7. HABITAT PROTECTION

7.1. INTRODUCTION

Successful habitat protection depends on three important components. First is a public that recognizes the importance of salmon habitat protection, and that does not condone actions by others that do harm to these resources. This sentiment should be nurtured through a vigorous public information effort, and by providing the technical information to assist landowners and others in their efforts to comply with existing regulations. Technical and financial resources should also be made available to those who voluntarily want to do even more to protect and restore salmon habitat if they so choose. Providing people with the information to make informed decisions that will be protective of salmon habitat when working in and around streams is the first step towards habitat protection. To summarize, providing people the tools to "do the right thing" capitalizes on the vast majority of the public that wants to provide for a future for Skagit River Chinook.

A second factor and one that needs to be implemented concurrently with the first step is an unambiguous regulatory framework that insures that the habitat needs of the fisheries resource are fully protected, either through avoidance of impacts or through the full mitigation of unavoidable impacts. The regulations should provide sufficient clarity to landowners and other project proponents about what standards need to be met, and what actions are unacceptable. These regulations must be applied equally to all, with assistance from implementing agencies so that people can understand the necessity of the regulated actions, and how they can comply.

Finally, there needs to be an enforcement presence to insure that those that choose not to follow the rules will be held accountable. This is important for a number of reasons. First and foremost, vigorous enforcement provides a deterrence to those that might otherwise try to circumvent or ignore existing regulations. Also important is that an active enforcement process indicates to those that are abiding by the rules that others will be held to a similar standard, and that there is an even playing field for everyone that needs to work in an around streams. Finally, a vigorous enforcement presence indicates to the public that these matters are an important public policy, and that the authorities with jurisdiction take their responsibilities seriously and are committed to ensuring that salmon protection is an important priority.

Habitat actions taken to recover and protect Chinook salmon must be based on the biological and ecological requirements of the species. While science forms the primary basis for protection and recovery actions, scientific knowledge is incomplete, and therefore monitoring and adaptive management will be necessary as habitat preservation and restoration actions are implemented. Some of the recommended actions in this chapter may need to be refined or altered as recovery progresses, and new actions not yet apparent may become necessary.

In contrast to the relatively specific scope of responsibility regarding hatcheries, harvest, and hydropower, the authority and responsibility for habitat as it pertains to salmon recovery is widespread. Ultimately, this authority and responsibility rests with every individual landowner and permitting authority that makes a decision regarding how a piece of land will be developed and managed.

Because responsibility for addressing habitat issues affecting salmon is so widespread among Washington citizens and governments, recovery and protection of Chinook salmon will require involvement and collaboration of many stakeholders. This collaboration will be successful only if all parties are willing and able to understand the economic, political, and social constraints of other stakeholders and work together to address these constraints within the realm of sound science and at the same time meet the Chinook recovery goals within this plan.

In the face of increased human population growth and the impact of ongoing land use activities, the ability to recover Chinook salmon can only occur if the fish productivity necessary to meet recovery goals is met through a combination of habitat restoration and protection actions. Any further reductions in current habitat capacity and fish productivity will result in the necessity for additional restoration measures, which may result in greater economic challenges in the future

Given this assumption, we offer the following specific recommendations that could, and should, be taken by federal, state, tribal, and local governments and stakeholders in an effort to realize viable recovery efforts. Furthermore, we believe the following recommendations represent only one pathway to ensure the continued freshwater and estuarine productivity of Skagit Chinook. Other combinations of habitat protection and restoration actions may also achieve recovery, and the authors of this document look forward to considering other pathways to meet the Chinook recovery goals. The authors recognize that elements may be changed in order to account for anticipated or desired impacts, and we trust proponents for such changes will be willing to measure their actions with the same or similar quantitative assessments of potential fish productivity and abundance as we present herein.

It is important to understand that these recommendations apply only to those areas of the Skagit River watershed that are currently or historically occupied by Chinook, or areas that influence Chinook habitat. A further refinement of this plan will result in the development of site-specific maps where these recommendations should apply.

Protection and restoration of habitat critical to maintaining Chinook production and productivity is dependant on seven factors:

1) Application of best available science and implementation of adaptive management practices to deal with uncertainty
2) Local collaborative planning that fully incorporates the needs of salmon in the recovery planning process
3) Adequate regulatory safeguards that meet the required certainty of fish and habitat protection
4) Adequate technical assistance to aid parties with the compliance of regulations
5) The vigorous enforcement of these regulatory safeguards
6) Adequate incentives to promote voluntary involvement of the public in the restoration and protection of salmon habitat
7) A desire on the part of the public and elected officials to provide for those habitat elements necessary to sustain salmon populations sufficient to meet the recovery goals

This document will focus primarily on state and local governmental agencies because they have the largest regulatory impact at the watershed level and therefore play a fundamental role in the

expression and implementation of habitat recovery efforts. These agencies include: WDNR, through its implementation of Forest Practices rules and through the management of aquatic lands; WDOE, through implementation of the Clean Water and Shorelines Management Acts and administration of the water code; WDFW, through administration of the Hydraulics Code; and local city and county governments.

This document recognizes the fact that co-managers of the fisheries resources have their primary jurisdictional authority over hatchery and harvest activities. Therefore, the protection elements within this recovery plan are recommendations to local, state and federal entities. Implementation of these recommendations will be the prerogative of these governments, and the ability to reach Chinook recovery goals will in large part be determined by the extent to which these or equally effective recommendations are implemented.

The recommendations in this chapter highlight actions that must be addressed with expediency. The involvement of jurisdictional stakeholders is, in fact, imperative. Towards such end we strongly recommend a decision-making process that builds upon local voluntary efforts already underway, and also incorporates other non-voluntary elements as described herein. The co-authors of this plan resolutely believe our ability to reach recovery goals will in large part be determined by the extent of successful implementation of these or other equally effective measures.

Protection elements within this chapter (restoration elements will be found in Chapters 9-12) are arranged according to salmonid life history needs, and the physical processes and habitat types affecting them. The primary components consist of, in part:

- Stream Flow
- Basin Hydrology
- Water Quality, Sediment Quality, and Sediment Transport
- Stream Channel Complexity
- Riparian Areas and Wetlands
- Estuary and Nearshore
- Fish Passage and Access

7.2. STREAM FLOW

Washington State's Governor's Salmon Recovery Office's "Statewide Strategy to Salmon Recovery, Extinction is Not an Option", dated September 1999, states as a goal:

> "Retain or provide adequate amounts of water to protect and restore fish habitat. Objectives include: Establish stream flows for watersheds that support important fish stocks, and Protect and/or restore instream flows by keeping existing flows and putting water back into streams where flows are diminished by existing uses-especially illegal or wasteful uses or by poor land use practices." (p. IV.57)

The following discussion examines progress toward meeting the Strategy's goal in the Skagit Basin, and then offers specific recommendations that will measurably facilitate the recovery of Chinook salmon:

Instream flows for the Skagit River were established by rule in 2001 (WDOE 2001). Instream flow studies have demonstrated that existing flows are frequently below optimum for spawning and rearing Chinook. Additional growth pressures, along with illegal use of water throughout portions of the basin, can have adverse effects on Chinook productivity. Stream flow is affected by basin hydrology as well as withdrawals (either permitted, permit-exempt, or illegal) for:

- Individual residential use (e.g., wells)
- Municipal water systems
- Agricultural use
- Hydropower
- Commercial and industrial use

To protect stream flows from over-appropriation through withdrawals and diversions, we offer the following recommendations:

7.2.1 Individual Residential Use

The use of exempt wells has had an adverse impact on stream flows, particularly in tributaries that experience low flows during the summer months. A number of these streams within the Skagit Basin have been identified by state and local agencies for listing on WDOE's Surface Water Source Limited (SWSL) list. The Chinook streams identified are:

- Nookachamps Creek
- Diobsud Creek
- Carpenter Creek

Recommendation 1
Issue new water right permits only when there will be no new impairment of current instream flows as established by rule or when appropriately mitigated.

Mechanism: Mitigation possibilities include the use of Skagit PUD or the City of Anacortes' inchoate water rights, through extension of service, or of municipal water systems that have been in place prior to new rulemaking. Many of these alternative sources are within established service areas and consistent with the purposes for which the water rights were originally issued. Additional basin-specific storage, the use of "pump and dump" systems, and the use of groundwater not in hydraulic connectivity to surface flows might be considered as alternative sources of water to accommodate new growth without reducing instream flows. The use of Overriding Consideration of Public Interest (OCPI) to allow for additional diversions and withdrawals should not come at the expense of instream flows, but should utilize existing out of stream sources to meet future needs.

Recommendation 2
Enforce the provisions of the Skagit Instream Flow rule such that there will be no use of exempt wells that are in hydraulic continuity with surface waters in cases where instream flows will be impaired.

Recommendation 3
Provide Washington State Department of Ecology with the resources needed to apply and enforce the instream flow rules.

Recommendation 4
Enforce RCW 90.14.160 for the relinquishing of unused water rights.

Recommendation 5
Issue new building permits only when water rights have been secured.

Mechanism: Building permits should not be issued unless there is an adequate supply of potable water, which in this instance, at a minimum, means that use of this water will not impair instream flows. The Growth Management Act requires that an adequate supply of potable water must be available prior to the issuance of building permits, perhaps via PUD extensions or transfers of valid existing rights.

Recommendation 6
Use available municipal water rights to service unmet domestic and industrial and other needs.

Mechanism: Skagit PUD and Anacortes water systems should work to serve current unmet needs. These systems draw from the Skagit River and are consistent with both the Skagit Instream Flow Rule and the 1996 MOU between the Swinomish, Sauk-Suiattle, and Upper Skagit Indian Tribes; Skagit County; Skagit PUD #1; the City of Anacortes; WDOE; and WDFW. This will minimize the impacts of additional diversions to Skagit Chinook stocks.

Recommendation 7
Develop coordinated mitigation plans to offset new ground and surface water developments.

Mechanism: Local, state and federal relief could be made available to local landowners to provide funding and technical capability to develop mitigation plans and programs to offset the impact of new groundwater developments. All stakeholders, in conjunction with WDOE, should develop a consensus request to the Washington state legislature that addresses this issue; contingency plans must be available if state funding is not provided.

7.2.2 Public Water Systems

The passage of HB1338 provides for an expansion of the original place-of-use of previously issued water rights without regarding impacts to instream resources. It also expands the definition of municipal water systems to provide for the use of inchoate water rights that otherwise would go unused or be relinquished. The bill eliminates restrictions on existing water permits. All of this will result in additional use of water that will further impair instream flows.

Instream flow agreements already established in the Skagit Basin have secured water rights for the major water purveyors within the county, Skagit PUD, and Anacortes. These water rights will appropriately be used to meet future growth needs while at the same time reducing the impacts of individual exempt wells.

Recommendation 8
The expansion of service areas or the use of inchoate rights for areas outside of original place- or purposes-of-use should be prohibited (which is inconsistent with current law as expressed in HB1338). The definition of public water systems should not be expanded to include what were formerly private or non-municipal water systems.

7.2.3 Hydropower

We believe current operations at Skagit River mainstem dams operated by Seattle City Light have been adequately mitigated through the relicense process concluded in the 1995 Settlement Agreement.

The Baker River Project, operated by Puget Sound Energy, is currently undergoing relicensing by the Federal Energy Regulatory Commission (FERC). A settlement agreement has been reached between Puget Sound Energy and all relicense stakeholders, including state and federal resource agencies and Tribes. If FERC issues a license that includes flow provisions in the settlement agreement, construction will be completed in 2012 that will add two additional turbines, providing greater flexibility in flow releases. Washington State downramp rates will be met in the Skagit River downstream of the Baker River, greatly reducing the potential for Chinook fry stranding due to Baker River Project operations. There will be maximum flow release restrictions while Chinook are spawning downstream of the Baker Project, and new minimum flow releases that greatly reduce or eliminate the potential for Chinook egg and alevin stranding from project operations.

Recommendation 9
Implement the license articles proposed by the parties to the PSE Baker Relicense Agreement.

Recommendation 10
Additional flood control needs must be consistent with instream flows established and agreed upon in the Baker River license agreement. Any new flood control operations agreed upon by USACE will need to be consistent with these flows as well.

7.2.4 Agricultural Use

The use of water for irrigation of crops is becoming increasingly important in the Skagit Valley. Current recorded water rights greatly exceed the actual beneficial use of legally authorized water rights. In addition, there is evidence that unpermitted water use for agricultural purposes is taking place in the basin.

Recommendation 11
Define current and future irrigation needs. Conduct landscape-level planning to implement coordinated water management in the Skagit Basin. Consider development of a water bank to ensure the most efficient use of water rights.

Recommendation 12
Enforce existing provisions of the water code such that water is utilized consistently with the purpose, place, and quantity of use authorized on permits, certificates and claims. Rights to water that is not put to beneficial use should be relinquished.

7.2.5 Commercial and Industrial Use

Most industrial water use in the Skagit Valley is served by municipal water systems. Recent State Court decisions have expanded the use of exempt wells for commercial use, such that additional water withdrawals will likely occur if WDOE does not enforce the existing Skagit Instream Flow

Rule, and if Skagit and Snohomish Counties continue to issue building permits when adequate water supplies are not available.

Recommendation 13
Hold commercial water users to the provisions of the Skagit Instream Flow Rule. Prohibit the use of exempt wells by commercial enterprises, as this is in direct conflict with exempt well provisions of the State water code.

7.3. BASIN HYDROLOGY

Basin hydrology is affected by a number of land uses, including forest practices, increased area of impervious surfaces, and flood control. Each of these can degrade stream channel morphology and adversely affect the physical processes of sediment transport, channel development, wood loading, and stream bank integrity.

7.3.1 Impervious Surfaces

Studies in King County have demonstrated that watersheds with increased impervious surfaces can have altered basin hydrology such that channel capacities are exceeded during storm events. This often results in the down-cutting and degradation of streams. Few watersheds within the Skagit Valley exceed 7% impervious surface, but some watersheds will exceed this capacity at full build-out based on current comprehensive plan documents.

Recommendation 14
Develop and implement regulations that will limit impervious surfaces to levels that are below a threshold of 7% total impervious surfaces in any tributary watershed.

Mechanism: Low impact development techniques should be evaluated and approved by local jurisdictions and written into local building codes. Incentives should be sought for the application of innovative techniques that mitigate for new impervious surfaces. Comprehensive plans should be adjusted if necessary to insure that full build out will not result in impervious surfaces exceeding 7% unless other equally effective measures in maintaining hydrologic stability are put in place.

7.3.2 Flood Control Measures

In the past 15 years, numerous flood control measures have been proposed for addressing the serious issue of flood protection. Some of these measures would result in significant changes in the hydrology of the Skagit Basin. Currently, the USACE, in conjunction with Skagit County, is conducting a major flood control study to assess various alternatives for meeting the flood control needs of the basin. Changes to basin hydrology may result from implementation of any one of the alternatives developed.

Recommendation 15
Implementation of any measures identified in the Skagit Flood Control study should seek to maintain the hydrological and physical integrity of the mainstem Skagit River and its tributaries as well as the Skagit Delta.

Mechanism: The construction of new dikes and levees should be prohibited unless mitigated for, resulting in no net increase in isolated floodplain area nor additional loss of floodplain habitat.

Operations of flood control structures at both the Baker River and Seattle City Light dam projects must be consistent with and subordinate to instream flows adopted as a result of the agreed-upon license articles of the Baker River relicensing process, as well as currently established license provisions of the Seattle City Light projects.

7.3.3 Global Warming

Issues of global warming should be recognized as a current reality, but details necessary to ameliorate the impacts of climate change are beyond the scope of this plan.

Recommendation 16

Assess the potential impacts of global warming on flood frequencies and durations, and on stream flows. Upon completion of these assessments, integrate the conclusions with ongoing permitting and planning processes.

7.4. WATER QUALITY, SEDIMENT QUALITY, AND SEDIMENT TRANSPORT

Nearly twenty Skagit Basin streams are currently listed on the Clean Water Act Section 303(d) list of waters with impaired water quality. Most are listed as a result of not meeting water quality standards for fecal coliform, temperature, or dissolved oxygen, although White Creek and Hansen Creek are listed based on a narrative standard for inadequate habitat. Human-caused sources of elevated sediments come primarily as a result of several land uses including agriculture, urban development, forestry, stormwater and road systems.

7.4.1 Forest Practices

Management-related landslides and road-surface runoff have been identified as contributing to accelerated sedimentation rates in streams. Landslides related to timber harvesting and road construction have been addressed in WAC 222-16-050 that requires forest practice activities taking place on unstable landforms are in compliance with the State Environmental Policy Act guidelines and will require an environmental checklist and additional review, at a minimum. In addition, forest Practices Rules further specify that road maintenance and abandonment plans (RMAPs) are to be completed by June 30, 2006 (assessment portion), and all of the work finished by June 30, 2016. Existing roads are to be brought up to new construction standards unless there is "little risk to public resources" (fish are considered to be a public resource). Much of the work involves replacement of undersized or poorly installed culverts. Culverts need to be able to allow passage of the debris likely to accompany 100-year flood events. The work will also include installation of additional culverts as needed, and side cast pullback in high-hazard areas.

Recommendation 17

Secure funding for maintenance, storm-proofing or decommissioning of roads.

Mechanism: The RMAP provisions of Forests and Fish Agreement are being implemented. Complete inventory of orphan and high-risk roads on roads not covered by Forest and Fish. Prioritize and schedule identified roads for closure and decommissioning. Timber interests, U.S. Forest Service (USFS) and WDNR should provide background and outline issues regarding roads that directly and indirectly affect fish habitat.

Recommendation 18
Reduce sediment from road-surface runoff.
Mechanism: Accomplished through the RMAP process by disconnecting the runoff from the stream networks. New roads will have ditch relief pipes placed close to streams that will direct ditch water onto the forest floor before it reaches the streams. Existing roads will be brought up to the new standards over the 15-year life of each plan. Construction of new stream-adjacent parallel roads is strongly discouraged and requires, at a minimum, an on-site interdisciplinary team review (WAC 222-24-020 (2)). Existing stream-adjacent parallel roads receive high priority for repair and maintenance in road maintenance plans (WAC 222-24-051 (7 (e))). Recommend that timber interests and WDNR provide background and outline issues regarding roads that directly and indirectly affect fish habitat. Successful resolution of this issue may require a detailed, basin-wide inventory of salmon streams and roads, along with priorities (or a process to determine priorities) for implementing road management plans.

Recommendation 19
Small landowners, as defined by the current Forest Practices Act, own a disproportionately large number of salmon-bearing stream miles. Measures need to be put in place to protect water quality regardless of size of land ownership.

Mechanism: Appropriate water quality protection measures may be achieved by legislative changes to Forest Practices Rules or by other measures that will provide for equivalent levels of protection

7.4.2 Agricultural Practices

The Statewide Strategy to Recover Salmon summarizes the current situation with respect to salmon and agricultural practices in Washington. Approximately 37,000 farms cover 15.7 million acres and produce more than 200 commodities that contribute significantly to the state's economy. Although it is acknowledged that current farm practices are necessary for the profitability and the existence of farming in Skagit County, it is also recognized that some farm practices are harmful to salmon and salmon habitat (Appendix F)

Recommendation 20
Governor Locke's Extinction is not an Option (1999) called for a collaborative process to develop an agricultural strategy within three years, and delineated default actions if that strategy was not developed among interested parties. These default actions include a regulatory framework in the form of an Agricultural Practices Act, a Riparian Protection Act, or the mandatory use of Farm Plans based on Best Management Practices (BMP) based on Best Available Science (BAS). The commitment to enforce these regulations, is a necessary component to protect water quality within the Skagit Basin. A Water Quality based agricultural strategy has yet to be developed.

Mechanism: Implement the default actions or develop an institutional mechanism through which water quality issues can be discussed, prioritized and study designs developed for focused investigations. Utilize existing institutional resources such as WSU research, UW fisheries or Western Washington University to broker objective investigations and implement agreed upon work plans in areas of acknowledged expertise.

Recommendation 21
Assist and support development of Total Maximum Daily Load (TMDL)s for each of the Chinook streams listed on the 303(d) list in the Skagit River Basin. Identify and implement the measures necessary to meet water quality standards. These measures should become part of either local or state regulations to ensure their implementation.

Recommendation 22
Develop and implement drainage maintenance plans pursuant to the Skagit Drainage and Fish Initiative.

Recommendation 23
Provide access for review of site-specific water quality improvement measures of Farm Plans, Conservation Reserve Enhancement Program (CREP) buffers, and the expenditure of EQIP funds implemented by the Skagit Conservation District (SCD) and NRCS to ensure that appropriate BMPs and Farm Plan elements are being employed to protect water quality. On-going monitoring and reports of results regarding the efficacy of these programs should be undertaken.

Recommendation 24
The Shorelines Management Act currently exempts agricultural practices, which inadequately protects essential Chinook habitat. Protecting this habitat requires modification of the Shorelines Management Act to eliminate the exemption for agricultural practices, or to develop alternative mechanisms that provide equivalent levels of protection.

Recommendation 25
Increase funding level for water quality improvement grants, and ensure that funding is targeted to actions that will demonstrably improve water quality.

Recommendations 26
Ensure that changes to State water quality standards reflect the actual as well as the potential use of Skagit Basin streams by anadromous fish, rather than the core and non-core areas that is currently being proposed.

Recommendation 27
The Clean Water Act (CWA) does not adequately provide for non-point source water quality protection. Adequate protection requires modification of the CWA or establishment of other mechanisms that provide for levels of protection equivalent to those required for point sources of pollution.

Recommendation 28
Ensure the adequacy of water quality violation investigations and follow up, and review the adequacy of BMPs as implemented.

7.5. STREAM CHANNEL COMPLEXITY

Stream channel complexity needs to be protected from further degradation. Much of the Skagit River below Sedro Woolley has been modified as a result of stream bank hardening and the construction of dikes and levees. Compared to historical conditions, the complexity of the mainstem Skagit River and many of its tributaries has been significantly compromised. On the Skagit delta the

watercourses consist of a complex network of natural streams, dredged and straightened natural drainages and artificially constructed agriculture ditches. In order to prevent further damage to these streams, additional bank protection and dredging of salmon-bearing waters should be prohibited, unless it is possible to mitigate for such actions, resulting in no net impact to habitat.

Recommendation 29
Acquire floodplain parcels for conservation and/or restoration in priority areas, through willing sellers. Priority should be given to those areas subject to recurring flood damage, and those that require streambank hardening for protection of life or capital investments.

Mechanism: Based on priorities identified in the floodplain section of this document secure where possible those parcels that realize recurring flood damage. Recommend that the Federal Emergency Management Agency (FEMA) define current criteria for purchase of flood-prone land parcels. Land purchases by local entities might be based, in part, on alternative mitigation programs.

Recommendation 30
Prohibit new development within active floodplains.

Mechanism: Floodplain development that will require the use of bank hardening or other long-term maintenance or protection measures for capital investments pose a risk to human life and siphon public resources. Incentives to avoid floodplain development such as development right transfers should be encouraged.

Recommendation 31
Construction of any new capital facilities should be prohibited within the channel migration zones of the Skagit, Sauk, Suiattle, and Cascade Rivers.

Recommendation 32
Allow wood entrained on bridge pilings or abutments to stay within the river system.

Mechanism: County contractors, maintenance crews, USACE, and Washington Department of Transportation (WDOT) should be trained and empowered to float entrained wood downstream to maximize the functions of wood introduced into streams as a result of natural riparian and upslope processes. The incorporation of this wood along the bed and banks of streams at downstream locations could assist in the preservation of stream bank integrity.

Recommendation 33
Consistent with recent WDFW legislative recommendations, modify statutes governing the administration of the hydraulic code such that violations would be treated as civil penalties rather than criminal offenses.

Recommendation 34
The current system of depending upon the willingness of local prosecutors to prosecute hydraulics violations is inadequate, due to a higher-priority afforded to criminal workloads involving human safety. This results in few cases going to court. A special prosecutor's office should be established to be responsible for handling hydraulic code violations, or an equivalent mechanism should be developed to allow for adequate priority to ensure that hydraulic violations are prosecuted.

Recommendation 35
No new riprap, levees, or bank hardening should be permitted within the Skagit Basin, except where mitigation is adequately provided.

Mechanism: New construction within the high water mark should occur only after an analysis of site-specific and reach level impacts associated with new bank hardening projects is completed, and fully mitigated for with proven techniques. Physical processes that allow for the losses of existing side channels and floodplain functions should be prohibited. It is recommended that USACE initiate discussion of this issue by outlining the legal foundation and current implementation process regarding riprap, levees, and bank hardening. The relationship between USACE and WDFW regarding their separate regulatory authorities should also be discussed and reconciled as much as possible.

Recommendation 36
Exemptions for emergency actions on the part of USACE should be limited to a period immediately following the flood events. In instances where emergencies have been declared, a specific declaration determining the end of the emergency period should be declared as well. Any work to be conducted subsequent to this date should not be entitled to exemptions from USACE review processes.

Recommendation 37
The impacts of emergency dike and levee construction and maintenance should be fully mitigated per review of each project by appropriate federal, state, or local regulatory agencies.

Mechanism: For each project constructed or modified during emergency actions, a proportion of the costs of the project should be deposited into a fund to be used to mitigate for the effects of these activities. The recommendation is for 20% of the project costs to be deposited into the fund. The details of a funding mechanism will need to be developed.

Recommendation 38
The USACE or local diking districts should provide yearly analysis of dike and levee maintenance needs in order to ensure that only damage associated with floods will be exempt from normal CWA and ESA review and requirements.

Recommendation 39
Develop a Sauk River Flood Management Plan that identifies structures and properties at risk.

Mechanism: This plan should identify site-specific actions, such as property purchases, road relocations, habitat improvements, and bank protection such that habitat is protected. The intent of this plan is to provide certainty to landowners regarding what actions may be available to address property concerns, and which actions will not be allowed. This plan should provide for funding sources for implementation. All stakeholders, led by Snohomish and Skagit Counties, should contribute to the implementation of this recommendation.

Recommendation 40
Adequate funding for enforcement and a priority for enforcing habitat violations is necessary. The WDFW enforcement program should regard the application of the hydraulic code as among their highest priorities.

Recommendation 41
Adequate funding for technical assistance and permit processing is necessary to provide assistance in the development and design of hydraulic projects.

Recommendation 42
The co-managers will, pursuant to adequate funding, will develop mitigation techniques to assist landowners in the implementation of activities to provide for the protection of habitat and salmon productivity

Recommendation 43
Enhance the Hydraulic Project Approval (HPA) information-sharing process with Skagit Basin Tribes in order to increase the level of collaboration between the co-managers.

Recommendation 44
Develop long-term funding sources for the purchase of lands or easements in order to reduce the loss of channel complexity caused by human activities.

7.6. RIPARIAN AREAS AND WETLANDS

The riparian strategies of the Forests and Fish Agreement acknowledged that significant changes in riparian management were needed and laid out a series of recommendations. At the center of the recommendations is the concept that a "healthy" riparian forest is a mature forest stand of 140 years of age and that any management in the riparian zone must not inhibit or prevent the accomplishment of this condition. Key components of the riparian strategies include a 50-foot no-harvest core zone, a moderate-management inner zone ranging from an additional 30 to 84 feet in width, and finally an outer zone consisting of extensive management activity extending out to the "site potential tree height" for a total riparian width of between 90 and 200 feet, depending on site conditions. This agreement represents a major increase in the riparian zone protection for forest practices regulated by WDNR.

The new riparian rules should enable the riparian zones to sufficiently recover over time to conditions that approach pre-management levels. This will provide for needed bank stability, large wood recruitment, and a variety of other riparian functions. In cases where riparian degradation is especially severe, active riparian restoration may be required. Activities such as brush clearing, removal of hardwoods, and planting of desired species can help reverse the damage and reduce the length of time required to return to a fully functioning riparian system.

Recommendation 44
Adopt by regulation the stream buffer measures consistent with the BAS. Include a provision that site-specific alterations are possible, based on information that demonstrates a comparable level of resource protection can be attained.

Recommendation 45
City and county Critical Areas Ordinances (CAO), under the Growth Management Act (GMA) and local Shorelines Master Plans (SMP), are critical elements in protection of riparian areas and wetlands. The GMA requires that local jurisdictions protect wetlands and riparian areas by including BAS, and that they give special consideration to conservation or protection measures

necessary to preserve or enhance anadromous fisheries. Apply BAS relative to protection for fish provided by buffers contained in WDFW's Priority Habitats and Species document (WDFW 1997) (See Appendix G) or by other means that provide for equivalent levels of protection within CAO and SMP.

Recommendation 46
The CREP and NRCS Farm Plans can be useful programs for protecting habitat along critical Chinook salmon streams. CREP and riparian elements of Farm Plans need to apply BAS relative to protections for fish provided by WDFW Priority Habitats and Species document or by other means that provide for equivalent levels of protection.

Recommendation 47
Exemptions for small forest landowners from provisions of the Forests and Fish Agreement is not consistent with the original Forests and Fish Agreement. To be consistent, remove riparian exemptions for small forest landowners from the Habitat Conservation Plan (HCP) under consideration by NOAA Fisheries.

Mechanism: Provisions must be made to ensure that all forest landowners will not be allowed to impact riparian buffer functions and values.

7.7. ESTUARY AND NEARSHORE

7.7.1 Shoreline Modifications

The construction of bulkheads along marine shorelines has had a significant impact on the productivity of the nearshore environment. The loss of gravels necessary for beach enrichment has resulted in a loss of habitat to support the production of forage fish upon which juvenile and adult salmon are dependent. The loss of eelgrass resulting from dredging operations has had a similar effect. Recent research has shown pocket estuaries to be a vital component of habitat necessary to support juvenile Chinook on their seaward journey, and these have been adversely affected or lost due to land use changes.

Recommendation 48
Prohibit any new infrastructure (i.e., roads, drainage systems) proposing to limit access or reduce the productivity of existing pocket estuaries.

Recommendation 49
Prohibit the net expansion of bulkhead length, or increase in elevation, in nearshore areas. Bulkhead maintenance should not provide a mechanism to expand footprint, length or elevation.

Mechanism: Any new construction of bulkheads along the marine shoreline should be permitted only when mitigated for by the removal of other marine bulkheads, resulting in no net expansion of bulkhead length. Based on recent site-specific information, mitigation should be based on an analysis at the littoral cell level so that impacts can be mitigated for on-site and in-kind.

Recommendation 50
Limit the size of eelgrass impacts to less than 0.5 acre and mitigate impacts to eelgrass beds prior to construction.

7.7.2 Oil Spill Response

A catastrophic spill located within Puget Sound, or more specifically within the Whidbey Basin and Admiralty Inlet, can have devastating effects upon Skagit Chinook stocks, along with other stocks within the area. These effects can come from two major sources: impact-related spills that occur as a result of hull breaches or lack of containment during transport of hazardous materials, and spills that occur during off-loading of materials. Protection activities involve reduction in the likelihood of impact losses and increase in the effectiveness of spill response.

Recommendation 51
Require advance notification by tanker operators to WDOE and U.S. Coast Guard (USCG), and ensure implementation of effective booming during ship and barge fueling and oil transfers.

Recommendation 52
Fund, maintain and train a support network of citizen response groups throughout Puget Sound that are adequately trained and outfitted to provide emergency response to spills.

7.8. FISH PASSAGE AND ACCESS

There are numerous fish passage barriers throughout the Skagit River Basin that prevent access of Chinook to waters that were historically productive watercourses. In addition, impassable barriers for other salmonids exist on federal, state, county, and private roads throughout the watershed.

Performance measures for fish passage should be as follows:

Hydrology- The allowance for a range of flows and flow conditions appropriate to the watershed and location within the watershed where a stream or water body crossing structure is located. Flow conditions should be maintained upstream, downstream, and within the crossing structure.

Sediment Transport and Deposition- Provision for sediment generated upstream (and potentially downstream in tidal areas) to be transported and stored in a natural manner conducive to creating and maintaining natural habitat conditions in the watershed. These storage and transport conditions must be maintained above and below any structure.

Woody Debris Transport and Storage- Provision for the transport and storage of wood of the size appropriate for the watershed and location in question. Transport capacity required will be a function of stream power, stream size (bankfull width), and vegetation. Large Woody Debris transport may be critical in many tidal areas.

Alluvial Fan Processes- Processes active on alluvial fans include sediment and LWD recruitment, transport and storage; channel creation, maintenance, and avulsion and associated habitat functions. Crossing structures must not disrupt these processes and habitat conditions.

Floodplain Processes- Processes include hydrologic connections to, as well as the ability to create and maintain, off-channel and side channel habitats including channels, other open water habitats, and wetlands. Processes also include connections to the hyporheic zone, and connections to sources of large woody debris, other organic materials, and nutrients.

Habitat Connectivity- Providing the appropriate level of habitat connectivity at the crossing location, including hydrologic connections for wetland areas, connection of off-channel habitats with floodplain areas, and connects to sources of LWD and other organic inputs.

Tidal Influence- Provision for the full natural extent of tidal influence, including tidal inundation and natural salinity levels, as well as woody debris transport and sediment import and export to areas on the landward side of tidal channel-crossing structures.

Fish Passage- Provision for the passage of native fishes, particularly anadromous salmonids, at all life stages at appropriate times and flows in appropriate locations. Current WDFW requirements reasonably represent conditions for adult anadromous salmonids in terms of passage flows and maximum upstream habitat limits. However, passage criteria for Juvenile salmonids should continue to be incorporated and implemented.

Recommendation 53
The construction of any new fish passage structures should be required to meet the performance measures stated above.

Recommendation 54
Current federal regulatory requirements regarding fish passage and access should be enforced at all structures within the legal definition of USACE' jurisdiction.

Recommendation 55
Enforce the current State statute that requires fish passage at all obstructions including road crossings. For the purposes of this recovery plan only, the enforcement priority related to impassable culverts shall be within those tributaries that currently do or have the potential to support Chinook use.

Recommendation 56
Each governmental entity should identify each culvert on their lands or under their jurisdiction that have man-made barriers to Chinook salmon. Their barriers should be eliminated based on the performance measures stated above.

7.9. MONITORING

Since the protection element of this recovery plan is based on the assumption that full implementation will result in no additional loss of productivity, it is vital to determine the degree to which this element is being carried out. For the protection element of this recovery plan, monitoring should consist of quantitative measurements of the physical and chemical changes associated with land use practices. These changes will be evaluated within the larger monitoring program of this plan in order to assess the loss of productivity (if any) that can be attributed to the associated land use practices.

The following parameters should be incorporated into a long-term monitoring strategy. At this time, these are the general parameters that need to be evaluated. Site-specific monitoring protocols for each parameter will need to be established upon plan implementation. Each measurement must

contain specific information regarding location of impacts, quantity of physical changes, and, if possible, the cause of the impact.

Instream Flows

- How many new water rights have been issued, what are the quantities of flow reduction associated with these rights, and what has the mitigation been? A quantitative investigation of the adequacy of the mitigation measures should be undertaken.
- Have exempt wells been permitted that effect instream flows where Chinook reside? If so, what is the quantity of water that has been withdrawn, and in which locations?
- Have there been any water rights relinquished, and if so, what is the quantity of water that has been made available for instream flows?
- What additional quantity of water has been withdrawn or diverted as a result of the use of inchoate water rights?
- Has there been an enforcement element associated with the illegal use of water, and if so, has additional water been made available to meet instream flow needs?
- Has a water bank been established, and has this resulted in water savings or additional water use?

Basin Hydrology

- What level of impervious surface exists in each Skagit tributary that supports Chinook, and have the levels remained below 7%?
- Have new flood control measures been instituted, and if so, have they resulted in habitat gains or losses? Have physical impacts been fully mitigated?
- Have there been changes in peak flows associated with land use practices?
- Have there been changes to water quality, sediment quality, and sediment transport?
- Has there been an increase or decrease in road-related sediment inputs, and have they occurred as a result of road building?
- Have water quality standards been met, and have measurements of water quality shown an increasing or decreasing trend?
- Upon what percentage of the landscape have BMPs been employed?

Stream Channel Complexity

- How many acres of new development have occurred in the floodplain?
- What areas and in what locations have new capital facilities and bank-hardening activities taken place?
- Has the amount of woody debris increased or decreased with the Skagit River and its Chinook-bearing tributaries?
- Has stream channel morphology changed as a result of land use practices?
- If mitigation has been employed as a result of the need for new bank-hardening structures, has the mitigation been demonstrated to adequately offset the impacts?
- Has unpermitted bank hardening and instream work been done, and has there been an enforcement effort that has resulted in mitigation of the impacts?

Riparian Areas and Wetlands

- Have shoreline activities that impact the recovery of riparian functions been eliminated? How many miles of riparian habitat have been established, and what is the condition of this habitat?
- How many additional acres of wetlands have been lost, and in what locations? What functional values have been lost?
- Have riparian areas been damaged as a result of timber harvest and road construction activities?

Estuary and Nearshore

- What has been the additional footprint associated with new bulkheads and infrastructure constructed along marine shorelines?
- What is the total acreage of eelgrass lost as a result of new development activities?

Fish Passage

- How many additional miles of fish-bearing streams have been blocked as a result of inadequate culvert and tide gate maintenance or construction?
- How much additional fish habitat has been degraded as a result of poorly designed culverts?