional bridge span at its present location to accommodate an historic secondary channel and removing most of the riprap upstream and downstream of the bridge, or 3) removing some of the

Upper Skagit Floodplain Restoration

Upper Skagit land acquisition is focused on protecting and restoring diverse floodplain functions and habitats important for chinook salmon in the areas identified in the attached maps. Initial acquisitions were focused on parcels identified in previous Skagit Watershed Council-endorsed assessment work. Newer acquisitions utilize the scientific principles developed in the Chinook Recovery Plan to acquire lands in the 'Upper' Skagit as well as the Sauk, Suiattle and Cascade basins important to chinook recovery. As most of the pristine properties have already been protected in the Upper Skagit floodplains, more and more the lands prioritized for purchase through the assessment work requires some sort of restoration work. This project proposes to conduct small scale restoration work on lands purchased for conservation purposes in the floodplains of the Upper Skagit, Sauk, Suiattle and Cascade Rivers. The restoration work must clearly have Chinook benefit, be associated with lands purchased in the floodplains of the above listed areas and be permanently protected for conservation purposes.
as long as the restoration work meets the above criteria. Small scale restoration will primarily mean riparian restoration with Chinook benefit including revegetation using native plants, removal of invasive plants and repairing or building fences to exclude livestock (or humans) and protect riparian areas. Additional small scale restoration may include simple removal of culverts or improving fish passage on the protected property that would have Chinook benefit. Other small scale restoration projects with Chinook benefit may also be included, however the benefit to Chinook must clearly be demonstrated for the restoration work proposed. Funds could also be used to pay for design, planning and permitting as needed for these small scale restoration projects. Small scale restoration projects will not exceed 20% of the purchase price of the protected property. This work will build on the successes and lessons learned from past salmon

Diobsud Roads Erosion Control

Skagit Conservation District is partnering with USFS on an erosion reduction project to reduce the risk of road failures, erosion and its negative effects to Bacon Creek and Diobsud Creek, and their flood plains. This project is designed to reduce the risk of road failure and resultant sediment production that occur from water collection and concentration and its negative affects on fish habitat. The project consists of culvert replacement and/or removal and replacement with rocked rolling dips, ditching and fill stabilization. Chinook, Dolly Varden utilized this area as well as coho, chum, pink, sea run and resident populations of cutthroat, rainbow (steelhead). This project targets the limiting factor of egg to fry survival due to sedimentation for native Chinook, Coho, steelhead and Dolly Varden. This roadwork was first documented in 1995 FS ATM Risk Analysis, 1996 landslide sediment delivery (Paulson, K. 1996) and 1995 following storm activity. This proposal will address 30 miles of high risk ditching and fill stabilization); Road 1062, Oaks Peak MP 10.5 and 1062014 MP 0-2.5; road placed into storage, culvert removal, install rocked line rolling dips. Road 1060 Bacon Creek MP 4.5-6.0; decommission (culvert removal, fill stabilization and installation of rock lined water bars). Road 1050 Diobsud Cr MP 0 -7; road upgrade to standard. Road 1054 MP 0-2.5 and Road 1056 MP 1.5; roads placed into storage. Two fish passage structures will be replaced on

Upper Skagit Acquisitions, Sauk and Suiattle River Land Acquisitions, Cascade River Land Acquisitions

Land acquisition work, led by The Nature Conservancy (TNC), Skagit Land Trust (SLT) and others, will focus on the purchase of parcels to protect and restore diverse floodplain functions and habitats important for chinook salmon. Initial acquisitions will focus on parcels identified in previous Skagit Watershed Council-endorsed assessment work. In addition, Skagit River System Cooperative (SRSC), TNC, SLT and the Skagit Watershed Council Restoration and Protection Committee will apply the scientific principles developed in the Chinook Recovery Plan to revise and refine previous assessment work (conducted in the 'Middle' and 'Upper' Skagit as well as in the Sauk basin) to identify additional parcels important to chinook recovery. In addition to improving current methods of identifying parcels with existing habitats worthy of protection, new methods will be developed for the identification and evaluation "combination

and purchase negotiations. Parcels will be acquired from willing sellers at fair market value determined by appraisals. Restoration design and simple restoration work will be conducted as needed. This work will build on the successes and lessons learned from past salmon habitat acquisition work, address the limitations of previous assessment tools, and enable a more comprehensive and integrated approach

Sauk Roads

Poorly designed or maintained forest roads can reduce spawning and rearing habitat quality by increasing sediment delivered to streams through surface erosion and mass wasting processes. Approximately 50 miles of Forest Service roads were identified in the Sauk Prairie and Dan Creek watersheds in the Sauk River Basin that are poorly designed or maintained and have the potential to increase sediment to fish-bearing streams. Treatments have already been completed on approximately 25 miles of road with a previous This project will address sediment impacts by upgrading roads that are needed for access and by decommissioning roads that are no longer needed. Upgrading roads involves increasing the size and number of cross-drain culverts, increasing the size of stream crossings to convey high flows, sediment, and woody debris, dipping and armoring fill material over larger culverts, and reducing or removing fill material on unstable slopes located adjacent to or upslope from streams. Decommissioning roads involves removing culverts, removing fill material from drainage crossings and on unstable slopes located adjacent to or upslope from

Upper Sauk Erosion Control

Replace worn out and undersized culverts for 7 miles of road; replace Chockwich Fish Passage; and under seperate effort replace Bedal Bridge an undersized structure.

Downey Creek Crossing

This project involves expanding the bridge crossing over Downey Creek to a length that would minimize impacts to approximately 1.2 hectares (3 ac) of the alluvial fan associated with the Downey Creek near the confluence with

Boundary Bridge

Restore floodplain connectivity by removing road and fill material associated with Boundary Bridge on the south side of the Suiattle River. Approximately 260 linear meters of road crosses the floodplain in this location. This road blocks several historic channels and isolates approximately 17 hectares (43 ac) of floodplain. The bridge currently does not provide access because the river eroded approximately 25 meters of the approach on the south side in October 2003. Habitat restoration options include removing the bridge and all of the associated road fill in the floodplain or extending a new bridge span across a portion of the floodplain and

Suiattle Roads

Poorly designed or maintained forest roads can reduce spawning and rearing habitat quality by increasing sediment delivered to streams through surface erosion and mass wasting processes. This is especially problematic for spawning conditions in the Suiattle River Basin, where the majority of Chinook spawning occurs in the lower reaches of a few larger tributary streams because the main stem has The watersheds in the upper reaches of the Suiattle River Basin have low road densities and so are not likely at risk from road-related sediment impacts. The Circle, Straight, Tenas, and Big Creek watersheds in the lower reaches of the Suiattle River all support at least some Chinook spawning and have higher densities of forest roads. Roads in the Tenas and Big Creek watersheds were inventoried in the summer of 2006 to evaluate potential impacts to fish habitat and the high hazard roads need to be upgraded or decommissioned. Inventory is still needed in the Circle and Tenas Creek watersheds. Upgrading roads involves increasing the size and number of cross-drain culverts, increasing the size of stream crossings to convey high flows, sediment, and woody debris, dipping and armoring fill material over larger culverts, and reducing or removing fill material on unstable slopes crossings and on unstable slopes adjacent to or upslope from streams, and restoring natural drainage patterns by excavating drainage crossings in the road fill.

Dearinger Campground

The habitat gap analysis showed that the Sauk River between River KM 5.2-6.2 is lacking in off-channel and backwater habitat. The primary floodplain modification in this area includes several riprap bank protection structures along a road that leads to Dearinger Campground. The one on the left bank of the Suiattle River at approximately River KM 6.8 was damaged during the flood of 2003 and again during 2006, and is currently being considered for repairs. This is outside the identified reach, but the floodplain in this area is large enough that restoration at this site could benefit the identified reach. A project at this site would involve removing the remaining riprap bank protection and relocating the road outside the floodplain. Although this project has not been scoped in detail, it would be relatively straightforward

Cascade River Trib Fish Passage

A fish passage barrier occurs on a left bank tributary to the Cascade River at Cascade River Mile 1.25. This drainage supports chinook salmon as indicated by the Limiting factors fish distribution layers and as confirmed by Brett Barkdul of WDFW. The crossing consists of an overgrown road crossing to the south side Cascade River Road at mile post 1. The land is privately owned (Daryl Trezise P45974) and has no

SFEG has already started to look for match funding for this project. We are in the process of contacting the landowner who has not been responsive to our phone messages. Soon we will be drafting the landowner a letter to encourage them to participate in the project. The repair would likely include construction of a recycled flat car bridge crossing to replace