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Floodplain Management: A Synthesis of Issues Affecting Recovery of Puget Sound

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Floodplain Management:

A Synthesis of Issues Affecting Recovery of Puget Sound

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Foreword

On May 27, 2009, the Puget Sound Partnership released its Action Agenda, providing a regional blueprint for the recovery of Puget Sound. In it, the Partnership identifies the importance of the protection and restoration of floodplains.

The Partnership recognized that floodplain management presents unique issues and challenges, requiring the careful understanding of the laws, policies and social desires that have led to our current use of floodplains, as well as the ecologic functions that they afford to strike the right balance going forward.

In the Spring of 2009, Partnership staff initiated work to study the issues, gain background and insight into current issues, trends and conflicts, and report back on options for actions that would advance Action Agenda implementation related to floodplains.

This report is the result of that work. The report highlights the social, ecological, legal and policy issues that exist in attempting to manage diverse land uses in floodplains for the protection or restoration of floodplain and nearshore ecological functions.

The report admittedly focuses more on the issues surrounding floodplains and nearshore areas associated with Puget Sound Rivers than on coastal flooding issues, although both are important. We acknowledge that our initial outreach to citizens and our analysis was constrained by the limited time available for this work and thank those who gave generously of their time to help the Partnership gain insight and background information needed for this work.

The Action Agenda's Six Statutory Goals:

1. A healthy human population supported by a healthy Puget Sound that is not threatened by changes in the ecosystem;
2. A quality of human life that is sustained by a functioning Puget Sound ecosystem;
3. Healthy and sustaining populations of native species in Puget Sound, including a robust food web;
4. A healthy Puget Sound where freshwater, estuary, nearshore, marine, and upland habitats are protected, restored, and sustained;
5. An ecosystem that is supported by groundwater levels as well as river and stream flow levels sufficient to sustain people, fish, and wildlife, and the natural functions of the environment; and
6. Fresh and marine waters and sediments of a sufficient quality so that the waters in the region are safe for drinking, swimming, shellfish harvest and consumption, and other human uses and enjoyment, and are not harmful to the native marine mammals, fish, birds, and shellfish of the region.

Our study cannot replace the numerous reports that have been done over the years by other floodplain experts across the nation who have studied these issues; indeed, that prior work provides useful analysis and guidance to our current efforts. We have incorporated the best of what others have suggested where applicable to the issues in Puget Sound. This report also suggests some areas for early action by the Partnership and other entities to advance the Action Agenda, taking advantage of current events that present opportunities for change. The recommendations set forth here do not represent final policy or program decisions by the Partnership, but instead are presented to stimulate further discussion and refinement of the actions proposed.

I. Floodplain Ecological Functions

One might ask: Why do we care about floodplains when we are trying to save Puget Sound? The answer is simple. The waters that flow from the upland mountains, down to the valleys, and out to the Sound, pass through our region's floodplains. Essential habitat-forming processes occur in each place along the way. Without healthy floodplains, Puget Sound and its people cannot be healthy.

Floodplains have served as the center of life for humans, fish, and wildlife for centuries. Floodplains include the flat land that borders a stream, river or lake. This proximity to water not only provides a source of water, but also the moist, rich soil hosts a diverse array of plants, making the area attractive to wildlife, livestock, and people. Floodplains include the river channels and floodways that convey floodwaters (typically deeper, faster moving waters) as well as the floodplain fringe (Galloway et al., 2006).

The first people of the Puget Sound, the northwest tribes, inhabited the rich deltas of its major river systems, finding valuable food and fiber resources in its waters and along the shorelines. They sought protection from the harsh winter storms in the Sound's bays and inlets. When explorers and traders arrived 200 years ago, they also valued the floodplains and deltas for their rich soil, on which crops and livestock thrived. In those days, Puget Sound rivers also served as major transportation corridors.

In addition to providing food, agriculture and transportation to humans, and habitat for fish and wildlife, floodplains function in a number of ways to keep watersheds healthy. Floodplains store floodwaters, recharge aquifers, and clean water that moves through them. The trees and shrubs along streams slow floodwaters, allowing for absorption and less flooding downstream. Natural vegetation also supplies critical habitat components such as large woody debris (LWD). LWD contributes to channel complexity, creates pools, and helps retain sediment and nutrients.

Today, with nearly 4 million people in the region and more coming, the lands found in floodplains across Puget Sound are home to many diverse uses. We use floodplains for things such as mining, grazing, farming, transportation, logging, recreation, and residential and commercial uses. Some floodplains contain significant amounts of development, including entire cities and towns (e.g., the cities of Burlington, Monroe, Carnation, Orting, Hamilton), industrial development, supporting infrastructure (e.g., sewage treatment plants, roads, bridges, major ports and shipping operations, railroads, electrical power transmission lines, gas and

Natural and Beneficial Resources and Functions of Floodplains

Natural Flood & Erosion Control

- Provide flood storage and conveyance
- Reduce flood velocities
- Reduce flood peaks
- Reduce sedimentation

Water Quality Maintenance

- Filter nutrients and impurities from runoff
- Process organic wastes
- Moderate temperature fluctuations

Groundwater Recharge

- Promote infiltration and aquifer recharge
- Reduce frequency and duration of low stream flows

Biological Productivity

- Support high rate of plant growth
- Maintain biodiversity
- Maintain integrity of ecosystem

Fish and Wildlife Habitat

- Provide breeding and feeding grounds
- Create and enhance waterfowl habitat
- Protect habitats for rare and endangered species

Harvest of Wild & Cultivated Products

- Enhance agricultural lands
- Provide sites for aquaculture
- Restore and enhance forest lands

Recreational Opportunities

- Provide areas for active and passive uses
- Provide open space
- Provide aesthetic pleasure

Areas for Scientific Study and Outdoor Education

- Contain cultural resources (historic and archaeological sites)
- Provide opportunities for environmental and other studies

Source: Federal Interagency Floodplain Management Task Force Report at p. 41 (1994)

oil pipelines, and water supply pipelines), as well as recreational uses (e.g., docks, moorage, camp grounds, and golf courses). In more rural areas floodplains are used for farming, dairy and beef cattle operations (often with manure lagoons), equestrian centers, lowland bird hunting, and wildlife habitat reserves. To support and protect these and other uses, people have dammed and diverted rivers, built levees and roads, filled in wetlands and diked waterways. Dredging and channel straightening have also occurred to make it easier for boats and larger ships to navigate in larger river systems.

In its natural state, floodplain habitat is resilient and can withstand natural disturbance such as fire, flooding, pest and disease outbreaks, slope failures, and windstorms. Adding an abundance of human disturbance can overwhelm such resilience. It is well documented that human disturbances have altered floodplain dynamics by increasing stream velocity, changing sediment transport and supply, altering groundwater recharge, reducing or impairing wood storage and recruitment, and changing light delivery and stream temperature. While filling in floodplains increases human habitat and development locations, it often removes that area from fish and other wildlife use. The increase in pollutants and stormwater run-off from developments, coupled with a diminished filtering capacity of the floodplain, further degrades water quality. (See, *Discussion Paper: Habitat and Land Use Topic Forum,* Puget Sound Partnership, 2008.)

Marine Areas Subject to Flooding Impacts

Areas adjacent to lakes, rivers, streams and freshwater wetlands aren't the only areas that flood. Other areas of similar concern include the marine nearshore, coastal marshlands, and coastal wetlands of Puget Sound. The Puget Sound nearshore is defined as that area of marine and estuarine shoreline totaling approximately 2,500 miles from the Canadian border, throughout Puget Sound and out the Strait of Juan de Fuca to Neah Bay. It generally extends from the top of shoreline bluffs to the depth offshore where the lack of sunlight limits plant growth, and upstream from estuaries to the head of tidal influence. It includes bluffs, beaches, mudflats, kelp and eelgrass beds, salt marshes, gravel spits, and estuaries (Puget Sound Nearshore Ecosystem Restoration Project , 2010).

Marine nearshore areas provide food, shelter, and breeding grounds for coastal and marine species, including commercially important species such as crabs, shrimp, and salmon. Coastal habitats also provide other irreplaceable services. Marshes filter pollutants and retain nutrients, helping to maintain good coastal water quality. Wetlands, barrier islands, and coral reefs provide significant protection against coastal storms—dissipating wave energy and absorbing flood waters (NOAA, 2010). In these important marine and shoreline areas, other issues are emerging that cause concern: increasing coastal population growth in natural hazard areas and sea level rise. According to the National Oceanic and Atmospheric Administration:

> The U.S. coast confronts a wide range of natural hazards from hurricanes and severe storms to floods and landslides, earthquakes and tsunamis, shoreline erosion and land subsidence. All of these coastal hazards threaten both lives and property—a problem that becomes more pressing as the coastal population continues to rise. Although coastal counties comprise only 17 percent of the nation's land area, they are home to over half the U.S. population. In 2003, 153 million people lived along the coast, 33 million more than in 1980. The population was projected to grow by another 7 million by 2008.
>
> Intensive development in the coastal zone not only places more people and property at risk to coastal hazards, but it also interferes with natural protections from severe hazard events. For instance, seawalls on a beach accelerate beach erosion and

inhibit the beach's ability to absorb storm energy, thus exposing buildings to the full force of wind and waves. Development can also destroy wetlands which serve as important buffers against storm surge and flooding.[1]

The destruction in New Orleans from Hurricane Katrina provided a clear, extreme example of what can result when humans alter nature's built-in storm buffer systems.

The Ecological Baseline: the Current State of Floodplains and Nearshore Areas

The current state of floodplains and nearshore areas in Puget Sound is far from healthy. The National Marine Fisheries Service (NMFS) recently stated that all freshwater, estuarine, and nearshore marine habitats designated as critical for salmon and killer whales have been degraded throughout the Puget Sound region. In studying several key habitats, NMFS observed:

> **Shoreline habitat** – At least 33 percent of Puget Sound shorelines have been modified with bulkheads or other armoring. The number of piers and docks in Puget Sound is 3,500; the number of small boat slips 29,000; and the number of large ship slips is 700. Each of these is a source of structure and shade which can support predator fish, interfere with juvenile salmonid migration, diminish aquatic food supply, and is a potential source of water pollution from boating uses.
>
> **Floodplain and off-channel habitat** – Most devastating to the long-term viability of salmon has been the modification of the fundamental natural processes that allowed habitat to form and to recover from disturbances such as floods, landslides, and droughts. So critical are these driving processes that Spence et al. (1996) state that ". . . salmonid conservation can be achieved only by maintaining and restoring these processes and their natural rates." Among the physical and chemical processes basic to habitat formation and salmon persistence are floods and droughts, sediment transport, heat and light, nutrient cycling, water chemistry, woody debris recruitment and floodplain structure (Shared Strategy, 2005). The development of land for agricultural purposes has resulted in reductions in river braiding, sinuosity, and side channels through the construction of dikes, hardening of banks with riprap, and channelization. Constriction of the rivers increases the likelihood of gravel scour during high flow events and the dislocation of rearing juvenile steelhead. Much of the steelhead habitat has been lost, including overwintering habitat and side channel areas that existed before European immigration (NMFS, quoting Beechie et al., 2001; Collins and Montgomery, 2002; Pess et al. 2002).
>
> Vegetation removal has also altered the hydrologic system in many watersheds, affecting the watershed's retention of moisture and increasing the magnitude and frequency of peak and low flows. Wetlands play an important role in hydrologic processes, as they store water that ameliorates high and low flows. Roughly 73 percent of the wetlands in major deltas of Puget Sound rivers have been lost in the last 100 years.
>
> **Estuarine habitat** – Before 1900, 4,000 acres of tidal marshes and mudflats once existed where Harbor Island and the East and West Waterways now stand in Elliott Bay near Seattle. Throughout Puget Sound, 290 pocket estuaries formed by small

[1] *See*, Office of Ocean and Coastal Resource Management: Hazards (http://coastalmanagement.noaa.gov/hazards.html).

independent streams and drainages have been identified; of these, 75 are stressed by urbanization (NMFS, 2009, page 55).

In rating existing floodplain function, NMFS found:

> 71 percent of the State's floodplains are in poor condition.

> Out of 41 water resource inventory areas (WRIAs) with overall floodplain ratings in Washington State, 71 percent had generally poor floodplain conditions. In assessing Type 1 streams that are also shorelines, NMFS further found that floodplain problems in the larger streams will impact all species, while impacts in small streams will have greater effects on coho, chum, and steelhead (Smith, 2005).
>
> In looking further into those ratings, NMFS found that all of the basins that rated "fair" or "good" for floodplain conditions, consisted of 65 percent or more forestland and were associated with a low human population density of less than 1 person per acre. In contrast, WRIAs with lands with 15 percent or greater urbanization had the ratings of "poor" or "poor-fair" floodplain conditions. Similarly, agriculture-dominated WRIAs (25 percent or greater agricultural use) also had "poor" or "poor-fair" conditions (Smith, 2005).

In addition to basic floodplain habitat conditions, there are other important factors affecting rivers. NMFS found:

> Channel simplification has had a significant impact on river habitat:
>
> More than 90 percent of the wetlands and floodplains once associated with lowland alluvial rivers of the Puget Sound basin have been lost.

> Historic river simplification has been a significant factor over time, creating systemic habitat loss and degradation to river valleys in the last 200 years (Beechie et al., 2001; Pess et al., 2003). In addition to the immense reduction in land area once linked to fluvial processes, river ecosystems underwent a massive simplification in their physical complexity (Abbe et al., 2003; Collins et al., 2003). Less than 10 percent of the wetlands and floodplains once associated with lowland alluvial rivers of the Puget Sound basin remain intact (Collins and Montgomery, 2002).
>
> Channel simplification resulted from aggressive efforts to improve navigation, flood control, fish passage, agricultural and industrial development of floodplain lands, and the development of hydroelectric and water supply projects. Historic channel alterations included clearing channels of thousands of snags and logjams, construction of levees, revetments and dams. Ditching, diking, and dredging activities in floodplains, primarily found in urban and agricultural regions, were associated with 73 percent of the coho salmon rearing habitat losses in the Skagit River system (Beechie et al., 1994). Another widespread activity that had a significant impact on Pacific Northwest rivers was the clearing of snags and logjams (Collins et al., 2002; Abbe et al., 2003).

Effects of Climate Change on Floodplains and Coastal Functions

Another factor contributing to the environmental baseline is climate variability. Salmon populations, particularly early life history stages, are affected by climate variability in marine and freshwater environments (NMFS, 2008). These climate variations include effects from El Niño and La Niña, the Pacific Decadal Oscillation (Mantua et al., 1997), and past and on-going climate change.

Climate change, and the related warming of global climate, has been well documented in the scientific literature (IPCC, 2007; ISAB, 2007). Evidence includes increases in average air and ocean temperatures, widespread melting of snow and glaciers, and rising sea level.

Observations consistent with a changing global climate have already been documented in changes of species ranges and in a wide array of environmental trends (ISAB, 2007; Hari et al., 2006; Rieman et al., 2007). In the northern hemisphere, ice cover durations over lakes and rivers have decreased by almost 20 days since the mid-1800s. These changes in snow pack decrease ocean productivity in the marine environment, and stream flows in the freshwater environment, decreasing survival of salmon early life stages (Scheurell and Williams, 2005; ISAB, 2007). For many species, their ranges have shifted pole-ward and upward in elevation. The combined effects of warming stream temperatures and altered stream flows will very likely reduce the reproductive success for many salmon populations in Washington's watersheds, with actual impacts varying according to how a species uses river and stream habitats at different freshwater life stages, and the degree to which the precipitation pattern in a watershed is snow- or rain-dominant. (Mantua, 2009). For cold-water associated salmonids in mountainous regions, where upper distribution is often limited by impassable barriers, an upward thermal shift in suitable habitat can result in a reduction in range, which in turn can lead to a population decline (Hari et al., 2006).

Temperatures in most major rivers in Western Washington have markedly increased over the past 5 to 25 years. Pacific salmon rely on colder water for spawning and incubation. Increasing temperatures are likely to adversely affect the availability of suitable cold water habitat. Ground water temperature has been shown to strongly influence the distribution of Pacific salmon species. Ground water temperature can also be linked to selection of spawning sites and has been shown to influence the survival of embryos and early juvenile rearing (Spence et al., 1996; McCullough, 1999).

Climate change is already affecting the frequency and magnitude of fires, especially in the warmer, drier regions of the west. To further complicate our understanding of these effects, the forest type that naturally occurs in a particular region may, or may not, be the forest that will be responding to the fire regimes of an altered climate (Bisson et al., in press). In several studies related to the effect of large fires on fish populations, Pacific salmon and steelhead appear to have adapted to past fire disturbances through mechanisms such as spatial dispersal and genetic plasticity. However, extreme fire events may have substantially changed watershed conditions for salmon and steelhead and other aquatic species, e.g., habitat loss, simplification and fragmentation of aquatic systems, and the introduction and expansion of exotic species (Bisson et al., in press).

With respect to climate change and the resulting sea level rise, NOAA states:

> As Earth's climate warms, so do the oceans. Ice caps melt, ocean water expands, and, as a result, sea level rises. Even when glacier melt is not considered, the average global sea level is predicted to increase as much as 7 to 23 inches over the next century (IPCC, 2007). Sea level rise increases the risks coastal communities face from coastal hazards such as floods, storm surge, and chronic erosion. In the Gulf of Mexico region, a recent multi-agency report noted that within the next 50 to 100 years, 27 percent of the region's major roads and other critical transportation infrastructure will be below projected sea levels for the region (CCSP, 2008). The effects of storms would be even greater; more than half of the region's major highways, almost half of its rail miles, 29 airports, and all ports are projected to be more vulnerable to damage from storm surge.

> Sea level rise may also lead to the loss of important coastal habitats and public access areas. Due to existing shoreline development and protective structures (such as sea walls and bulkheads), wetlands, beaches, and other intertidal areas may not be able to migrate inland as sea level rises. These important areas would drown under the rising sea. Sea level rise can also lead to saltwater intrusion—salt water moving further up rivers and seeping into groundwater—making the water unfit for drinking or irrigating crops (Office of Ocean and Coastal Resource Management, 2010).

(NMFS, 2009, page 57-61.) Not only are such impacts hazardous to the environment, they impact sectors of our economy. The drowning of nearshore areas will have a significant impact on local commercial shellfish production and salmon harvest, and sea water intrusion into rivers will affect agricultural irrigation operations and local drinking water supplies in some areas. Such actions could have significant impacts on Puget Sound's economy.

Social and Economic Effects of Flooding

The economic and social consequences of flooding are significant. Since 1990, Puget Sound has experienced 13 flood-related federal disaster declarations, an average of more than one every two years.[2] Statistics gathered from Federally-declared disasters by the National Wildlife Foundation are sobering:

- At least 42 people have been killed by flooding, and thousands have lost homes and businesses in the wake of flood waters.
- More than 700 homes in Puget Sound have been flooded multiple times.
- Flooding has closed our major highway, Interstate-5 four times in the past 20 years, twice since 2007, costing an estimated $181 million in losses.
- In the last two decades, flood losses in Puget Sound have exceeded $860 million.
- In the wake of flooding in 1990, over 600 cattle died in Snohomish and King Counties and 1,200 dairy cattle had to be evacuated from Fir Island in Skagit County. In 2003, over 300 farm animals died in flooding.
- Last year, over 100 homes were destroyed and 2,000 were damaged in floods.

The statistics reveal the grim reality of the social and economic cost of continuing to allow development and other activities within floodplains: People and livestock will continue to be killed, injured or displaced; homes, businesses and public infrastructure will continue to be lost or damaged and taxpayers will be asked to cover repetitive losses. The irony of this situation is that it is happening in areas where taxpayers have spent millions of dollars on protective levee systems.

The value of land subject to repeat flooding can also be measured in other ways. In terms of the ecosystem services provided by floodplains, Earth Economics has determined that the annual value of Puget Sound's floodplain habitats is immense: $96,000 per acre for salt marshes, $31,400 for each acre of water produced by freshwater wetlands, $19,700 per acre for aesthetic and recreational uses of rivers and lakes. According to The Nature Conservancy, "The ability of our

[2] Source: National Wildlife Foundation, "Indicators of People Affected by Federal Flood Disasters in Washington." 1990-2009(2009).

rivers and estuaries to produce these [ecosystem] services depends on their ability to interact with the floodplains that are adjacent to them."[3]

With this ecological, economic and social baseline in mind, we examine the ways in which land is currently managed in Puget Sound floodplain and nearshore areas.

II. Managing Puget Sound Floodplains – Today's Issues

As noted above, 71 percent of Washington's floodplains are poorly functioning and very little – just under 10 percent–of the floodplains and wetlands associated with lowland alluvial rivers remain. In Puget Sound, protection of the remaining habitat functions of floodplains and restoration of lost functions is noted as a high priority in many listed species recovery plans, and the Action Agenda calls for several near-term actions supporting these outcomes. Current events have also placed an urgent focus on floodplains and coastal zones and how we manage them:

- Scientists and emergency management agencies are grappling with the effects and risks posed by climate change in attempting to map floodplains and floodways in freshwater systems, as well as in those nearshore areas (coastal zones) highly susceptible to marine flooding from increasing wave force and height and sea level rise.

- NMFS has issued a Biological Opinion (BiOp) pursuant to Section 7 of the Endangered Species Act concluding that certain elements of FEMA's National Flood Insurance Program jeopardize the continued existence of ESA-listed salmonids and Southern Resident Killer Whales in Puget Sound. In response to certain Reasonable and Prudent Alternatives (RPSs) set forth in the BiOp, FEMA is presently making changes to the flood insurance program, including the preparation of a new model land use ordinance for adoption by local governments. New standards will be set by FEMA that will be required elements of continuing in the NFIP for local governments.

- In many Puget Sound watersheds, salmon recovery groups are seeking to protect and restore floodplains to their natural condition. In those watersheds, floodplains are altered with levees, and some of those levees contain vegetation and provide a minimal, but important, amount of habitat that supports salmonids. However, where local governments receive federal funding from the Army Corps of Engineers (Corps) under PL 84-99 to help maintain those levees, they must manage the levees according to the Corps' levee vegetation standards. These standards, found in the Corps Engineering Technical Letter (ETL) 1110-571 and the Levee Owners Manual, provide guidelines for landscape plantings and vegetation management on levees, floodwalls, embankments dams and appurtenant structures. These standards limit uncontrolled vegetation growth (brush, weeds, or trees) to smaller than two inches in diameter and *require removal* of trees and shrubs from levees that exceed those measurements based on performance and safety concerns. Under those existing standards, regional variances can allow vegetation on some levees. Puget Sound has been granted such a variance over the years, which is now in jeopardy.

  On February 9, 2010, the Corps announced its proposal to end its variance policy which, if adopted, will require thousands of trees and shrubs to be removed from levees and floodwalls across our region. (See, Docket No. COE-2010-2007). The Corps official position appears to be that all vegetation on levees causes a public safety concern. This position is the subject of intense debate across the country, and has drawn protests from salmon recovery proponents and other leaders, who argue that miles of riparian habitat will be lost in areas that are already

[3]Bob Carey, The Nature Conservancy, commenting on the value of Puget Sound floodplains in providing ecosystem services.

under stress from alteration of the natural habitat by dikes and levees.[4] The effects of the proposed policy are already being felt. Hundreds of trees have been removed last summer by King County, to avoid jeopardizing their levee maintenance funding. Continued removal of vegetation will have significant, negative impacts on ESA-listed salmonids and could expose the groups or governments engaged in removing such vegetation to risk of legal action and liability under the ESA for violating the Section 9 "take" prohibition. In addition, the removal of such vegetation from levees under the Corps new policy threatens the significant investment of public and private dollars already spent to restore habitat in floodplains. The PSP's Action Agenda calls for the creation of a working group to resolve the conflict with the levee maintenance standard. This is identified as a near-term action.

In order to understand the current system of how rivers, nearshore and coastal areas are managed for flooding impacts,[5] we briefly examine the three levels of government, who have varying types of regulatory authority over those areas.

Management Authority over Floodplains and Nearshore Areas

Federal Authority over Floodplains

At the federal level the NFIP, adopted as part of the National Flood Insurance Act of 1968, plays a major role in efforts to reduce flood losses to property and the loss of natural floodplain functions. Implementation authority over the NFIP is vested in the Federal Emergency Management Agency (FEMA). Some commentators believe that the NFIP is the most important regulatory tool for controlling land use actions that negatively affect floodplain functions. However, as will be discussed below, others are highly critical of the NFIP, and believe that as currently configured, the Program causes environmental damage and encourages or allows population growth in areas subject to repeated flooding, causing significant risks to public safety and unnecessary public expense.

Other federal laws grant regulatory authority to other agencies and programs that impact the use of floodplain areas, including the U.S. Army Corps of Engineers (through its levee management program, discussed above), and the National Marine Fisheries Service and U.S. Fish and Wildlife Service (through their implementation of the Endangered Species Act) and the Environmental Protection Agency (EPA) through its implementation of the Clean Water Act.[6] Additionally, the management actions of the U.S. Forest Service relative to commercial forestry can impact and have impacted river functions upstream of floodplains, resulting in downstream impacts. With so many federal agencies taking actions in floodplains, implementing competing and often conflicting programs and regulations, ecological function has often suffered at the expense of achieving other goals.

State Authority over Floodplains

At the state level, primary authority to manage floodplains is vested in the Department of Ecology. In adopting Chapter 86.16 RCW (floodplain management), the Legislature stated that the alleviation

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[4] On March 12, 2010, a joint letter in opposition to the Corp's proposed policy revision was sent to Corps Headquarters in Washington D.C., signed by State agency directors, mayors, commissioners, Tribal leaders, environmental groups and the Regional Director of NMFS.

[5] These areas are often referred to in shorthand as floodplains, channel migration zones, frequently flooded areas, floodways, special flood hazard areas and coastal zones, high hazard areas (16 U.S.C. Section 1453), all of which have unique and specific meanings by law. In this paper, we use the terms "floodplains" and "coastal zones" to refer to the broadest freshwater and saltwater areas prone to flooding impacts. Where important for the context, the specific term is used and defined.

[6] Summaries of FEMA's NFIP program and the US Army Corps of Engineers' floodplain authorities are found in Appendix A.

of recurring flood damages to public and private property and to public health and safety is a matter of public concern. (RCW 86.16.010) As a means of minimizing such damage, the State assumed full regulatory control over the navigable and non-navigable waters of the State (subject to federal control of navigation) and charged the department with coordinating the State's floodplain management regulation elements of the NFIP. (RCW 86.16.020) Ecology has the authority to "examine, approve or reject designs and plans for *any structure or works, public or private, to be erected or built or to be reconstructed or modified upon the banks or in the channel or over and across the floodway* of any stream or body of water in the State. (RCW 86.16.025) The statute also directs Ecology to take certain actions with respect to approving all city and county floodplain management ordinances and in providing technical assistance and public outreach information to them. The statute adopts certain minimum standards that local ordinances must contain, and vests enforcement authority in the attorney general or local prosecuting attorney to ensure compliance with its terms. However, despite this grant of authority, the Department of Ecology is not authorized to adopt any statewide regulation that is more stringent than the minimum criteria of the NFIP, except in certain circumstances. See, RCW 86.16.031(6)(8). This restriction was enacted by the legislature in 1987, after the Department of Ecology attempted to adopt more stringent protections through its rulemaking authority.

In addition to this statute, the Department of Ecology also has regulatory authority to influence federal actions that occur in floodplain wetlands throughout Washington through its implementation of Section 401 of the Federal Clean Water Act, and to regulate implementation of the Shoreline Management Act, through its authority to approve or disapprove a local government's shoreline master program. The Department of Fish and Wildlife has the authority to regulate activities that could impair fish life through the State's Hydraulic Code (Ch. 77.55 RCW).

Local Authority over Floodplains

Local governments also have regulatory control over use of floodplains through the Shoreline Management Act, Growth Management Act[7] (by adopting critical areas ordinances), drainage, grading and filling regulations, zoning regulations and other land use controls. Of the local governments in Washington State that have floodplain lands in their jurisdiction, a majority (90 percent) participate in FEMA's NFIP program, and therefore have adopted the minimum standards of the NFIP for regulating local floodplain construction. (NMFS 2009) However, these regulations are now in flux, as local governments await new policy direction from FEMA resulting from the NMFS BiOp, as it responds to NMFS's Reasonable and Prudent Alternatives (RPAs) for avoiding jeopardy to ESA-listed species.

In addition to these primary land use regulations, there are other statutes that authorize jurisdictions to engage in flood management activities. The list of such regulations is fairly extensive. (See Table 2.) The State of Washington, local governments and numerous special districts (such as flood districts and diking and drainage districts), are also authorized to engage in flood management activities. Most of the enabling legislation for such districts focuses on flood prevention, flood damage control, or the use of waterways for navigation or other human purposes, rather than protecting the ecological resources found in floodplains or discouraging land use activities in flood prone areas.

[7]A summary of the main provisions of the Shoreline Management Act and Growth Management Act are found in Appendix A to this report.

Table 2. Selected State Legal Authorities Controlling Floodplains, Flooding, and Waterways

State Statute	Description of Authority
Title 85 RCW	**Diking and Drainage**
85.05	Diking districts
85.06	Drainage districts and miscellaneous drainage provisions
85.07	Miscellaneous diking and drainage provisions
85.08	Diking, drainage and sewerage improvement districts
85.12	Federal aid to diking, drainage and sewerage improvement districts
85.15	Diking, drainage, sewerage improvement districts –1967 act
85.16	Maintenance costs and levies – improvement districts
85.18	Levy for continuous benefits – Diking districts
85.20	Reorganization of districts into improvement districts – 1917 act
85.22	Reorganization of districts into improvement districts – 1993 act
85.24	Diking and drainage districts in two or more counties
85.28	Private ditches and drains
85.32	Drainage district revenue act of 1961
85.36	Powers of special districts
85.38	Special district creation and operation
Title 86 RCW	**Flood Control**
86.05	Flood control districts – 1935 act
86.09	Flood control districts – 1937 act
86.12	Flood control by counties
86.13	Flood control by counties jointly
86.15	Flood control zone districts
86.16	Flood plain management – Implementation of the National Flood Insurance Program
86.18	Flood control contributions
86.24	Flood control by state in cooperation with federal agencies, etc.
86.26	State participation in flood control maintenance
Ch. 35.56 RCW	Local Improvements – Filling and Draining lowlands (marshland, swampland, tidelands or tide flats) by cities and towns
Ch. 36.94 RCW	County drainage systems, authority, procedures
Ch. 36.70A	**Growth Management Act**
36.70A.170	Requiring designation and protection of critical areas (including fish and wildlife habitat conservation areas, wetlands, frequently flooded areas)
36.70A.172	Best available science to be included in adopting policies and development regulations to protect critical areas
RCW 79.26.560	Right of way for diking and drainage purposes over state lands
Title 88 RCW	Navigation and Harbor Improvements
Ch. 90.58 RCW	**Shoreline Management Act** – development of shoreline master programs for regulation of shoreline uses
Ch. 91.08 RCW	Public Waterways – (1911 statute) creating new waterways, deepening channels for navigation, draining swamp lands or overflowed lands; waterways as highways
Ch. 77.55 RCW	State Hydraulics Code – regulating the impacts on in-water resources from certain development
Ch. 89.10	Farmland Preservation
Titles 79 and 79A RCW	Public Lands regulations and Recreational Lands regulations

Changing the course of decline in river and floodplain habitat functioning to sustain healthy floodplains for Puget Sound recovery, will entail review, and in some cases revision, of all of these regulatory schemes and the way in which we manage lands in floodplains. There are several plans

which are instructive on what is needed, and many more studies at the national level that have called for reform of flood policy.

National and State Flood Policy – Calls for Reform

The National Debate

Our nation's top experts have consistently called for change in the direction of our national flood policy.

The impact of flooding on the nation's infrastructure, the environment, and its citizens has been extensively debated and studied. Over the past 15 years, Congress has held 56 separate hearings on flooding, flood prevention, and management and the nation's emergency response to flooding (Carter, 2009). At the same time, there have been 36 separate flood-focused reports written by the U.S. General Accounting Office. In the aftermath of Hurricane Katrina, Congress commissioned 6 separate reports and held 10 congressional hearings on the lessons learned from that storm and our nation's response to flooding in coastal areas.

The most prominent report addressing flood damage reduction is entitled, *Sharing the Challenge: Floodplain Management into the 21st Century*, also known as the Galloway report, produced by the Interagency Floodplain Management Review Committee, which was led by Brigadier General Gerald Galloway (Galloway et al., 1994). It recommended a floodplain management strategy that sequentially supported:

- Avoiding inappropriate use of the floodplain;
- Minimizing vulnerability to damage through both structural and nonstructural means; and
- Mitigating flood damages when they do occur.

It also recommended reducing the vulnerability of population centers to roughly the 500-year flood (Carter, 2009). *What is striking about many of these studies and reports is the consistency with which our nation's experts have called for change in the direction of our national orientation toward flooding and floodplain management.* As one writer observed:

> Over the years, many commissions and reports, like the Galloway report, have called for a fundamental re-orientation in national flood policy that addresses not only the economic but also the social and environmental welfare tradeoffs of floodplain development. These commissions and reports have urged Congress, relevant agencies, and the public to commit to the broad goal of reducing the dangers and damages via flood and floodplain management, rather than allowing development that could be located elsewhere to occur in flood-prone areas. Despite these recommendations, a fundamental reorientation of floodplain management has not occurred.

(Carter, 2009). Additionally, the U.S. Commission on Ocean Policy has adopted a national plan for managing and protecting coastal resources, calling for reform in many areas including in areas subject to coastal hazards and tidal inundation due to sea level rise (U.S. Commission on Ocean Policy, 2007). Following up on those recommendations, the Joint Ocean Commission recently released its recommendations to the Obama Administration and Congress, calling on them to undertake 20 urgent actions to protect the world's ocean resources, including certain items that are relevant to protecting floodplains and coastal zones. (Joint Ocean Commission, 2009) These actions included:

- Strengthening and reauthorizing the Coastal Zone Management Act to enhance coastal management and to serve as a key mechanism to enable coastal communities to prepare for, and adapt to, climate change impacts; and

- Actively encouraging the use of innovative, science-based approaches that take into account important ecosystem dynamics that affect the health of our nation's marine ecosystems as a whole and, in particular, its fisheries.

Id. Most recently, in the wake of renewed Congressional interest in reforming the NFIP, the Institute for Policy Integrity of the New York University School of Law published a policy analysis examining the distribution of the NFIP's costs and benefits across the Country. Their findings were striking:

NFIP Statistics

- Floods are the #1 most common natural disaster in the United States.
- In the past 10 years (1999-2008) the average flood insurance claim paid in the US was more than $49,529 per year.
- In the past 10 years (1999-2008) the NFIP paid over $27,639,087,687 to flood insurance customers.
- The average premium for a yearly flood insurance policy is around $558.
- 24.4% percent of all flood insurance claims are filed in moderate-to-low risk areas.
- The NFIP paid $3,202,783,762 in flood damage claims to-date to homeowners, business owners, and renters in 2008.

FEMA CLAIMS AND PAYMENTS FOR 2008

Top 10 States NFIP CLAIMS (as of 6/09)	Total Number of 2008 FEMA Claims	Total 2008 FEMA Claims Payments
Texas	35,248	$2,155,876,306
Louisiana	11,795	$426,062,584
Iowa	4,461	$161,216,863
Missouri	3,098	$109,502,641
Illinois	2,893	$106,815,301
Indiana	2,843	$103,873,812
Florida	2,785	$60,885,186
Wisconsin	1,512	$33,639,208
Mississippi	1,315	$30,391,763
North Carolina	699	$17,762,844

- Because of its below-market insurance rates and intense hurricane-related floods in recent years, the NFIP has accrued a substantial deficit: $19 billion. As currently structured, the program will not be able to repay this debt.

- Since the NFIP cannot charge market rates, hold reserve funds, or purchase reinsurance, the program faces a constant financial risk of insolvency. The NFIP also causes environmental damage, by externalizing the risk of building in ecologically-sensitive floodplains.

- Those costs – financial risk and ecological damage – are widely distributed among taxpayers and citizens across the Country.

- The benefits of the NFIP, by contrast, are enjoyed largely by wealthy counties and by a significant number of owners of vacation homes.

- The Gulf Coast states benefit disproportionately from the below-market insurance rates of the NFIP.

(See, Holladay and Schwartz (2010), "Flooding the Market – The Distributional Consequences of the NFIP," Institute for Policy Integrity). The report calls on Congress to "...devise a structure that will distribute the costs and benefits with rationality and fairness." Id. Some believe that reform of the NFIP should include a discussion of residual risk, meaning that structures built and maintained behind accredited flood control levees should not be exempted from insurance requirements, reflecting the reality that they still exist within areas at risk of flooding.

State Plans Call for Reform

At the state level, two regional plans (the Puget Sound Chinook Salmon Recovery Plan[8] and the Action Agenda), have called for the comprehensive reform of the way in which we manage floodplains. The Salmon Recovery Plan provides numerous statements calling for protection and restoration of floodplains and nearshore functions in nearly every watershed in which ESA-listed Chinook salmon are found. In some watersheds, it is the highest priority.[9]

Similarly, the Puget Sound Partnership's Action Agenda calls for protection and restoration of floodplain processes in several places in the plan, including some that are Near-Term Action items:

- A.2.2.5 – Work with FEMA and local governments to prevent further residential, commercial and industrial development in floodplains. Evaluate the feasibility of assisting vulnerable communities in relocating away from floodplains.

- B.1.3 – Restore floodplain and river processes where there is a high likelihood of re-creating ecosystem function (e.g., lower 2.6 miles of the Dungeness River).

- D.1.1 – Develop methods and conduct future planning for biodiversity and species recovery, water quality, water supply and reuse, air quality, floodplain management and land use, in an integrated way. This includes coordinated planning efforts among and between federal, state, local and tribal governments.

- D.1.2 – Integrate and coordinate implementation of existing Sound-wide and local plans and programs to improve efficiency and effectiveness in addressing Action Agenda priorities (including, among other things….floodplain management plans).

- D.4.1.6 – Reconcile levee maintenance standards to address the ecosystem needs of providing habitat and protecting public safety and welfare. Collaborate with the U.S. Army Corps of Engineers and other key stakeholders to develop modifications to standards or their application through the existing variance mechanism.

- D.4.4 – Convene a process with Corps, NMFS, USFWS, jurisdictions responsible for levee maintenance and stakeholders to identify and describe conflicts between levee maintenance standards and healthy habitat. This meeting should result in recommendations to the Corps to develop/review potential modifications to levee maintenance standards or the use of the existing variance mechanism (Puget Sound Partnership, 2008).

Similar recommendations are found in yet another regional report entitled, *Uncertain Future: Climate Change and its effects on Puget Sound* (Climate Impacts Group, 2005).

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[8] The Chinook Salmon Recovery Plan ("Recovery Plan"), calls for the recovery of "… self-sustaining, harvestable salmon runs in a manner that contributes to the overall health of Puget Sound and its' watershed and allows us to enjoy and use this precious resource in concert with our region's economic vitality and prosperity." (Recovery Plan at p. 11). If this is accomplished, it will help to "maintain and restore ecological processes and services…[including] maintaining instream flows, restoring riparian habitat and estuarine habitat, removing fish passage barriers, opening up off-channel and floodplain habitat, reducing sediment loading – all of these actions will help restore ecological processes that are essential to freshwater, terrestrial, and marine species and systems." (Recovery Plan at p. 23). Within the Plan, many watersheds have identified the impairment of floodplain function as a limiting factor to salmon recovery.

[9] For example, the Puyallup-White Watershed Chapter states "….[T]he most important action for salmon recovery in the Puyallup/White Watershed is to reconnect the mainstem rivers with their floodplains. . .." Puget Sound Chinook Salmon Recovery Plan, Volume II—Puyallup/White Watershed Chapter at p. ii.

Collectively, these plans are important in that they recommend significant changes from the status quo in how we manage and regulate floodplains and coastal zones subject to flooding.

The urgency of changing direction is underscored by the recent NMFS' NFIP Biological Opinion. In it, the Services concluded that the continuation of our current course of altering floodplains and natural channel critical habitat, allowed by the NFIP, puts listed Puget Sound Chinook salmon and Southern Resident Killer Whales in jeopardy of extinction (NMFS, 2009). In addition, the 2007 Puget Sound Chinook Salmon Recovery Plan adopted by NMFS provides specific recovery goals in each of the 14 watersheds with floodplains, calling for the removal and setback of levees and for the reconnection of the floodplain to the natural river system. In some areas, this is the highest priority for salmon recovery from the threat of extinction.

Mindful of this risk and the Partnership's stated 2020 Action Agenda goals, we provide the following options for consideration by the Partnership and its leadership bodies, and the region as a whole in charting a new course for Puget Sound floodplains.

III. Charting a New Course: Options for Implementing the Action Agenda

In light of everything we have learned from our scientists, federal, state, and local policy experts and the numerous studies that have been done to examine what is wrong with the way we manage floodplains today, we conclude that the status quo will not lead us to recovery of Puget Sound by 2020.

In terms of our protection mechanisms, the current regulatory system is insufficient to achieve the Partnership's goals. This is mainly because most of the floodplain laws adopted over the past century were written to allow and perpetuate human activities within floodplain that alter or remove natural habitat processes and functions, or that control or minimize flooding risks through structural means, rather than to ensure the long-term natural functioning of floodplains.

At the federal level, despite decades of study and policy papers calling for change, there is still no comprehensive national policy on floodplain management and few regulations that focus on flooding and floodplains from an ecological standpoint. Federal regulatory goals in floodplains often conflict, which will make it more difficult to achieve the Action Agenda goals.[10] Adding to the complexity of the problem, there are many different federal agencies involved in flood management programs and the national committee that formerly provided some federal coordination among them was abandoned in the late 1990s.[11]

The NFIP is generally viewed as the nation's most far-reaching set of land use regulations aimed at floodplains and flooding, and is widely adopted by local governments as the minimum standard for land use regulation in floodplains. Yet, portions of the program have been found by NMFS to jeopardize two ESA-listed species in Puget Sound.

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[10] See, for example, the U.S. Army Corps of Engineers' levee vegetation standards [Corps, 2010], the NFIP mapping practices that allow floodplain filling to remove an action from FEMA's NFIP jurisdiction and regulation [NMFS, 2009], both of which allow alteration habitat-forming processes in floodplains, contrasted with the ESA recovery goals found in two recent species recovery plans: the Puget Sound Chinook Salmon Recovery Plan floodplain goals [NOAA, 2007] and the Recovery Plan for Puget Sound Southern Resident Killer whales [NOAA, 2008], which both call for the reconnection and restoration of floodplain function.

[11] The Water Resources Council established by PL 89-80 was disbanded in 1983. Its successor is the Federal Interagency Task Force on Floodplain Management, which has been unsuccessful in playing the same leadership role of its predecessor.

At the state level, two of our stronger environmental protection laws, the critical areas regulations requirements found in the Growth Management Act, and shoreline master program requirements found in the Shoreline Management Act, could be used to provide greater protection in areas subject to flooding. However, these statutes require local government to balance competing (and often conflicting) goals. As a result, regulations routinely balance protection of floodplain and nearshore function against other public policy objectives, such as the siting of utilities, roads, and other infrastructure, the desire to sustain long-term commercial agriculture, and to allow the development of single family residences and commercial or industrial development in those areas. Despite the promise that these regulations offer to protect habitat functions in floodplains and along nearshore areas, impacts are routinely permitted through variances, exemptions, inadequate mitigation standards or through outright allowances in most regulatory schemes. In addition, few jurisdictions offer guidance or clear restrictions in their regulations as to when a proposed development must avoid impacts altogether. Routinely, project proponents must do little to show they have avoided impacts before being allowed to minimize, mitigate or restore habitat impacted by their proposal. This process is commonly known as "mitigation sequencing." The cumulative effects of these routine, permitted impacts have not been measured. But their effects are seen in the decline of habitat, alteration in watershed hydrology and the listing of species under the Endangered Species Act. Some commentators believe that if measured, cumulative impacts would be found to be significant, and most believe that ecological function will be further strained as the effects of climate change are felt throughout Puget Sound.

Despite all of this, there are several hopeful signs that things may be improving. For example, Pierce County recently adopted new floodplain regulations that provide some of the strictest flood hazard protection standards in the region, in both the freshwater and marine systems. In addition, FEMA is drafting a new model ordinance for local governments to use in response to the NMFS Biological Opinion which could provide better protection for ESA-listed Chinook salmon than the current NFIP. Additionally, the NMFS Biological Opinion, itself, will likely be considered a new scientific resource and part of the "best available science" that jurisdictions must consider in updating their critical areas and shoreline master programs regulations, which could be used to improved regulatory protections for salmonids and floodplain/nearshore functions.

In light of the foregoing, we offer the following options for near and long-term actions that the Puget Sound Partnership can take to change the status quo as it relates to floodplain management.

These actions originate from the perspective that given the PSP's statutory goals, floodplains must be managed in a way that leads to recovery of Puget Sound by 2020. This means that (1) the land remaining within floodplains essential to habitat-forming processes, structures, and function must be protected from further degradation; (2) active restoration of what has been lost in our river systems and the connection between rivers and their floodplains must be an ongoing focus of restoration and protection; and (3) the management approach to floodplains must sustain habitat-forming processes while they serve other human objectives. We believe that if taken, these actions will help ensure that floodplain management is aligned with the Partnership's Action Agenda goals and strategies.

1. Adopt a Puget Sound Floodplain Policy

A. Create and adopt a Puget Sound Partnership floodplain management policy calling for the protection and restoration of floodplain ecological functions, avoiding flood hazards to people and property, and accounting for the impacts of climate change.

The policy should be based upon best available science and articulate a performance-based set of goals for floodplain ecological function, channel migration zones, floodways,

freshwater and marine shorelines, shorelands, and nearshore areas vulnerable to sea level rise and storm surges. (Consider convening a multi-disciplinary task force to accomplish this work).

B. Require consistency from state and local governments to achieve "Partner" status with the PSP.

Consider the creation of a new designation of Puget Sound "Partner" that could be granted to state, local and tribal governments, as well as non-governmental organizations. Gaining "Partner" status with the PSP could be used as an incentive tool to encourage the taking of actions that are consistent with the implementation of the Action Agenda. Such incentives could include improved ranking for grant funding, streamlined permitting, revenue sharing, etc.

2. Push to reform national floodplain policies and laws consistent with the Partnership's Floodplain Policy

A. Amend Federal policies to achieve protection of floodplain and nearshore ecological functions ahead of other policy objectives:

- **Amend U.S. Army Corps of Engineer's levee maintenance standards** to allow for vegetation to remain for ecological purposes. At a minimum, support a Puget Sound variance to the existing policy of vegetation removal that is consistent with the ESA. Consider convening a stakeholder group, similar to the effort in California, to examiner levees as an entire system within a watershed and their role in the ecological recovery of floodplain function while providing for public safety.

- **Amend Corps legal authority and funding to allow staff to engage in floodplain management coordination work** within Puget Sound, outside of specific construction projects.

- **Amend the NFIP** to reorient national flood policy to deter and avoid risks to public safety, protect ecological functions, and account for the actual cost of flood protection within the flood insurance program.

B. Support implementation of the recommendations of the Galloway report and, in particular, **enact a national Floodplain Management Act** to define government responsibilities, strengthen federal-state coordination and improve accountability.

C. Support implementation of the Joint Ocean Commission recommendations to the Obama Administration and Congress.

3. Push to reform State floodplain policies and laws consistent with the Partnership's Floodplain Policy

A. Amend state law to provide specific protections for ecological functions in floodplains:

- **Amend Ch. 86.16 RCW (Floodplain Management) to require protection of floodplains and coastal nearshore areas** against alteration, including standards that exceed the NFIP, where less protective, using best available science.

- **Amend Ch. 90.58 RCW (Shoreline Management Act) to require protection of floodplain and nearshore functions in areas critical for habitat-forming processes.** The law should require that areas important for habitat-forming processes should be designated as "conservancy" environments, and activities that disrupt or impair such processes, structures or functions should be prohibited.

- **Amend zoning codes in floodplains to prohibit rebuilding of non-farming structures subject to repetitive loss, and discontinue incompatible uses.** Using local zoning authority, discourage the replacement of non-farm buildings or other structures in areas where flooding regularly occurs, and prohibit incompatible uses in floodplains to prevent investments that leads to permanent loss of floodplain functions and/or prevent restoration of such functions.

- **Expand the authority of the Department of Ecology to adopt and implement state regulations through rulemaking that provide protection for ESA-listed species.** Allow Ecology to provide regulatory and non-regulatory (incentive-based) protections for ESA-listed species through the programs that it implements to ensure consistency across jurisdictional boundaries within Puget Sound.

B. Amend State law to provide for consistency within and across State regulations and policies affecting floodplain and nearshore areas. Adopt amendments to Ch. 86.16 RCW, Ch. 36.70A RCW and Ch. 90.58 RCW to provide consistency in the required approach to floodplain protection. Consider repealing or amending Titles 85 and 86 RCW, to the extent those statutes authorize management of floodplains to control flood impacts and damage, without regard for the protection of ecological function.

C. Amend the Growth Management Act to:

- **Prohibit allocation of population density to urban growth areas and rural areas located within floodplains and nearshore areas** and close existing loopholes in EHB 1967;

- **Limit or prohibit development activities within floodplains** (consider the Pierce County and King County development regulations) Prohibit residential, commercial and industrial development within the channel migration zone and floodway; and

- **Prohibit the siting of essential public facilities and other infrastructure within the channel migration zone,** including construction roads, pipelines, sewage treatment plants and transportation facilities.

D. Close permitting loopholes used annually by public works agencies. Prohibit state and local government agencies and special purpose districts from maintaining levees and other structures in floodplains using "emergency" exemptions from normal permitting requirements during non-emergency events.

E. Account for Repetitive Loss during State Environmental Policy Act (SEPA) reviews. Amend SEPA to require true cost of repetitive loss to be stated in environmental checklists when analyzing project and non-project actions (including maintenance and repair projects) in floodplains.

F. Create new incentives to encourage:

- **Sustainable agricultural practices**, rewarding farming activities that work with natural floodplain ecological function; and
- **Landowners to abandon and/or remove structures** in the floodways/floodplains, allowing the reconnection of rivers with their wetlands, deltas and floodplains.

4. Perform Actions that Increase Floodplain and Shoreline Protection of Ecological Functions

A. Create Disincentives. Amend state law to create significant revenue disincentives for cities and counties that expand urban growth areas, increase population density allocations, or increase zoning density within floodplains, along shorelines or in nearshore areas.

B. Create Financial Rewards and Other Incentives. Reform state business and occupation tax law and policy to reward cities that annex urban growth areas with limited commercial and industrial development outside of floodplains or other critical areas. Invest in the development of incentive programs to encourage floodplain landowners to reconnect their land to the adjacent river system.

C. Pilot a Watershed-Scale Restoration River/Floodplain Project. In conjunction with watershed rapid assessments, fund a multi-year pilot watershed project that creates an inventory of uses and structures in several key floodplains, designs and implements specific local strategies to achieve protection of remaining floodplain functions. Encourage the pilot to include multi-jurisdictional management of the watershed. Monitor results and report on effectiveness for application in other watersheds.

D. Pilot a Study of Levee Maintenance Techniques Using Vegetation. Perform a multi-year pilot project to test levy performance using natural vegetation to create scientific support for change to Corps levy vegetation standards.

E. Increase Funding for the FEMA Map Modernization Initiative. Immediately provide more funding to FEMA to complete the Map Modernization Initiative in all Puget Sound communities by 2012.

F. Reform Corps Funding Limits to Allow Participation in Action Agenda Work. Provide more funding for Corps to prepare comprehensive watershed studies in Puget Sound to support local government efforts to regulate developments away from floodplains and floodways, and to determine long-term program for levees or other flood control structures.

G. Get Resources and Technology to Local Governments. Provide geographic information system technology and/or mapping of floodplains and coastal management zones for resource limited local governments.

H. Purchase flooding easements from farmers in floodplains. Purchase permanent flooding easements and employ other incentive-based programs on agricultural lands in floodplains as tools to create flood storage and regain floodplain ecological function, while conserving agricultural activities.

I. Purchase and Restore Key Properties. Aggressively fund buyouts, relocation and removals of structures in floodplains.

J. **Fund Habitat Monitoring in Floodplains.** Monitor and assess floodplain ecological function and report losses and gains over time.

K. **Expand funding for key federal partners and tribes to** engage in floodplain management activities within Puget Sound.

L. **Restore funding to State Department of Commerce** to work with local governments planning under GMA on floodplain issues.

5. Educate and Advocate for Floodplain and Nearshore Goals

A. **Educate the public and decisions makers on the need to protect floodplains and marine shoreline areas vulnerable to sea level rise and storm surges** from further development. Include full cost accounting to capture and convey to the public the cost of repetitive losses.

B. **Advocate that local governments** adopt comprehensive plans and development regulations to protect floodplains and nearshore ecological functions.

C. **Advocate that state and other agencies** (including utilities) locate essential public facilities, including transportation facilities, outside of floodplains.

D. **Advocate in Washington, D.C. for changes in federal regulatory regimes** that inhibit federal participation in achieving floodplain goals in the Action Agenda.

6. Build Relationships with Federal Agencies

A. **Support FEMA, NMFS, Ecology and Local Governments in creating a workable response to the NFIP Biological Opinion.** Create a multidisciplinary task force to support FEMA's effort to respond effectively to the RPAs and achieve NFIP alignment with the ESA.

B. **Support NMFS, USFWS and the Corps** in their attempt to implement the Joint Vision agreement, create a Framework similar to the 2009 California Central Valley Flood System Improvement Framework, and/or pilot project to test alternative levee vegetation standards.

C. **Create an ongoing presence in Washington, D.C.** to build relationships with key federal agencies leads and members of Congress to support changes needed for Puget Sound floodplains. Many of the changes needed to implement change in floodplain and nearshore policies and law begin in agencies headquartered in Washington DC and in Congress. Without an ongoing presence in D.C., the Partnership will be at a disadvantage in pursuing change at the federal level. Consider partnering with nongovernmental organizations already engaged in this work in Washington D.C.

D. **Continue working with State legislators to inform and build relationships on Partnership actions.** Begin a grassroots outreach/education/engagement campaign in key legislative districts to build relationships with individual legislators and their staff. Implement the recommendations received by the Salmon Recovery Council from Lobbyist Cliff Traisman in 2007, on ways to improve the effectiveness of the Partnership's legislative agenda.

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APPENDIX A

A BRIEF SUMMARY OF SIGNIFICANT REGULATORY PROGRAMS AFFECTING FLOODPLAIN LAND USE MANAGEMENT

The National Flood Insurance Program

The National Flood Insurance Act (NFIA) of 1968 established the National Flood Insurance Program (NFIP) run by the Federal Emergency Management Agency (FEMA). FEMA designed the NFIP to help address economic loss caused by flooding. The program lowers the cost of flood-related disaster costs paid by the general taxpayer, by augmenting its budget through insurance premiums paid by property owners and businesses in floodplains. The NFIP benefits those property owners because this type of insurance is not generally available on the private market.

NFIP ties insurance rates and flood plain management activities to the "base-flood elevation," or the 100-year flood elevation, in each unique flood plain. The 100-year flood designation identifies areas where water has a 1 percent chance of reaching the base flood elevation in any given year. Under NFIP, local communities in the 100-year flood plain must adopt building and land use regulations that meet minimum federal and state standards to qualify for NFIP coverage.

The NIFA requires FEMA to identify and publish information on floodplain areas nationwide that have special flood hazards and to establish flood risk zone data, which is used to set flood insurance rates. 42 U.S.C. Section 4101. Flood hazard identification is the backbone of the NFIP and is critical to managing development of the floodplain. The NFIA does not provide specific guidance on how FEMA is to implement its mapping functions. By regulation, FEMA has defined the following terms, which are key to FEMA's mapping and rate-setting activities:

- the "floodplain" is any land area subject to inundation;
- the "base flood" is the flood having a 1 percent chance of being equaled or exceeded in any given year (also referred to as the 100-year flood);
- the "area of special flood hazard" (referred to as the special flood hazard area, or SFHA) is that area within the flood plain inundated during a 100-year flood event; and
- a "floodway" is the channel of a river or watercourse and adjacent land areas that must be reserved in order to discharge a base flood without cumulatively increasing the water surface elevation more than a designated height.

See 44 CFR 59.1.

FEMA has recognized a second goal of the NFIP program: to preserve and restore natural floodplain function. FEMA did this not because it was mandated by the National Flood Insurance Act, but because of a number of external factors. (The Evaluation of the National Flood Insurance Program Final Report, page 35-36.) For example, the Act called for the NFIP to be "integrally related to a unified national program for floodplain management." The later-established Unified National Program called for this second goal of floodplain preservation.

In addition, FEMA must comply with a number of laws designed to protect floodplain resources including the National Environmental Protection Act and the Endangered Species Act, as

well as Executive Orders 11988 (*Floodplain Management*) and 11990 (*Protection of Wetlands*). Also, amendments made in 1994 to the Community Rating System part of the NFIP that allocates points to communities if they reduce their risk of flood damage, recognizes the protection of natural floodplains as a beneficial use.

Finally of note, recent lawsuits and the resulting Biological Opinion issued by NMFS seems to posit that FEMA has a preservation goal that it is not fulfilling. In fact, in 2006, the *Evaluation of the National Flood Insurance Program Final Report* concluded that "[m]ost natural and beneficial floodplain functions in the United States are still subject to being degraded by development, in part because the NFIP has not emphasized the protection of those functions and has few tools to help restore them, once impaired.[1]

It should be noted that the NFIP has only two restrictions on where construction and other development can occur (which are translated into State law through Ch. 86.16 RCW). The first restriction is that no new construction can occur seaward of the mean high tide. This standard is based on older data and maps in most coastal communities, and these sources generally do not yet incorporate projected sea level rise. Second, local governments must prohibit any encroachment within its riverine floodway that would result in an increase in flood heights. While this has slowed development in and provided substantial protection to floodways, it has not stopped for four reasons:

(1) The rule does not prohibit floodway development. Instead it allows development that can be shown not to cause an increase in flood heights.

(2) The restrictions are only as good as the maps that show floodplain locations. Where those maps do not exist or are out of date, there is no obligation to enforce floodway restrictions in those areas. This situation exists in many rural areas across the country.

(3) Where development is allowed to fill or re-grade lands or channelize natural streams, it can remove the land from the floodway and free up otherwise floodprone land for construction.

(4) Traditional mapping allows a large floodplain fringe to be developed because the floodway delineation is based on the area needed to discharge the base flood without "cumulatively increasing the water surface elevation more than one foot." This results in a relatively narrow floodway in which most development is excluded (Galloway et al., 2006). (Some jurisdictions, such as Pierce County, have adopted a zero-rise floodway standard or used other regulations that widen the defined "floodway;" but such regulations are not prescribed and have not been widely used).

See, *Evaluation of the National Flood Insurance Program Final Report* – Wetmore et al, American Institutes for Research, October 2000.

The NMFS Biological Opinion – a critical review of the effect of the NFIP on listed species in Puget Sound

On September 22, 2008, per court order and the Endangered Species Act, NMFS issued a Biological Opinion evaluating the effects of the NFIP on all threatened and endangered species in the Puget Sound basin under their purview. NMFS based their evaluation on salmon and steelhead trout "indicator" populations and concluded that the NFIP, as implemented, does jeopardize most

[1] *The Evaluation of the National Flood Insurance Program Final Report,* American Institute for Research, NFIP Evaluation Final Report Working Group, October 2006, at p. 37.

salmon, steelhead trout, and Southern Resident killer whales in the Puget Sound region, as well adversely modifies their designated critical habitat.

NMFS's Biological Opinion examined three aspects of the NFIP: the mapping program, the minimum floodplain management criteria, and the community rating system (CRS). The analysis determined how these parts of the NFIP affect listed species habitat, and how that in turn affects fish population viability characteristics, and if any changes caused would reduce the conservation prospects for the respective Evolutionarily Significant Units or Distinct Population Segments comprised of those populations.

Filling in floodplains and detrimental levee construction and maintenance practices are the two main drivers of salmon and steelhead habitat disturbance related to the NFIP. Because most listed salmon and steelhead stay in streams for one year, they are exposed to seasonal flooding. Floodplains provide refuge from high flood volume and velocities, provide access to high quality prey not otherwise available, and are used for spawning. Fill diminishes floodplain extent and alters the function that creates and maintains salmon habitat. Levee practices channel streams and remove vegetation, thus reducing food, habitat and water quality. Fill and levees also encourage developments that create extra storm water runoff, further exacerbating the problem of runoff volume and velocity. Finally, the large amount of contaminants released from developed areas further degrade habitat. Without access to healthy floodplains, salmon productivity and survival decrease.

The NMFS found that all three aspects of the NFIP they examined encouraged fill and detrimental levee practices. To begin with, flood insurance rate maps are a key component of the NFIP. They identify areas subject to a 1% chance of flooding, i.e., the 100-year floodplain, which in turn mandates flood insurance procurement and other regulatory requirements. NMFS identified two main problems with these maps. First, though statute requires the maps to be updated every 5 years, most maps of Washington communities are 20+ years old and do not reflect current or anticipated land use, nor do they consider the effects of climate change. Second, maps are easily revised based on fill and levee protection. If land is filled to a height one foot above the base flood elevation, or if land is protected by an Army Corp of Engineers (ACE) levee certified to protect against 100-year floods, then the floodplain boundary stops at the levee and all land protected or filled is "mapped out." Mapping an area out eliminates the obligation to purchase flood insurance and other regulatory requirements. In contrast, if a levee loses its certification and the area is reincorporated into the floodplain, not only will communities loose emergency flood fighting funds from the ACE, but also communities may lose their eligibility to participate in the NFIP, thus loosing disaster relief funds and federal guarantees in property financing.

The next portion of the NFIP found to encourage fill was the requirement that local communities adopt certain floodplain development criteria. If a community does not adopt these minimum standards, then they lose their eligibility for flood insurance. Criteria address things such as building materials and locations for building within the floodplain (i.e., at or above the 100-year floodplain level). Building improvements are only subject to the requirements if the structure is increased more than 50% in market value. These minimum criteria not only recommend fill, but also allows for increased development (and all the associated pollution, storm water runoff, vegetation removal problems, etc.).

Finally, the CRS is a point allocation system that gives communities discounts on their insurance premiums if they implement land use or development standards that exceed NFIP minimum requirements to prevent flood loss. Although some activities awarded points, such as floodplain acquisition, are good for listed species, some such as levee practices are detrimental.

As a result of its jeopardy and adverse habitat modification conclusion, the NMFS recommended seven reasonable and prudent alternatives (RPA) for FEMA to follow in order to avoid "take" of listed species. The first of those required FEMA to notify all NFIP communities of the BiOp outcome, and that implementation of the NFIP as it currently stood would result in the jeopardy of listed species and the adverse modification of their habitat, and thus "take" under the ESA. This notification was to include a recommendation for a voluntary moratorium on all floodplain development. It also noted that any "take" would be protected against ESA litigation so long as communities followed the revised minimum criteria outlined in the rest of the RPAs. The deadline for this RPA was 30 days after the BiOp's issuance; it was completed in October 2008.

The second RPA concerned the NFIP mapping program. In order to address the problem of encouraging floodplain fill, the NMFS recommended that FEMA only issue map revisions when the effects to listed species are avoided or mitigated. In addition, outdated maps should be updated, with priority given to critical salmon population locations. The BiOp included various recommendations to increase map accuracy, including the suggestion that flood risk behind levees be reevaluated based on future conditions, including anticipated land use and climate change. The deadline for this RPA was March 2009.

The third RPA recommended changes to the minimum development criteria required by the NFIP. Specifically, all development from waterways up to the Riparian Buffer Zone (RBZ) (up to 150 feet on either side of a stream) should be 1) prohibited or 2) demonstrated to have no adverse effects. In addition, all development within a 100-year floodplain and outside the RBZ, should be 1) prohibited or 2) mitigated (including flood storage function, habitat, and development effects offset). In general, storm water should be addressed by low-impact development, and any building expansion greater than 10% of the current building structure footprint should be subject to mitigation requirements. The deadline for implementation of this RPA ranged from 2-3 years from BiOp issuance, depending on a communities physical proximity to critical habitat.

The fourth RPA addressed the CRS and required an increase in the amount of credits given for activities that benefit listed species, and a decrease in the credits given for activities that harm listed species. The deadline for implementation was set at June 2009.

The fifth RPA addressed specific aspects of levee practices and development in the floodplain. NMFS requested that FEMA not recognize levees certified under U.S. Army Corps of Engineers (Corps) standards, unless it is demonstrated that there will be no adverse effects on listed species (i.e., not accept Corps vegetation standard practices). In addition, FEMA should make emergency repair funding available to levee operators that choose not to comply with Corps vegetation standards. Finally, FEMA should not map out areas protected by levees unless the levees do not interfere with floodplain function. As for development, FEMA should address the increase in runoff from developments by funding projects that increase floodplain storage. Implementation of this RPA must occur by September 2009.

The sixth and seventh RPAs deal with mitigation and monitoring. FEMA must mitigate any habitat, flood storage or development effects that occur within their jurisdiction from the date of the BiOp issuance. Of note, some people see this as limiting Washington's vesting rights provision. In addition, FEMA must mitigate any failed mitigation attempts, including those done by communities. These RPAs are ongoing, and FEMA must report all progress to NMFS annually.

In response, FEMA is considering or developing adjustments to portions of the NFIP. It is in the midst of preparing a model ordinance for local governments to consider in implementing land use regulations within floodplains. Other changes are underway as well.

The Army Corp of Engineers Regulatory Authority

The Army Corp of Engineers (ACE) exercises regulatory authority over activities that occur in areas of the Puget Sound floodplain categorized as navigable waterways or wetlands. Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) and Section 404 of the Clean Water Act (33 U.S.C. 1344) grant the Corps this authority. The Corps's authority includes the ability to grant permits for projects that obstruct or alter navigable waters of the United States (Section 10) or involve the discharge of dredged or fill material into waters of the United States (Section 404). Typical examples of projects requiring such permits include wetland fills for private construction or public highway infrastructure development.

The inclusion of wetlands into the Corps' jurisdiction by the Clean Water Act of 1972 (CWA) expanded the reach of Corps regulatory authority. Under Section 404 of the CWA, the Corps administers the day-to-day program, including individual, national and regional permits, and also enforces its decisions. National and regional permits are issued on a regular basis, but when the impact of an action is significant enough, an individual permit is required. The permitting process includes a notice and opportunity for public hearing. Permitting decisions are based on Army Regulations 33 CFR § 320-331. Decisions weigh public benefit and detriment and consider factors such as conservation, economics, aesthetics, wetlands, cultural values, navigation, fish and wildlife values, water supply, water quality, etc.

A variety of laws limit the ACE's ability to grant permits. Significantly, the Corps will always evaluate the proposed activity under the Section 404(b)(1) guidelines, as prepared by the Environmental Protection Agency. The guidelines restrict discharges into aquatic areas where: practicable alternatives exist; the action violates a State water quality standard, violates a toxic effluent standard, jeopardizes the continued existence of a threatened or endangered species, or violates protective requirements of a federal marine sanctuary; the action will result in significant degradation of waters of the U.S.; or if appropriate and practicable steps have not been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem. In addition, Section 401 of the CWA requires state certification or waiver of certification of all 404 Corps issued permits. As an added safeguard, the Corps implementing regulations require district engineers to conduct additional evaluations on applications with the potential for having an effect on a variety of special interests such as Indian Reservation lands, historic properties, endangered species, wild & scenic rivers (33 CFR § 320.3).

In addition to intrinsic restrictions placed on permits, all applicants must gain certification by the state that their project is in compliance with an approved state Coastal Zone Management Program per section 307(c). And, all permits issued must comply with NEPA; i.e., they must either be categorically excluded, be subject to an Environmental Assessment, or an Environmental Impact Statement.

The regional Seattle office has issued some regional permits that are in compliance with Endangered Species Act Section 7 consultation requirements, Essential Fish Habitat Consultation, and water quality certifications where applicable. Most of these regional permits deal with overwater structures, piers, ramps and floats. The local Corps has also published "work windows" for numerous locations that guide applicants to times of the year that are least likely to impact endangered salmon species. However, when an individual permit is required, the Corps must consult with NMFS and USFWS for any permit that *may* affect threatened or endangered species or their designated critical habitat per ESA Section 7. This includes locally listed salmon populations, as well as some other plant and animal species.

The Growth Management Act

Growth Management Act (GMA)–Enacted in 1991, Chapter 36.70A RCW governs the way in which land use is managed in Washington. It is today the single most important driver of land use decision-making in Puget Sound.

The GMA requires the preparation of comprehensive land use plans, future land use maps and development regulations that are consistent with the policies and objectives of the comprehensive plan. Lands are required to be divided into urban, rural and natural resource (agricultural, forestry and mineral land) categories. The GMA requires cities and counties planning thereunder to consider the population growth projections of the Office of Financial Management (OFM) for their jurisdiction, and to plan for that level of growth by providing adequate housing, transportation systems, capital facilities, and economic development directed mainly into urban areas, all the while protecting "critical areas" from impacts. Cities and counties must designate and protect *critical areas*, which include fish and wildlife habitat conservation areas, frequently flood areas, critical aquifer recharge areas, wetlands, and geologically hazardous areas. Significant litigation has occurred over the meaning of the Act, and the Growth Management Hearings Board provides administrative review and issues decisions over its meaning prior to any court proceedings.

The GMA is a "bottoms up" approach to land use planning, requiring policies, plans and regulations to be put in place at the local government level. Those policies and plans are then rolled up and reconciled with countywide land use policies (known as "countywide planning policies"), and ultimately regional land use plans (e.g., Puget Sound Regional Council's *Vision 2040 Plan*, consisting of planning goals and strategies for a four-county region). As a 14th goal of the GMA, the Shoreline Management Act goals and policies are incorporated by reference.

The Shoreline Management Act

The Shoreline Management Act (SMA) was enacted in the 1970's through a citizen initiative. It depends on a system of locally-adopted shoreline master programs that are adopted pursuant to regulations promulgated by the State Department of Ecology (See, WAC 173-26). Each shoreline master program must include environment designations, and consistent development standards and regulations governing uses of the shoreline environments. Its basic premise is that no activities are allowed on the state's shorelines that are inconsistent with the Act or local implementing regulations and, further, that there shall be "no net loss" of shoreline ecological function resulting from development activities. See, Chapter 90.58 RCW.

The regulatory reach of the SMA on aquatic systems is fairly broad. It applies to all shorelines of the state, marine waters, certain larger streams, large lakes and water reservoirs. It also includes shorelands extending landward 200 feet from the ordinary high water mark, and all wetlands and river deltas associated with streams, lakes and tidal waters subject to the Act.[2] However, the SMA is not merely a protective regulation. It also balances development and preservation near shorelines, establishes a priority of uses for the shoreline, including an emphasis

[2]The SMA applies to "all shorelines of the state" which include both shorelines and shorelines of state-wide significance, marine waters of the state together with the lands underlying them out to the western boundary of the state in the Pacific Ocean, to streams with a mean flow of 20 cfs or more, and to lakes larger than 20 acres in area and to water reservoirs. The SMA also applies to associated "shorelands" of all of these shorelines. Shorelands are defined as those lands extending landward for 200 feet in all directions as measured on a horizontal plane from the Ordinary high water mark, floodways and contiguous floodplain areas landward 200 feet from such floodways, and all wetlands and river deltas associated with the streams, lakes and tidal waters which are subject to the Act. Id. See, Ch. 90.58 RCW. (The federally approved Coastal Zone Management Program (CZMP) for Washington contains all of the local shoreline plans, except that the coastal zone plan does not include rivers and wetlands. Id.

on water-dependent uses and public access; and the reduction of adverse environmental impacts of development and other activities occurring in the shoreline zone.

Most local government shoreline master programs were originally written in the 1970s and will be revised within the next few years. Many programs are under review and revision now. In making such changes, recent revisions to the Department of Ecology's Shoreline Master Program Guidelines require local governments to use an ecosystem or landscape approach when updating their master programs. Ecosystem-wide processes and ecological functions must be characterized and the linkages with shoreline functions described. From this characterization and analysis, measures must be identified to protect and restore healthy and degraded shoreline processes and functions. Additionally, the environment designations, policies, development standards and regulations must be based on the characterization (which includes a comprehensive inventory of shoreline conditions). Local governments are also required to monitor the implementation of their SMP and demonstrate that there will be "no net loss" of shoreline function.

Recognizing that restoration will play a central role in the recovery of Puget Sound ecosystems, the guidelines require the preparation of a restoration plan. The restoration plan is also based on the characterization. The Department of Ecology has the statutory authority to review and approve shoreline plans before they become effective.

APPENDIX B

FLOODPLAINS IN PUGET SOUND – LEADERSHIP COUNCIL DISCUSSION DRAFT, JULY 9, 2009

This report summarizes and distills the information staff compiled during a round of interviews with floodplain management practitioners in 2009 to gain perspective on the current policy issues affecting their work. This report provided significant local background in the development of the main report to which this document is appended. Feedback in response to this document was incorporated into the main report, in lieu of revising this document to a final version.

PugetSoundPartnership
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LEADERSHIP COUNCIL DISCUSSION DRAFT – July 9, 2009[1]

Floodplains in Puget Sound

In April 2009, the Puget Sound Partnership began a project relating to floodplains in the Puget Sound basin in order to increase its understanding of the significant policy issues involved in managing floodplains, and to begin to identify key actions that could be taken to further the goals of the Action Agenda. Working with a consultant, the Partnership interviewed key stakeholders, both individually and in groups, to gain firsthand insight into the competing goals of people interested in protecting and restoring floodplains and those who manage floodplains for certain uses of that land. Those stakeholders contributed a great amount of their time and knowledge about the use of lands in floodplains for this study, and we thank them for their contribution.[2] As a result of these interviews and additional background research, we compiled a list of issues and perspectives that the Partnership should consider about the use and management of floodplains and what appears to be driving the use of those lands.

EDITOR'S NOTE: We found that there are widely varying perspectives on the use and management of floodplains in Puget Sound. We also heard many opinions about what should be done in the future. The Section below addresses only the issues and perspectives portion of what we heard, so that the Leadership Council gains a full understanding of where the community is today and what the issues are that we must resolve if we are to protect and restore floodplains as called for in the Action Agenda. It is anticipated that the recommended opportunities for future action by the Partnership and others will be presented at the Leadership Council's Fall meeting.

A. COMMUNITY PERSPECTIVES ON THE USE OF FLOODPLAINS

There are many different views about the use and management of floodplains. Those perspectives include:

ECOLOGICAL PERSPECTIVES

1. The land in floodplains is important for providing flood storage and for the habitat-forming processes, structures and function ("floodplain functions") that occur there.

[1] This draft is a slightly modified version of the Review Draft that was circulated to the interviewees on July 1, 2009. A small number of modifications were made to add clarity and correct minor text errors.

[2] A list of those persons participating in the interview process is included at the end of this document.

Rivers and their floodplains are important places in the life stages of salmon, bull trout and other species of fish and wildlife.

2. Many people believe we are not adequately protecting river and floodplain functions.

3. The natural floodplain of rivers presents great opportunities for recreation (fly fishing, hiking, camping and other uses). When rivers are constrained, this recreational opportunity may be lost.

4. Floodplains are important for recharging streams and groundwater, and filtering water pollution.

5. The protection and restoration of floodplain function is essential for the recovery of ESA-listed salmon species such as Puget Sound Chinook Salmon, which is a primary food source and important to the recovery of listed Orca whales in Puget Sound.

6. Puget Sound Tribes have already significantly modified their Treaty-protected harvest rights to support recovery of listed Chinook salmon. This is a cultural and financial sacrifice for these Tribes, and they expect that similar sacrifices will be made by non-tribal members of the Puget Sound community to protect and restore the ecological systems, including floodplains, needed to achieve recovery of these species.

HUMAN USE PERSPECTIVE (People, Infrastructure, Farms and Businesses Uses)

1. Floodplains and rivers should be, and have always been, controlled to protect against risks to life and property.

2. Restoring habitat can take away areas for recreational use and sometimes is dangerous to people (e.g. placing large woody debris back into rivers and in floodplains can be dangerous to swimmers, boaters and rafters).

3. There is already development in many Puget Sound floodplains and some cities and counties are actively planning for more urban growth in floodplains. There is also a significant amount of public infrastructure (such as transportation systems, sewage treatment plants, water and gas pipelines, and electrical power transmission lines) in floodplains. As a result, the alteration and impairment of floodplain function is necessary to protect the built environment.

4. Continued farming in floodplains is essential to ensure the economic viability of the Puget Sound agricultural industry and to ensure the availability of local food

sources. If farming is to continue, the alteration and impairment of floodplain function is necessary to protect it.

5. The Growth Management Act (GMA) requires counties to designate agricultural lands of long-term commercial significance, depending on soils and other considerations. Many of these lands are in floodplains. Once designated, the law requires that the land is used for farming and not other uses. This means that it is likely that dikes and levees will be built, managed and repaired in floodplains to protect those lands over time. It also means that the conversion of those lands to conservation uses is difficult and discouraged by state law.

B. PROBLEMS WITH FLOODPLAIN MANAGEMENT

There was general agreement within the group of stakeholders we interviewed that there are some systemic problems with the current way floodplains are managed under federal, state and local laws and policies. Common themes expressed include:

1. Apart from the broad goals stated in the Action Agenda and Puget Sound Chinook Salmon Recovery Plan, there is no statewide or regional overarching policy or strategy for protecting and restoring floodplain function across Puget Sound.

2. Management of floodplains in Puget Sound is accomplished in a piecemeal fashion because of the structure of our legal and regulatory system. As a result, there is little opportunity to consider the ecology of an entire river system or the constraints placed on it by levees and alteration of the floodplain.

3. Current floodplain management efforts do not adequately account for changes that are occurring as a result of climate change. These effects include larger, more frequent storms which cause increasingly severe flooding and risk to people and property.

4. In addition, current floodplain management regulations and programs do not adequately take into account the cumulative impacts – including those from hydrologic alteration and increased stormwater-borne pollution – on floodplains that result from upland development and the accompanying loss of forest cover and increases in impervious surfaces.

5. There are a variety of incentive programs designed to achieve protection of habitat areas across the landscape, including floodplains (e.g., purchase of development rights, transfer of development rights, conservation easements, flooding easements, flood protection districts, tax classifications such as open space taxation), but there

is no "silver bullet" approach that appears to be extremely successful at limiting further alteration of floodplains or causing large numbers of landowners to remove structures from floodplains.

6. Federal and state agencies believe they individually lack the sufficient breadth of regulatory authority that would be required to manage floodplains in a way that would achieve protection and restoration of full floodplain function.

7. Federal and state agencies believe that cities and counties are the units of government in the best position currently to regulate floodplains through local land use controls. However, they recognize that this is complicated and there are often multiple local governments (and other agencies) regulating and managing portions of any single floodplain.

8. Most cities and counties adopting critical areas regulations provide exemptions and variances from the protection standards to allow construction of infrastructure, residential development, utilities and other uses in the floodplain.

9. The Shoreline Management Act applies in some areas of floodplains, but has competing policy goals that call for recreational access to shorelines, the support of water-dependent uses (such as industry) and conservation. It also has exemptions and allowances for alteration of habitat in flood plains.

10. Many people view FEMA's National Flood Insurance Program (NFIP) as the regulatory tool with the most potential for achieving consistent floodplain habitat protection across Puget Sound, if those standards are amended to meet the requirements of the Biological Opinion issued by NMFS.

11. Existing conservation regulations (such as development regulations including critical areas, shoreline master program, and flood hazard regulations) adopted by local governments are not consistent across Puget Sound, and are not adequately enforced.

12. Some federal agencies have regulatory policies that are inconsistent with the Puget Sound Partnership's stated floodplain goals in the Action Agenda. An example of this includes the U.S. Army Corps of Engineers levee maintenance standards.

13. All federal agencies located in Puget Sound are supportive of regulations or incentive programs that result in better floodplain protection or restoration. However, as to changing their own programs, federal employees are prohibited from lobbying Congress to change federal law. In addition, some federal agencies

may need to overcome internal opposition to new floodplain approaches from their agency colleagues or leaders in other parts of the country. Internal opposition may arise out of opposition to the floodplain conservation policy objective, concern about how changes made here would impact the agency's programs across the country, or the need to carry out other priorities in the agency's mission.

C. OTHER CONSIDERATIONS THAT IMPACT FLOODPLAIN MANAGEMENT DECISIONS – Unseen Drivers

Beyond the desired uses of floodplains discussed above, there are other factors (including financial issues) that play a role in shaping and driving the decisions that are made by floodplain managers. These issues can be easily overlooked by those proposing solutions to floodplain conflicts because they are indirectly related to floodplains. Those considerations include:

1. Local governments are in the business of balancing competing interests and this means they don't always prioritize conservation as their highest goal. There are external drivers that influence whether cities or counties prioritize ecological protection or restoration over other goals. These drivers include such things as the desire to ensure that tax revenues are available to support needed municipal services, community support for new legal and policy approaches, a desire to support the needs of local agriculture, and competition from other jurisdictions to attract new business.

2. Some people believe that decision-makers are not adequately accounting for the full cost to society of allowing structures to be rebuilt in the floodplain after a flood loss. They call this the "cycle of repetitive loss." They believe that if full cost were taken into account (including the sociological, economic and ecological cost) of repeatedly operating, maintaining and repairing flood protection facilities before, during and after flooding events, people would see that the cost is simply too high and demand that government stop paying to maintain floodplain structures.

3. The lack of consistency that exists in floodplain regulations across Puget Sound creates uncertainty and risk to developers, businesses, utilities, and transportation agencies, which tends to drive up project costs in floodplains.

4. Some people believe that the way we spend money on infrastructure in floodplains may result in driving new development into those areas. For example, constructing new, high occupancy rapid transit systems (bus or rail) across and in floodplains may drive new urban residential development and businesses into those areas).

5. Federal, state and local governments and Tribes lack adequate resources (funding and staff) to focus on the floodplain management policy issues presented above. For example, most city council members are only part-time elected officials, and many cities have small staffs that are expected to run all of the city's operations. However, all of the agencies cited appear willing to participate in the development of policies or new floodplain management approaches if resources were provided.

D. PEOPLE DESIRE MORE INFORMATION ABOUT FLOODPLAINS

Most stakeholders saw a need for new information that could be used to guide floodplain regulation and management decision-making. This information includes:

1. The completion of the watershed characterization study is widely seen as a necessary tool to identify the areas within river systems and floodplains that are essential to protect habitat-forming processes, structures and functions, and the impact that climate change has had, and will have, on floodplain function. Many believe that this information will be very useful in helping decision-makers reach well-informed policy decisions about the future use and protection of lands in floodplains.

2. Local governments and others need more up-to-date flood maps and predictive models to understand today's high-risk areas for flooding (floodplains, channel migration zones, and flood hazard areas).

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