

Nisqually Watershed Answers for Three-Year Work Program Questions:

Consistency Question

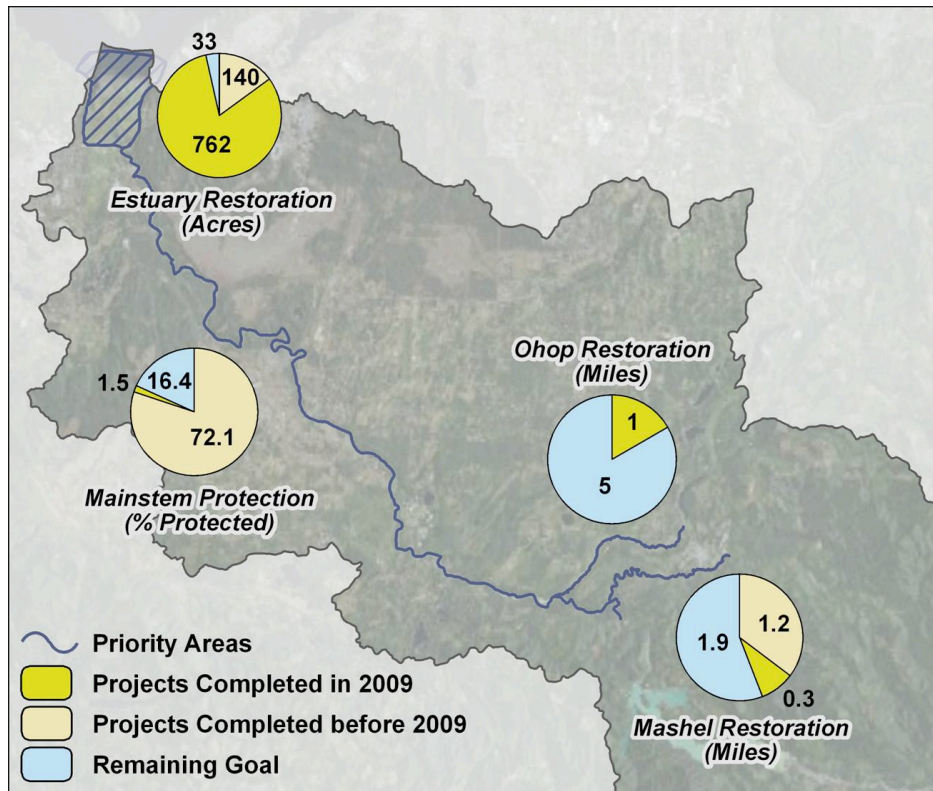
1. What are the actions and/or suites of actions needed for the next three years to implement your salmon recovery chapter as part of the regional recovery effort? (A template spreadsheet with general categories is provided to identify which actions and/or suites of actions are needed. Please note that you can use the HWS to produce a list of habitat actions)

We have habitat actions identified that are primarily focused on the Nisqually Estuary, the Nisqually mainstem river, the Mashel River, Ohop Creek, and the South Puget Sound nearshore. See the attached documents for descriptions of the types of actions needed in each of these areas. In addition we describe needed actions in our hatchery and harvest management that will be essential to lead us to recovery.

Pace/Status Question

2. What is the status of actions underway per your recovery plan chapter? Is this on pace with the goals of your recovery plan?

We have made some significant progress in habitat protection and restoration in the last few years, especially in the Nisqually estuary where we are substantially done with our major restoration work. We still have some smaller scale projects to finish up our estuary restoration. See the figure below for our goals for each of our priority habitat areas and the progress we have made recently.



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If we are to complete the rest of our goals in the next 10 years we will need to receive significant funding to implement the remaining projects.

Our primary concern is that while we are making significant forward progress in protection and restoration of habitat in the Nisqually watershed we seem to be losing habitat rapidly in the Puget Sound nearshore.

3. What is the general status of implementation towards your habitat restoration, habitat protection, harvest management, and hatchery management goals? Progress can be tracked in terms of ‘not started, little progress, some progress, or complete’ or in more detail if you choose.

Habitat restoration – some progress.

Habitat protection – some progress in the watershed, no net progress in the nearshore

Harvest management – some progress this year

Hatchery management – some progress this year

Sequence/Timing

4. What are the top implementation priorities in your recovery plan in terms of specific actions or theme/suites of actions? How are these top priorities being sequenced in the next three years? What do you need to be successful in implementing these priorities?

The top priorities are described in the attached documents in more detail. In brief summary the top habitat priorities are completion of the Estuary Restoration, protection of the Nisqually mainstem, protection and restoration of the Mashel River, protection and restoration of Ohop Creek, and protection and restoration of the Puget Sound nearshore. The top stock management priority is to manage the population to allow the development of a natural origin stock that is locally adapted to the Nisqually watershed. This involves both hatchery and harvest management actions that are explained in the attached documents.

The high priority habitat actions are being sequenced based on landowner willingness and logistics considerations for next steps in the major projects.

The primary thing we need to be successful in these projects is the funding necessary to implement them and continued funding for the capacity to coordinate their implementation.

Next Big Challenge

5. Do these top priorities reflect a change in any way from the previous

three-year work program? Have there been any significant changes in the strategy or approach for salmon recovery in your watershed? If so, how & why?

The most significant change this year is the decision to develop a stepping stone integrated hatchery program that will allow us to begin reversing the gene flow in our Chinook stock. In previous iterations of the plan we were planning a segregated program, however recent modeling suggests it would be difficult for us to achieve long term sustainable success without trying a stepping stone integrated program.

6. What is the status or trends of habitat and salmon populations in your watershed?

In the Nisqually watershed salmon habitat has been improving as we implement major habitat protection and restoration projects in the watershed. The work completed in the Nisqually estuary last year is expected to contribute over time to a significant increase in salmonid abundance in the watershed. Significant projects completed in the Ohop and Mashel subbasins are expected to make a contribution to the life history diversity of Nisqually Chinook.

In the Nisqually there is a comprehensive effort to evaluate the status and trends of Chinook salmon in the watershed and in the South Sound. This is being done with a combination of adult spawner surveys, in-river fishery monitoring, an in-river smolt trap, juvenile seining and fyke trapping in the Nisqually estuary and nearby South Sound nearshore environments. As part of this effort otoliths from the juvenile and adult Chinook salmon are being collected which can tell the story of how the salmon are using and responding to the available habitat and which salmon life histories are surviving to return as adults.

7. Are there new challenges associated with implementing salmon recovery actions that need additional support? If so, what are they?

There are not new challenges, however there are continuing old challenges including inadequate funding for projects and capacity to coordinate and implement projects and weak regulations that don't protect shorelines.

Nisqually Watershed Chinook Salmon Recovery Plan 3 year workprogram 2010-2012

Introduction

Large scale habitat restoration projects in all three of the priority restoration areas of the Nisqually watershed (the Nisqually River estuary, Mashel River, and Ohop Creek) completed major work in 2009. This three year workprogram includes work to finish up and monitor the results of these projects and to begin the work to develop and implement the next phase of restoration in each of these areas. More details about work we have identified with our partners in the Puget Sound nearshore are also included. These nearshore areas are outside of our official watershed/lead entity boundaries however we are including them because protection and restoration of Puget Sound nearshore habitat is one of the most critical habitat actions necessary to recover Nisqually Chinook.

Additionally, our stock management objectives and plans are nearing the end of a major update process. We anticipate having a new updated stock management and terminal area management plan for Nisqually Chinook in place for the fall of 2010. This plan will address the challenge we face in successfully restoring a self-sustaining run of natural origin Nisqually Chinook while maintaining a successful hatchery program that will allow for continued harvest of Chinook. Major elements of this effort will include the construction this year of a seasonal mainstem weir to control straying of hatchery Chinook to the spawning grounds. This weir will be managed in combination with a stepped reduction in harvest of natural origin Chinook. The Tribe also plans to begin experimentation with new selective fishing techniques for the tribal fishery in order to maximize the harvest of hatchery Chinook. In the hatchery we will also complete this year a plan to develop a stepping stone integrated hatchery program that will allow us to begin reversing the gene flow in our Chinook stock. The goal will be to bring natural origin fish genetics into the hatchery population over time.

We also plan to complete in the summer of 2010 a Nisqually Chinook Adaptive Management Framework that builds on the draft that was submitted with our 3 year workplan update in 2009. This framework is intended to direct the monitoring and evaluation of our recovery efforts and to inform recovery plan updates. Over the next 3 years we

will continue to refine and implement this framework through an adaptive management process.

The Nisqually Watershed is making large measurable progress in Habitat, Hatchery and Harvest actions that will lead to significant improvements in the viability of the Nisqually Fall Chinook Salmon population. **This three year workprogram, combined with the work completed in 2009 contains habitat projects that have a modeled result of doubling of the number of naturally produced Chinook that return to the watershed and increase the life history diversity of the population from its current 80 % of historic diversity to 93 % of its historic diversity¹.** In addition we have identified harvest and hatchery actions we can take to increase the number of natural origin spawners and decrease the number of hatchery origin spawners on the spawning grounds.

Implementation of the Nisqually Chinook Recovery Plan has been ongoing since the completion of the plan in 2001. Much of the last eight years has been spent continuing the work to protect key salmon habitat areas and developing specific habitat projects that target the plan's high priority stream reaches. We currently have seventy-three percent of the mainstem Nisqually that is used by salmon under protective ownership. Large scale restoration projects in the estuary and the Mashel River were completed in the last three years. Restoration project monitoring has demonstrated that salmon respond quickly and positively to the well designed large scale projects. **The additional projects proposed in this workprogram will increase protective ownership of habitat to over 75 % of the anadromous mainstem river shoreline, and will substantially implement the major habitat restoration work identified in 3 out of the 4 main priority restoration areas.**

Recent work done in the Nisqually to look closely at integration of our habitat, hatchery and harvest actions has led us to conclude that we need to take aggressive actions in each of these areas if we are to be successful in making a major contribution to the recovery of Chinook salmon in the Puget Sound ESU. The current total exploitation rate on natural origin Nisqually Chinook (including Alaska, Canada, Puget Sound and in-river fisheries) must be reduced. However, this will not allow the natural stock to become self-sustaining unless we also reduce the proportion of hatchery origin fish that stray and spawn with

¹ The population parameter metrics in this document were derived using the Ecosystem, Diagnostic, and Treatment model (EDT). See the 2001 Nisqually Chinook Recovery Plan for a detailed discussion on the use of the EDT model.

natural origin fish. This workprogram contains projects and programs that will allow us take those actions.

We have done the work in Nisqually to identify the key actions we need to take to recover Nisqually Chinook and we have laid the groundwork in the last eight years to allow those actions to take place. Most of the major priority actions we have identified that are necessary to recover Nisqually Chinook are incorporated into this plan. Many of the high priority projects listed in this plan are ready to be implemented as proposed if the funding becomes available to support the work necessary. The primary limiting factor in the implementation of our plan is securing the necessary funds to implement the actions we are including in this workprogram.

The final high priority protection and restoration habitat priority in our plan that has had the least amount of progress made on it is the Puget Sound nearshore. Our modeling continues to indicate that this nearshore habitat is critical to the survival and abundance of our fish. This habitat however falls outside of our watershed/lead entity's designated area but we have still chosen to list specific projects and initiatives in our plan to indicate the great importance of this work in order to recover Nisqually Chinook. The success of this part of our plan is dependent on the success of Puget Sound as a region and of the individual watershed leads that are accountable for this habitat to protect and restore these areas.

LONG TERM GOALS FOR NISQUALLY RIVER CHINOOK

1. Assure natural production of Chinook in perpetuity by providing high quality, functioning habitat and by developing a self-sustaining, naturally spawning population with diverse geographic distribution. The long term population target for Nisqually Chinook is 3600 natural spawners. The long term population target may be updated and specific population parameter targets like productivity and abundance may be added as our knowledge about the stock improves and our modeling efforts advance.
2. Assure a sustainable annual terminal harvest of 10,000 to 15,000 Chinook.
3. Provide significant contributions to ecosystem functions.
4. Secure and enhance natural production of all salmonids.
5. Assure that the economic, cultural, and social benefits derived from the Nisqually ecosystem will be sustained in perpetuity.

10 YEAR OBJECTIVES FOR ACHIEVING LONG TERM NISQUALLY RIVER CHINOOK GOALS

Stock objective:

Integrate harvest, hatchery, and habitat actions in order to manage for a minimum of 1200 self-sustaining natural origin recruits with no more than 10%, or the lowest possible, contribution from hatchery origin recruits over the next 10 years with the implementation of an integrated hatchery program and a terminal harvest of 10,000 – 15,000. The specific stock objective target may change as knowledge about the stock increases and our modeling efforts progress.

Habitat objective:

Utilize protection and restoration actions to support the stock objective.

- *Protection component:* No further degradation in the Nisqually watershed's and Puget Sound's ability to support the productivity, abundance, and life history diversity of natural origin Nisqually Chinook.
- *Restoration component:* Restore habitat in the Nisqually watershed and in Puget Sound to support a predicted increase in natural origin Nisqually Chinook productivity, abundance, and life history diversity.

Implement the suite of habitat projects developed during the EDT planning process and listed in the action plan over the next 10 years. The modeled cumulative impact of the habitat actions is an increase in the productivity of the Chinook population from 3.7 to 5.3 and in the ability of the watershed to support a capacity ranging from 4960 to 8600 Chinook. Additionally, the habitat actions are predicted to increase the EDT life history diversity index from 80% to 93%. The EDT productivity, abundance, and life history diversity parameters are theoretical targets that do not account for harvest, hatchery, and other (e.g., stochastic) effects. Spatial structure is also predicted to increase as habitat is restored. Improvements in the Chinook stock parameters are expected to occur over multiple generations after habitat, harvest, and hatchery actions are taken.

Community support objectives:

- Increased local community awareness of and support for high priority actions to recover Nisqually and Puget Sound salmon.
- Increased regional, state, and national community awareness of and support for high priority actions to recover Puget Sound salmon.

3 YEAR WORKPLAN IMPLEMENTATION EXPECTATIONS

Stock objective progress:

- Make significant progress towards reducing the combined pre-terminal and terminal harvest in order to achieve natural origin escapement objective (1200) with an annual terminal harvest of 10,000 – 15,000 Chinook in accordance with the agreed upon Management Unit Profile.
- Reduce hatchery origin recruits contribution over the next five years to an average of less than 10% of the total spawning population.
- Implementation of habitat objectives that result in habitat's ability to support an increased productivity, capacity and life history diversity.

Habitat objective progress:

Projects implemented that, **as they mature and as the stock has time to respond**, will increase the ability of the habitat to support a Nisqually fall Chinook productivity and capacity from its current estimated values of 3.7 and 4961 to 5.3 and 8600 and increase the life history diversity index from 80% to 93%.

Community support objective progress:

Local community support:

- Increase in percentage of Nisqually watershed residents who are aware of Nisqually salmon recovery efforts.
- At least one third of currently unwilling landowners in high priority restoration areas on the Mashel River and Nisqually mainstem will give permission for restoration projects on their property.
- An increase of at least 100 active Nisqually Stream Steward volunteers.
- Increase in local government support for high priority salmon habitat projects.

Regional, state, and national community support:

- Increase in percentage of regional, state, and national community members that are aware of Puget Sound salmon recovery efforts and are supportive of recovery priorities.

THREE YEAR WORKPROGRAM SUMMARY

In order to achieve the long-term goal of a sustainable population of locally adapted Nisqually Fall Chinook we must further reduce the total

harvest exploitation rate, limit the proportion of hatchery fish spawning with natural origin fish, and restore the ability of the Nisqually watershed to support greater productivity, capacity and life history diversity. We believe we can make significant progress in these three areas in the next three years by implementing the proposed 3 year Nisqually workprogram. The following sections summarize the proposed elements of the 3 year workprogram.

Stock objective progress:

Harvest: Continued support for the capacity necessary to manage tribal and non-tribal fisheries to ensure negotiated exploitation rates and escapement goals are met. Resources to purchase and test commercial fishing gear types that would allow for retention of hatchery fish and release of natural fish in the in-river fishery. Develop and implement a variable weir and harvest management schedule that allows us to continue moving towards our 10 year goal of 1200 Natural Origin Chinook on the spawning grounds while allowing less than 10% of the spawning population to be hatchery strays.

Hatchery: Support for the hatchery programs to continue to produce fish that support the terminal harvest objectives, including the development of a small integrated program. Support for the hatchery to manage the program consistent with their hatchery genetic management plans. Funding for the operation of a seasonal weir on the Nisqually River that will allow the physical separation of hatchery and natural origin fish to reduce hatchery origin fish straying to the spawning grounds.

Habitat: The described habitat actions, if implemented, will result in substantial increases to the productivity, capacity and life history diversity of Nisqually Chinook salmon, as the habitat projects mature and as the stock has time to respond. The table below outlines the currently modeled condition of the population and then the predicted eventual changes in those parameters after the habitat actions are completed:

Scenario	Diversity Index	Productivity	Capacity
Current condition	80 %	3.7	4961
After 3 yr workprogram	93 %	5.3	8604

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Nisqually Salmon Recovery Habitat Restoration and Protection Priorities

The identification, sequencing, and funding of salmon habitat projects in the Nisqually is being guided by this priority restoration and preservation areas list. These areas or reaches were identified by using all knowledge about habitat conditions and the Ecological Diagnosis and Treatment (EDT) model which combines the interaction of every salmon species with its habitat need and present and past habitat conditions. The model output identifies areas where habitat is important to the species abundance, capacity, and life history diversity. It shows where critical habitat is lost and restoration is needed, therefore a priority for restoration, or where habitat is in near historical or favorable condition and its degradation would highly impact the species and therefore becomes a priority area for protection.

The Nisqually salmon recovery priority areas for 2010 were identified by using known habitat conditions as of the end of 2009. The most significant difference in the current conditions from previous EDT model runs is the changes in the estuary habitat now available after the restoration of over 900 acres of habitat. The other new addition to the priority list is the inclusion of steelhead EDT model results with the Chinook salmon model results so that both federally listed endangered salmonid species, using both the freshwater and saltwater areas of the Nisqually basin, were used to identify the habitat priority areas. The priority results are still very similar to past years with a few modifications.

Each of the model runs for each species resulted in a list of priority areas based on either a combined percent or a combined rank change in abundance, capacity and life history. The combined percent change was used to be able to combine the two species efficiently, although it skews the list towards areas that are used by both species and weighs more importance on areas that rank high in at least one parameter (abundance, capacity or life history) rather than an area that ranks moderately in all three parameters.

Below is a generalized priority area list. The complete list, individual reach names, rankings and EDT results are attached (Figure 3.) If combined percentages (both species, all three parameters) of the percent change were more than 30%, it was placed into the highest priority tier. If the percent change was less than 30% but more than 12% it was a high priority area. Areas less than 12% and above 3% are designated as medium priority and anything less than 3% is considered a low priority.

Tier 1 (Highest Priority)

Estuary Protection and Restoration

Protection of functioning reaches of the mainstem Nisqually River and the mouth of the river.

Preservation of the lower Mashel River.

Tier 2 (High Priority)

Protection of the rest of the mainstem Nisqually River reaches, except upper Nisqually.

Improving upstream fish passage at Centralia Diversion Dam

Restoration of the lowest reach of the Nisqually River reaches near Mounts Road

Restoration of lower Ohop Creek valley

Protection and restoration of the rest of mainstem Mashel River

Restoration of South Puget Sound

Preservation of the lower Yelm Creek

Tier 3 (Medium Priority)

Protection

Protection and restoration of Busywild Creek

Protection of Upper Nisqually River from Alder/LaGrande dams to mouth of Ohop Creek

Restoration of McKenna and Whitewater Reaches of Nisqually River

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Protection of lower and middle Tanwax Creek and restoration of upper Tanwax
Protection and restoration of Muck Creek downstream of Roy and South Fork Muck
Restoration of Muck Creek upstream of Roy
Restoration of Nisqually and Commencement Bays and Central Puget Sound and Eastern Straits
Protection of entire Ohop Creek Basin
Protection of Little Mashel
Protection of lower sections of Toboton and Powell Creek,

Tier 4 (Low Priority)

Protection and restoration of all other areas that are identified to contribute to the recovery of endangered Nisqually salmonids. See map for details.

Tier 5 (no priority)

Restoration and protection of the remaining stream reaches in the watershed

2010 Work plan high priority projects

The 2010 3-year workplan includes 98 habitat restoration and protection projects to recover endangered Nisqually salmon. Not all projects that fall within high priority areas are high priority projects. They also need to follow the guiding principles of Nisqually salmon recovery:

1. Addressing **priority** habitat features, watershed processes and sufficient scale

Projects need to address the priority limiting habitat features or processes identified by EDT analysis or other assessments. The project also needs to be at a sufficient scale or blocked with other similar projects to have a detectable impact over time. If the project is an assessment, it should identify data gaps, identify on-the-ground projects and further refine the strategy of addressing the priority features and process.

2. Watershed **process** restoration rather than habitat form manipulation

Restoration and protection projects should address habitat-forming process rather than the single manipulation of form or function that is not sustainable in the long-term. A complex system transfers watershed inputs and form to habitat functions, and projects could occur at any point in that spectrum. In general projects that address the inputs and pure processes will have higher priority. It is recognized that in today's populated environment, land use and human desires are sometime incompatible with full process restoration and therefore compromises will have to be made.

3. Project should be proposed in logical **sequence**

Projects should be implemented in logical and correct sequence. Projects are sometimes built upon previous projects or connected to related activities and timetables and therefore its timing should be carefully considered. In general, projects in higher priority areas should be implemented first, although circumstance or better cost/benefit ratios can elevate projects in lower priority areas. Protection projects that build upon others and therefore protect a larger block of land are also given higher priority.

4. Project need to be supported by the **public** and community

Salmon recovery projects will not achieve their goal completely if they are not supported by the community. All the projects are dependent on local landowner willingness. If projects are opposed by the public, permits and funding can be more difficult to obtain or even become unavailable to the proponent. More importantly, if the community perceives a project as wasteful, misdirected, or even harmful the support for salmon recovery in the watershed could diminish. Projects that are guided by local citizens could be used as showcases to educate, and generally help build support for salmon recovery and the community are encouraged and are higher priority.

These projects are located in high priority areas and follow the guiding principles:

Tier 1: Highest Priority Projects

Estuary Protection and Restoration

Protection and restoration of the estuary is still the highest priority for Nisqually Salmon recovery. Even with the **Nisqually Refuge Estuary Restoration** of over 760 acres and the Nisqually Tribe's **Red Salmon Slough (RSS)** restoration work, restoration of the rest of the historical estuary is still ranked above any restoration areas by the model. Both those projects are still in progress and the **Estuary Restoration Monitoring** of the projects is critical to our ability to evaluate the effectiveness of this work. One monitoring result, so far, has shown the low connectivity of the entire Red Salmon Slough area to the Nisqually Reach and river due to some remnant dikes. The **RSS Phase 3 Project** will remove those remnant dikes and increase the water, sediment and biota exchange between those areas. The areas that are left that included historical estuary but now are converted are mostly in the historical forested salt/freshwater transitional areas on the upstream side of Interstate 5. Restoring those historical areas would be a major undertaking that could involve reclaiming developed areas and removing or opening up the Interstate 5 fill which acts as a large cross valley dike. The impacts, benefits and feasibility of such a project would be investigated through the **I-5 Fill removal feasibility analysis** which is proposed within the next 3 years.

Protection of the estuary is now more important than ever, since several hundred acres are now accessible to juvenile salmonids. Fortunately most of the areas are in protected ownership, i.e. Nisqually Wildlife Refuge and Nisqually Indian Tribe's Braget Marsh. Some smaller areas are not, and the **Lower Nisqually Mainstem/McAllister ck. Acquisition project** is focused on securing those last remaining intact areas in the estuary and lower Nisqually mainstem, but also securing degraded areas to make them available for restoration.

2010 Estuary Protection and Restoration Projects:

Nisqually Refuge Estuary Restoration 760 acre	-in progress, near completion
Red Salmon Slough Restoration Phase 3	-planned for 2010
I-5 Fill removal feasibility analysis	-conceptual
Estuary Restoration Monitoring	-in progress
Lower Nisqually Mainstem/McAllister Ck. Acquisition	-conceptual

Protection of functioning reaches of the mainstem Nisqually River, and the mouth of the river.

Protection of the all functioning reaches of mainstem Nisqually River is the highest priority freshwater project. This includes the entire lower river from the mouth to McKenna, lower Wilcox Reach, and large sections of the Middle Reach. It recognizes the fact that the two lower reaches present 18.5 contiguous river and riparian miles and over 3000 acres of floodplain in near historic conditions. It includes some of the most heavily used spawning areas for both Chinook and steelhead, but also by chum and pink salmon. Due to its location in the lower watershed, it is the largest mainstem river section and the majority of salmon have to traverse through this section at least twice in their lifetime, as juveniles leaving the basin and adults returning to the spawning grounds. Large sections of the entire river valley are in protected ownership, mostly Joint Base Lewis-McChord and Nisqually Indian Reservation, and development in those areas is very limited. The upper end of the Whitewater Reach, near McKenna is privately owned on both sides of the river and is in various degrees of degradation.

The Wilcox and Middle reaches together, includes 11.1 river miles from the Centralia Diversion Dam to the mouth of Ohop Creek at Rivermile (RM) 37.3. A majority of the steelhead and a large part of the Chinook population still traverses and utilize these reaches as adults and juveniles. Due to the existing protection of most of the Lower and Whitewater reaches, most active acquisition for protection projects occur in those areas. Smaller in-holdings in all reaches are being protected through outright acquisition for protection through the on-going Nisqually Land

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Trust's and Pierce County's **Mainstem Protection Project**. The lowest area of the Reservation reach is unprotected along its Thurston County shoreline, and purchases of intact land in this area, would also be made by the Refuge through the **Lower Nisqually Mainstem/McAllister Ck. Acquisition** project. Larger pieces of unprotected land will still be addressed individually through projects such as the **Yelm Shoreline Protection Project** which would purchase forested land along the Whitewater reach of the river and therefore protect 0.4 miles of intact and critical shoreline. Other projects include the **Wilcox Area Protection Project** which targets protecting 250 acres of floodplain and riparian habitat through conservation easements on an active agricultural farm.

2010 Mainstem (Lower, Whitewater 3-2, 3-3, Wilcox Reach 5-1, and Middle Reach 6-2 and 6-3) Protection Projects:

Mainstem Protection Project	-ongoing
Yelm Shoreline Protection	-feasibility completed
Lower Nisqually Mainstem/McAllister Ck. Acquisition	-conceptual
Wilcox Area Protection Project	-conceptual

Protection of Lower Mashel River

The lower 3.2 miles are in protected status and owned by the University of Washington's Pack Forest along the south side and WA State Parks and Nisqually Land Trust on the north side. Further acquisition projects are not warranted at this time, although permanent protection of all habitat features are not guaranteed and should be monitored.

Tier 2: High priority

Protection of rest of the mainstem Nisqually

Although the McKenna Reach, Upper Reach and the rest of the Wilcox and Middle reaches of the Nisqually are not in as pristine condition as the lowest two mainstem reaches, they still include vast stretches of intact habitat and still provide migration, spawning and rearing habitat for a large proportion of the Nisqually salmon population. Most of the privately-owned streamside properties are located in these reaches, and therefore a lot of effort has been and still is being put into protecting the functioning habitat areas of these reaches. The **Mainstem Protection Project** is focusing on small parcels that have valuable habitat, that come up for sale unexpectedly and therefore cannot be identified specifically and can be applied in these reaches as well as all other mainstem reaches. The **Tatrimima Trust Shoreline Acquisition** secured 30 acres of floodplain and channel migration zone in the Wilcox reach and was completed in 2009. The **Wilcox Area protection and the McKenna Area protection projects** are planning on protecting 250 acres of floodplain habitat in each reach through conservation easements on active agricultural farms. These easements will protect existing valuable habitat, but also make them available for restoration, another high priority action.

2010 Mainstem (McKenna, Wilcox, Middle and Upper) Protection Projects:

Mainstem Protection Project	-on-going
Tatrimima Trust Shoreline Acquisition	-completed
Wilcox Area Protection Project	-conceptual
McKenna Area Protection Project	-conceptual

Examine fish passage at Centralia Diversion Dam

Fish passage rates are the only input for the EDT model for any dams and culverts in the watershed, not other habitat attributes are being used for the evaluation of these "point" reaches. The Centralia Diversion Dam includes an upstream fish ladder for adults and a juvenile exclusion device for the diversion canal. There is no good data currently on fish passage at the Diversion Dam. The EDT model uses as inputs for this point reach rough estimates by local biologists. If those estimates are correct then the fish passage at the Dam is a major impediment to species

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recovery. However, because there is no good data a major study, the **Centralia Diversion Dam passage study**, is being proposed to look at the upstream passage rates and refine the model inputs. This study is necessary before we can determine how much of an issue fish passage at the dam is for recovery.

Restoration of lowest Nisqually River reach

Restoration of the lowest mainstem Nisqually River section where human encroachment and development with the river valley has taken place is a high priority. This small section is the transitional area from freshwater to estuary and is almost through its entire section tidally influenced. Restoration projects on this distributary fan are being assessed and identified through the **Lower Nisqually Restoration Feasibility and Design Project**. Two projects that have resulted out of the assessment so far and are actively being worked on are the **Lower Nisqually Side-channel Project** which artificially re-creates a side-channel channel network in this historic delta fan and the **Riverbend Logjam Project**, which increases the instream habitat complexity and prevents further hardening of banks in this reach.

2010 Lower Nisqually 2a restoration projects:

Lower Nisqually Restoration Feasibility and Design	- in progress
Lower Nisqually Side-channel Project	-feasibility completed
Riverbend Logjam project	-feasibility completed

Protection and restoration of Lower and Middle Mashel River

Restoration of the mainstem Mashel River between the mouth to its confluence with Busywild Creek (RM 14.6) and protection from Hwy 7 Bridge (RM 3.2) to Busywild Creek is also of high priority because of many intact reaches of the river and its importance to Chinook life history diversity and steelhead production.

Restoration of the Mashel River has focused on the Eatonville reach over the years, and different phases of the **Mashel Eatonville Restoration Project** have been completed, are in progress, or are in design stage. The focus has been on restoring floodplain connections, in-stream habitat and riparian forests through the removal of bank hardening, side-channel re-activation, log jam installation and riparian tree plantings.

The Eatonville section of the Mashel River, where the river flows through the town of Eatonville is least protected. Protection of valuable land for conservation, but also to make them available for restoration in the Eatonville section is being undertaken by the **Mashel Eatonville Reach Protection Initiative** and the **Mashel Riparian Habitat Acquisition** project. In the upper half of the watershed the river flows through industrial forestlands in the Cascade foothills. Long-term protection of the river corridor through the commercial forest land is proposed via the **Mashel Middle Reach Protection** and the **Upper Mashel Community Forest Initiative**. The first project is an outright purchase of roughly 200 acres along Middle Mashel R-1. The second proposes to establish a forest tract that has the multiple purposes of producing forest products, protecting fish, wildlife and water, and supporting the community. The **Upper Watershed Small Property Protection Project** is an on-going initiative to protect small properties in the Mashel and Ohop watershed as soon as they become available and block them with larger protected lands. The protection of the habitat in commercial forestlands is also being addressed through the **Forest and Fish Prescription Technical Assistance** which monitors commercial timber practices

Restoration and Protection of the rest of the Mashel River mainstem

2010 Mashel River Protection Projects:

Mashel Eatonville Reach Protection Initiative	-in progress
Mashel Riparian Habitat Acquisition	-in progress

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Forest and Fish Prescription Technical Assistance	-on-going
Mashel Middle Reach Protection	-design completed
Upper Mashel Community Forest Initiative	-conceptual
Upper Watershed Small Property Protection	-on-going

Mashel Restoration

Mashel Eatonville Restoration Phase 2	-in progress
Mashel Eatonville Restoration Phase 3	- design completed
Mashel Monitoring Project	-on going

Restore lower Ohop valley

The low gradient lower Ohop creek has been severely altered over the last 100 years to drain the farmlands in the valley. The **Lower Ohop Valley Restoration Project Phase 1, 2 and 3** will re-elevate the 4.4 miles of severely channelized creek back into its original floodplain recreating a 6 mile long stream with its original meander pattern and restoring its hydrologic connection to the adjacent floodplain and wetland areas. Off-channel habitat will be created and the riparian areas will be planted with native vegetation. The project will also revegetate 400 acres of the surrounding valley floor which is dominated by wetlands. This project has been split into three phases to spread out the need for securing funding. This project will benefit Chinook and steelhead trout by providing over-wintering areas outside the mainstem Nisqually and a refuge basin to preserve life history diversity in case of catastrophic events in the mainstem.

2010 Lower Ohop 1a restoration projects:

Lower Ohop valley Restoration Project Phase 1	- in progress
Lower Ohop valley Restoration Project Phase 2	-in design process
Lower Ohop valley Restoration Project Phase 3	-feasibility completed

Restoration of Puget Sound Shorelines

Projects that are located within South Puget Sound i.e. downstream of Tacoma Narrows and east of Johnson Point, are identified in the Nisqually 3-year workplan, even though the location of the projects falls in adjacent watersheds' 3 year workplan, because the projects are significant to migrating Nisqually salmon. The EDT analysis identified South Sound, Central Sound, and the Nisqually and Commencement Bays as high priority areas for restoration. Due to extensive development activities over the last century on many of the Puget Sound shorelines, many key nearshore processes have been significantly degraded or lost. Impairments to habitat forming processes on the shoreline include: reduced sediment input and transport, loss of riparian fringe habitat, reduced estuarine area and connectivity, filling over of upper intertidal beaches and degradation of water quality due to introduction of contaminants. There are several discrete areas along these shorelines where such habitat and process impairments might be addressed through restoration or enhancement. Conversely, there are a few discrete areas, where habitat features still exist to support salmonids; these areas should be protected. The **Nisqually to Pt. Defiance Nearshore Assessment Project** identifies those restoration and protection projects such as the **Ketron Island Protection Project** which would protect some of the last intact shoreline between the Nisqually and Point Defiance. Most projects in the plan address one or more of the lost nearshore processes. The **Beachcrest Pocket Estuary Restoration, Titlow Estuary Restoration**, and the **Sequalitchew Estuarine Restoration Design** address lost small estuaries along the shorelines. The **Chambers Bay Estuarine and Riparian Enhancement** project addresses both, the estuarine and riparian processes within Chambers Bay. Sediment transport and beach habitat are addressed in the: **Chambers Beach Reconstruction and Riparian Enhancement, East Nisqually Reach Beach Nourishment Pilot, Filucy Bay Bulkhead Removal, VonGeldern Cove Bulkhead Removal, and Penrose Point Bulkhead Removal** Projects. The **Nisqually to Pt. Defiance Nearshore Restoration Project** is a placeholder for a substantial project to address the effects of the railroad on the shoreline.

Nisqually 2010 Three-Year Work Program

2010 South Sound nearshore restoration projects:

Beachcrest Pocket Estuary Restoration	-in progress
Ketron Island Protection Project	-conceptual
Nisqually to Pt. Defiance Nearshore Assessment Project	- completed
Nisqually to Pt. Defiance Nearshore Restoration Project	-feasibility completed
Sequalitchew Estuarine Restoration Design	-feasibility completed
Chambers Bay Estuarine and Riparian Enhancement	-feasibility completed
Chambers Beach Reconstruction and Riparian Enh.	-feasibility completed
East Nisqually Reach Beach Nourishment Pilot	-feasibility completed
Titlow Estuary Restoration	-design in progress
Filucy Bay Bulkhead Removal	-feasibility in progress
VonGeldern Cove Bulkhead Removal	-feasibility in progress
Penrose Point Bulkhead Removal	-feasibility in progress

Medium and low priority projects can be found in the 3-year workplan spreadsheet and identified by the priority tier number.

Figure 3. Table of all Tier 1-3 priority EDT reaches.

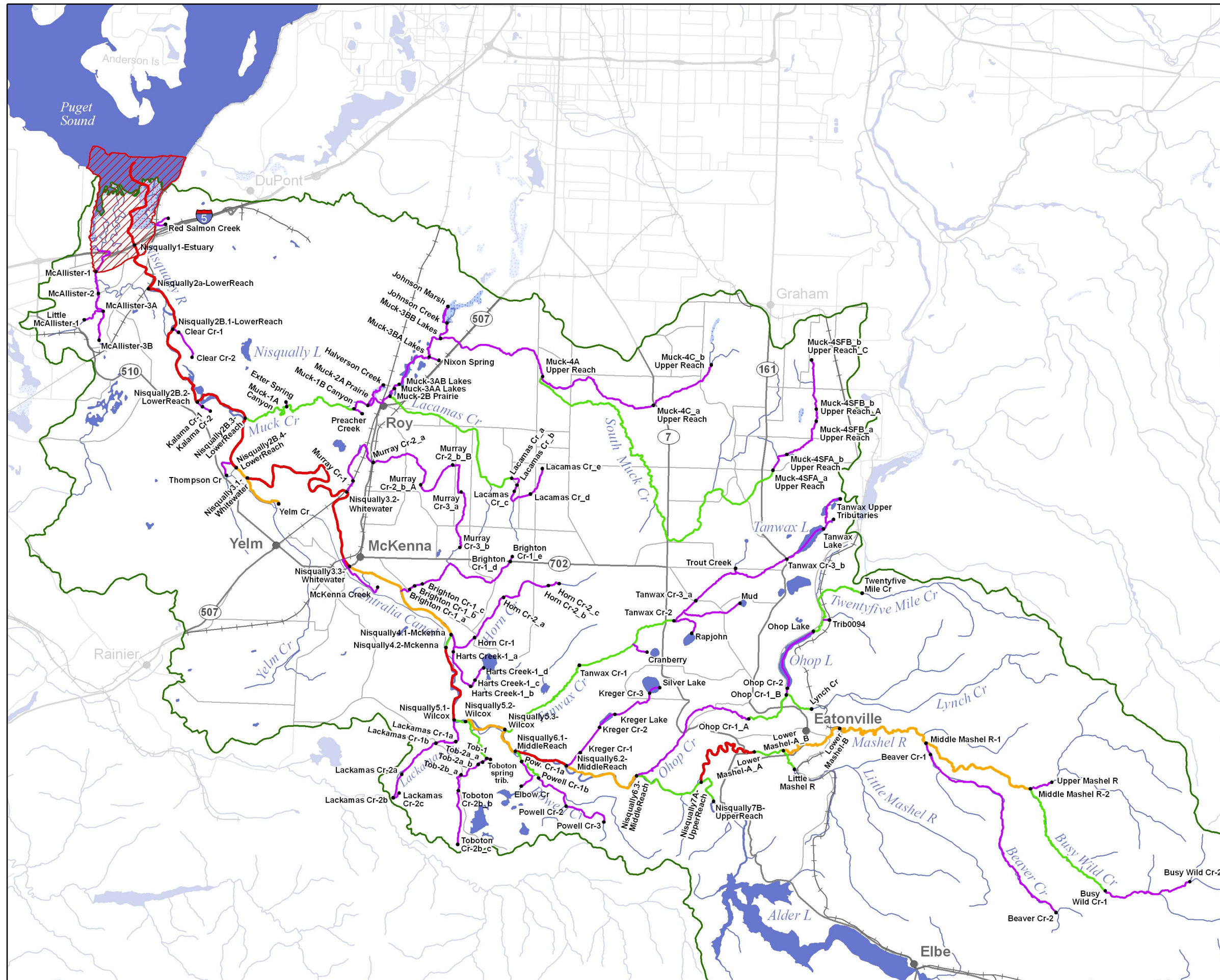
Table with columns: 2010 Status, Project Type, Plan Category, Project Name, Project Description, Priority Area, Principles modifier, Comments on modifier, Priority tier of project, Limiting Factors, Reference Document for limiting factor, Habitat Type, Activity Type and Project Performance, Primary Species Benefiting, Secondary Species Benefiting, Current Project Status, Year 1 Activity to be funded, Year 1 Estimated Budget, Year 2 Activity to be funded, Year 2 Estimated Budget, Year 3 Activity to be funded, Year 3 Estimated Budget, Likely End Date, Likely Sponsor, Total Cost of Project, Local share or other funding, Source of funds (FSA, SDF, ESDF, ARRA, etc.), Project ID, Unfunded Need.

Table with columns: 2010 Status, Project Type, Plan Category, Project Name, Project Description, Priority Area, Principles/modifier, Comments on modifier, Priority tier of project, Limiting Factors, Reference Document for Limiting Factor, Habitat Type, Activity Type and Project Performance, Primary Species Benefiting, Secondary Species Benefiting, Current Project Status, Year 1 Activity to be funded, Year 1 Estimated Budget, Year 2 Activity to be funded, Year 2 Estimated Budget, Year 3 Activity to be funded, Year 3 Estimated Budget, Likely End Date, Likely Sponsor, Total Cost of Project, Local share or other funding, Source of funds (FWSR, SGRB, other), Project ID, Unfunded Need.

Restoration										
		Steelhead			Chinook			Chnk and Sthd combined		
Rank	Reach	Benefit category	Combined Rank	% combined	Benefit category	Combined Rank	% combined	% change		
1	Nisqually1-Estuary	A	2	0.130	A	1	0.272	40.21%	Tier 1	
2	Centralia Diversion Dam	A	4	0.096	A	2	0.141	23.68%		
3	Nisqually2a-LowerReach	A	11	0.035	A	4	0.181	21.60%		
4	S Pug Snd-a	D	49	0.008	A	3	0.172	18.00%		
5	Ohop Cr-1_A	C	43	0.075	C	21	0.083	15.85%	Tier 2	
6	Middle Mashel R-1	A	1	0.121	B	14	0.030	15.10%		
7	Lower Mashel-B	A	3	0.102	A	10	0.044	14.62%		
8	Lower Mashel-A_A	A	7	0.107	B	13	0.028	13.51%		
9	Cent PSW-a	B	16	0.020	A	5	0.104	12.47%		
10	Cent PSE-a	A	15	0.026	A	6	0.081	10.70%		
11	Busy Wild Cr-1	A	9	0.076	B	15	0.030	10.58%		
12	Middle Mashel R-2	A	5	0.083	C	22	0.021	10.33%		
13	Commencement Bay		NA	0.000	B	15	0.077	7.67%		
15	Nisq Bay	D	60	0.005	A	7	0.052	5.75%		
16	E Strait	B	21	0.018	A	8	0.036	5.35%		
17	Muck-4SFA_a Upper Reach	A	12	0.050		NA	0.000	4.95%		
18	Muck-4SFA_a Upper Reach	A	6	0.046		NA	0.000	4.56%		
19	Nisqually3.2-Whitewater	B	19	0.026	C	24	0.019	4.50%		
20	Cent PSW-d	B	17	0.018	B	12	0.026	4.36%		
21	Cent PSE-d	D	50	0.007		9	0.034	4.08%	Tier 3	
22	Tanwax Cr-3_b	B	26	0.041		NA	0.000	4.06%		
23	Busy Wild Cr-2	A	10	0.040		NA	0.000	4.00%		
24	Nisqually4.1-Mckenna	A	14	0.027	E	44	0.011	3.80%		
26	Kalama Hatchery Weir	A	8	0.036		NA	0.000	3.57%		
27	Cent PSE-b			0.000	B	11	0.034	3.40%		
28	Cent PSW-b	C	33	0.011	B	15	0.022	3.34%		
29	Muck-1B Canyon	A	13	0.033		NA	0.000	3.26%		
30	Muck-1A Canyon	B	28	0.030		NA	0.000	3.03%		






Preservation										
		Steelhead			Chinook			Chnk and Sthd combined		
Rank	Reach	Benefit category	Combined Rank	% combined	Benefit category	Combined Rank	% combined	% change		
1	Nisqually1-Estuary	A	1	-57.49%	A	1	-89.28%	-146.77%	Tier 1	
2	Nisqually3.2-Whitewater	A	2	-31.48%	A	3	-59.67%	-91.15%		
3	Nisqually2B-LowerReach	A	4	-17.54%	A	2	-66.04%	-83.57%		
4	Nisqually2B.1-LowerReach	A	12	-7.09%	A	4	-56.98%	-64.08%		
5	Nisqually2B.4-LowerReach	A	6	-17.08%	A	6	-28.60%	-45.67%		
6	Nisqually2a-LowerReach	C	44	-1.45%	A	10	-36.25%	-37.70%		
7	Lower Mashel-A_A	B	16	-15.21%	B	12	-20.29%	-35.50%		
8	Nisqually5.1-Wilcox	A	3	-16.09%	A	7	-18.37%	-34.46%		
9	Nisqually6.2-MiddleReach	A	4	-18.22%	A	9	-15.72%	-33.95%		
10	Nisqually3.3-Whitewater	A	9	-9.43%	A	5	-21.55%	-30.98%		
11	Nisqually2B.3-LowerReach	A	14	-9.10%	B	11	-21.09%	-30.19%		
12	Nisqually6.3-MiddleReach	A	7	-13.33%	A	8	-15.66%	-28.99%		
13	Middle Mashel R-1	B	20	-9.65%	B	15	-16.37%	-26.02%		
14	Nisqually5.3-Wilcox	A	10	-9.25%	B	13	-11.80%	-21.05%		
15	Middle Mashel R-2	B	22	-7.95%	B	16	-10.82%	-18.77%		
16	Nisqually4.1-Mckenna	B	24	-6.30%	B	14	-10.60%	-16.90%		
17	Lower Mashel-B	B	28	-4.58%	B	20	-8.40%	-12.98%		
18	Nisqually3.1-Whitewater	B	18	-6.30%	B	18	-6.67%	-12.97%		
19	Nisqually6.1-MiddleReach	B	17	-5.49%	B	16	-6.94%	-12.43%		
20	Yelm Cr	B	19	-5.66%	B	19	-6.66%	-12.31%		
21	Tanwax Cr-1	B	27	-5.31%	C	22	-6.46%	-11.77%		
22	Busy Wild Cr-1	B	25	-6.69%	C	23	-5.01%	-11.71%		
23	Muck-1A Canyon	A	8	-11.38%			0.00%	-11.38%		
24	Nisqually7A-UpperReach	A	15	-5.49%	B	20	-5.42%	-10.91%		
25	Nisqually7B-UpperReach	A	13	-7.33%	C	30	-2.27%	-9.60%		
26	Muck-4SFA_a Upper Reach	B	25	-8.78%			0.00%	-8.78%		
27	Muck-1B Canyon	A	11	-8.77%			0.00%	-8.77%		
28	Toboton Cr-1	B	23	-3.73%	C	28	-2.65%	-6.38%		
29	Twentyfive Mile Cr	B	28	-2.91%	C	25	-3.36%	-6.27%		
30	Nisqually4.2-Mckenna	B	30	-2.94%	C	26	-3.10%	-6.04%		
31	Tanwax Cr-2	B	21	-5.48%			0.00%	-5.48%		
32	Powell Cr-1a	C	31	-3.36%	D	33	-1.92%	-5.28%		
33	Nisqually5.2-Wilcox	C	35	-2.64%	D	31	-2.19%	-4.83%		
34	Ohop Cr-1_B	E	61	-0.88%	C	23	-3.94%	-4.82%		
35	Lynch Cr	C	40	-2.26%	D	37	-1.81%	-4.07%		
36	Lower Mashel-A_B	C	44	-1.57%	D	35	-1.98%	-3.55%		
37	Powell Cr-1b	C	33	-2.30%	D	39	-1.23%	-3.53%		
38	Little Mashel R	D	50	-1.23%	D	32	-2.09%	-3.32%		
39	Lacamas Cr_a	C	39	-3.24%			0.00%	-3.24%		

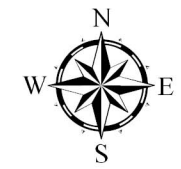
Figure 2. Nisqually Watershed Salmon Habitat Protection Priority Areas, 2010.



• EDT Reach Breaks (upper end of reach)

EDT Reaches - Protection Rank

-  Tier 1 - Estuary
-  Tier 1
-  Tier 2
-  Tier 3
-  Tier 4

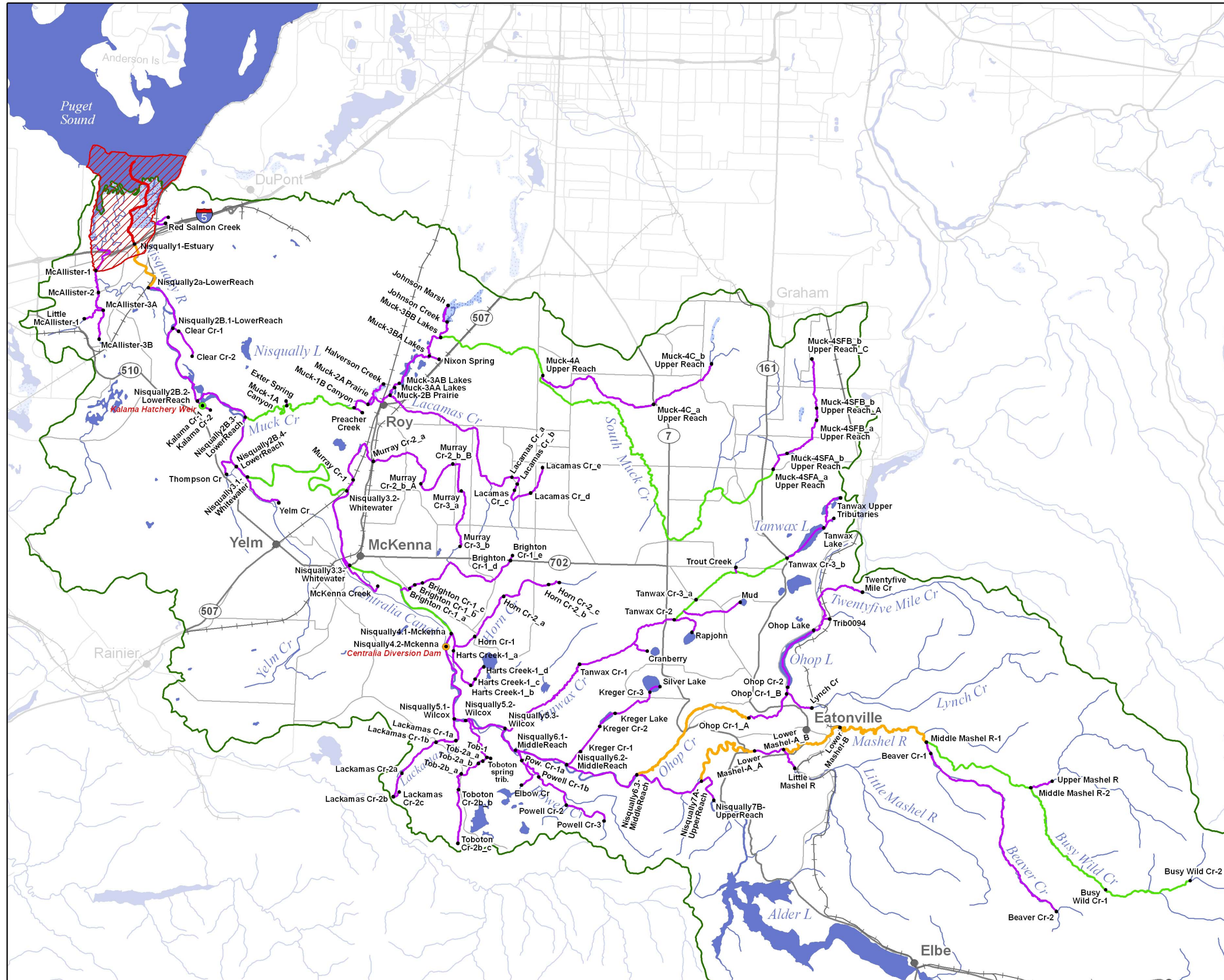


Data derived from: 2010 Salmon Habitat Priority Areas - Nisqually Natural Resources; Basedata - WADOE, WSDOT



Nisqually Indian Tribe
Cartography by: J.Cutler, April 15, 2010

Figure 1. Nisqually Watershed Salmon Habitat Restoration Priority Areas, 2010.

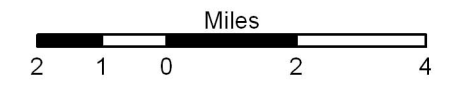


- EDT Reach Breaks (upper end of reach)
- EDT Obstruction Points - Restoration Rank**

 - Tier 2
 - Tier 3

- EDT Reaches - Restoration Rank**

 - ▨ Tier 1 - Estuary
 - Tier 1
 - Tier 2
 - Tier 3
 - Tier 4



Data derived from: 2010 Salmon Habitat Priority Areas - Nisqually Natural Resources; Basedata - WADOE, WSDOT



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