Northwest Power and Conservation Council

September 2, 2003

MEMORANDUM

TO: Council Members

FROM: Doug Marker and Bruce Suzumoto

SUBJECT: Update on mainstem implementation work plan

Staff will brief the Council on progress toward implementation of actions called for in the mainstem amendments to the Fish and Wildlife Program. Discussion will include the approach, specific tasks and schedule for implementation of mainstem tasks. As background for the discussion, attached is a table summarizing the program tasks and the draft workplan giving a more detailed description of each task. Again, the tasks in the table are not prioritized by importance, but instead are sorted based on the estimated level of effort needed to accomplish a task.

Prior to the September Council meeting, staff will meet with representatives from the federal action agencies and fish and wildlife agencies and tribes to discuss the mainstem tasks and coordination issues. The meeting will focus on Council amendment and research objectives, current research activities, implementation needs, research design and scientific review. In particular, the meeting will attempt to clarify when and how decisions must be made to implement mainstem amendment tasks in a timely manner. Council staff will update the Council on the results of the meeting and suggest possible next steps in the mainstem implementation process.

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Draft Mainstem Amendment
Council Work Plan

July 8, 2003

Goals & Objectives

The Council adopted new amendments to the Fish and Wildlife Program in April of 2003. These amendments provide a broad range of recommended policies, operations and specific research needs in the future. This work plan identifies the activities that the Council and its staff must follow to ensure that the appropriate federal agencies move quickly to implement the Council's recommendations. In addition to the activities identified in this work plan there will be other more detailed, work plans developed by the appropriate entities to begin implementation of the Council's recommendations. This work plan does not attempt to address the work plans of the appropriate implementation entities, and at this time the tasks identified are in no particular order of importance or priority. An important task (Task 43) for the Council is to establish priorities for this work plan. In developing this work plan it is the Council's objective to provide additional structure by identifying the key tasks, organizational responsibilities, milestones and schedules to ensure that the Council and its staff continue to apply our limited resources in the most effective and efficient manner possible to speed the implementation of the Council's recommendations.

Fundamental uncertainty continues to trouble the region's fish and wildlife mitigation and recovery efforts. For this reason, the Council calls for specific changes in current operations in an experimental fashion that will help to shed more light on the biological needs of fish and wildlife. Through systematic efforts to explore alternative strategies the Council recommends that the region can secure a management strategy that is as efficient and effective as possible at achieving the vision of the Council's Fish and Wildlife Program.

Council's Vision

The long-term vision of the Council's 2000 Fish and Wildlife Program is of a Columbia River Basin ecosystem that sustains abundant, productive and diverse communities of fish and wildlife, mitigating across the basin for the adverse effects to fish and wildlife caused by the development and operation of the hydrosystem and providing the benefits from fish and wildlife valued by the people of the region. This ecosystem provides:

- Abundant opportunities for tribal and treaty-right harvest of fish and wildlife, and for non-tribal harvest of fish and wildlife
- The recovery of fish and wildlife affected by the operation of the hydrosystem
- The fish and wildlife program is to be "habitat-based"

- Accomplished by protecting and restoring the natural ecological functions, habitats and biological diversity of the Columbia River Basin
- Where this is not feasible, other methods that are compatible with naturally reproducing fish and wildlife populations will be used.
- Where impacts have irrevocably changed the ecosystem, the program will protect and enhance the habitat and species assemblages compatible with the altered ecosystem.
- Provide conditions that meet water quality standards under the Clean Water Act.
- Actions must be cost-effective and not put at risk the region's adequate, efficient, economical and reliable power supply.

Biological Objectives

The Council's Biological Objectives in the Mainstem Amendments include:

- Recover ESA-listed anadromous and resident fish affected by development and operation of the hydrosystem.
- Provide habitat conditions that sustain abundant, productive, and diverse fish and wildlife populations that support the recovery of listed species and abundant opportunities for tribal trust and treaty-right harvest and non-tribal harvest.
- Maximize spillway survival by selecting the most biologically effective level of spillway discharge at each project while not exceeding interim gas supersaturation standards.
- Meet state and federal water quality standards under the Clean Water Act.
- Identify and protect habitat areas and ecological functions that are relatively productive for spawning, resting, rearing, and migrating salmon and steelhead in the mainstem.
- Protect, enhance, restore and connect freshwater habitat in the mainstem for the life history stages of naturally spawning anadromous and resident salmonids. Protect and enhance ecological connectivity between aquatic areas, riparian zones, floodplains and uplands in the mainstem.
- Allow for biological diversity to increase among and within populations and species to increase ecological resilience to environmental variability.
- Increase the amount of spawning habitat for fall chinook core populations in the lower and mid-Columbia area and in the lower Snake area.
- Where feasible, manage the hydrosystem so that patterns of flow more closely approximate natural hydrographic patterns. Ensure that any changes in water management are premised upon, and proportionate to, scientifically demonstrated fish and wildlife benefits.
- Identify, protect, enhance, restore, and connect ecosystem functions in the Columbia River estuary and nearshore ocean discharge plume as affected by actions within the Columbia River mainstem.

- Where feasible, pursue restoration of anadromous fish in mainstem areas blocked by dams. Where this is not feasible, other measures will be used to protect, mitigate, and enhance related habitat and species assemblages.
- Provide conditions that support the needs of resident fish species in upstream reservoirs and river reaches as well as the needs of anadromous and resident species in the lower parts of the mainstem.

Strategies

- Design and implement specific experiments to determine if the Biop measures have the biological benefits expected and represent the most cost-effective actions to achieve these benefits.
- Federal operating agencies should make every effort practicable to use the operational flexibility in the biological opinions to meet the biological opinion requirements and implement the other strategies in the Council's program. The exception is where the Council calls for explicit scientific testing of a particular operation in the biological opinions.
- Support development of tests and experiments for the hydrosystem even where some may require temporary departures from current biological opinion operations.
- NOAA Fisheries and the United States Fish and Wildlife Service will need to exercise the flexibility that currently exists within the biological opinions to implement the changes and experiments called for by the Council.
- For the purpose of planning for this fish and wildlife program, and particularly the hydrosystem portion of the program, the Council assumes that, in the near term, the breaching of any dams in the mainstem will not occur.
- Consistent with the biological objectives and overarching strategies in the program, all actions to provide or improve juvenile and adult fish passage through the mainstem dams should emphasize adult survivals as a high priority.
- Protect biological diversity by benefiting the range of species, stocks and life-history types in the river.
- Provide conditions that best fit those natural behavior patterns and river processes that most close approximate the physical and biological conditions needed by the relevant species.
- With regard to hatchery populations of salmon and steelhead, prioritize mainstem protection and support to those hatchery populations that provide the most significant contribution to the rebuilding of naturally spawning populations in areas of program habitat investments, or that provide the most significant contributions to harvest while ensuring the least detrimental impacts on the survival of native fish species.
- Optimize actions to produce the greatest biological benefits for the targeted species with the least cost and the least adverse effects on other species while ensuring an adequate, efficient, economical and reliable power supply.

Spill Passage Tasks

Background – In many instances spill has been shown to be an effective method for helping fish to pass dams quickly and safely. However, it is not without biological and economic impacts. For example, recent spill experiments have shown that too much spill can be harmful to fish survivals in the immediate vicinity of the dam. Little is known about the cumulative effects on survival of both adults and juvenile salmon of spilling water to gas supersaturation limits of 120 percent in the tailrace and 115 percent in the forebay at all mainstem projects.

Objective – To ensure that spill strategies are properly designed to maximize the passage survival of anadromous fish, specific experiments are needed to determine how best to manage spill to provide the most biologically beneficial levels, spill periods and patterns at each project. Experiments at The Dalles and Ice Harbor dams that have shown that spilling larger amounts can actually lead to increased juvenile mortality. The objective of this group of tasks is to determine how best to optimize both adult and juvenile salmon and steelhead survivals through mainstem dams.

Spillway passage can be the passage method most costly to the regional power system, especially in years of low water or high market prices for energy. The Council will work with the federal operating and fish and wildlife agencies, in consultation with the state fish and wildlife agencies and tribes and the Independent Scientific Advisory Board in a rigorous evaluation of the biological effectiveness and costs of spillway passage at each project and bring that information to bear in a systematic way in decisions on when, and how much, to spill. The goal of this evaluation should be to determine if it is possible to achieve the same, or greater, levels of survival and biological benefit to migrating fish as currently achieved while reducing the amount of water spilled, thus decreasing the adverse impact on the region's power supply. At the conclusion of this evaluation, the Council will conduct a public review process with the goal of providing recommendations to the federal agencies for the most biologically effective spill actions at the lowest cost possible.

Current Status – The following is a summary from the Water Management Plan prepared by the Corps for TMT. It describes planned spill and passage experiments at mainstem dams that will be conducted this spring and summer. During 2003 detailed spill tests are only being conducted at Ice Harbor and John Day dams.

Lower Granite Dam – An evaluation of the RSW operation without the presence of the Behavioral Guidance System or the Surface Bypass Collector will be performed this spring.

Lower Monumental Dam – A modified spill schedule has been adopted at this project this year. This spill schedule was based on observations of the physical models at the WES facility. The objective of this new spill schedule is to reduce eddies in the tailrace and improve egress conditions for juveniles passing this project.

Ice Harbor Dam – An evaluation of a modified spill schedule will be performed at this project this spring and summer. The objective of the modified schedule is to improve tailrace egress and improve survival for juveniles passing this project.

John Day Dam – An evaluation of a modified spill schedule will be performed at this project during the spring months. The objective of this modified schedule is to evaluate project FPE and survival under two treatment conditions. In addition, juvenile survival through the passage routes of spill, bypass, and turbines will be evaluated with a focus on improving egress conditions for juvenile fish exiting the bypass system. Summer testing will include an evaluation of 12-hour nighttime versus 24-hour spill under a block design schedule.

The Dalles Dam – An evaluation of the spillway will be conducted in 2003. The focus of the study will be to determine the need and potential location of a training wall and its potential to reduce injury and mortality in The Dalles stilling basin. The results of the study will determine whether a training wall will be constructed for the 2004 fish passage season.

Bonneville Dam – An evaluation of 75 kcfs daytime spill versus gas cap daytime spill will be conducted to determine the effects on adult and juvenile passage. The evaluation will follow a block design schedule. The adult evaluation will focus on the influence of spill on delay and fallback at the project.

Spill Tasks

Task 1. Optimize spillway passage at each dam and for the system as a whole.

The objective of this task is to better understand the operational strategies that will optimize survival of both adult and juvenile fish. To be able to optimize passage survivals a better understanding of the current level of survival via each of the passage routes is needed. This task will design a comprehensive research program that will integrate specific passage research at each dam and through each passage route with overall system survival evaluations. By conducting a broad range of system-wide research under an integrated study design it will be possible to better determine those operational strategies that provide the greatest improvements in life-cycle survivals. This will help to ensure that the region is applying its limited resources in a way that is most effective at achieving our recovery goals. The goal of this task is to determine if it is possible to achieve the same, or greater, levels of survival and biological benefit to migrating fish as currently achieved while reducing the amount of water spilled, thus decreasing the adverse impact on the region's power supply.

Task 2. Immediately implement summer spill tests

In this task the Council calls for immediate implementation of tests to examine the benefits of the current summer spill program for outmigrating juvenile fall chinook.

These tests should be designed to help determine if the biological benefits can be achieved in a more effective and less costly manner. Summer spill costs are estimated to average one-third of the total cost of all mainstem operations designed for fish and wildlife protection. This task will help to determine the efficacy and cost of all actions available to improve juvenile and adult survival. These tests should be designed to encompass the full life cycle of fall chinook and evaluate all sources of mortality. This provision is intended to pursue a more rigorous analysis and assessment of alternatives to the current summer spill program that may provide similar, or more effective, biological benefits at reduced cost

Task 3. Place a priority on designing, testing, and implementing new surface passage systems, especially removable spillway weirs.

Due to the promising results from preliminary tests of the removable spillway weir at Lower Granite, this task will continue efforts to test and evaluate removable spillway weirs. If these methods and devices produce positive results, they should be implemented as soon as it is practical to do so.

Task 4. Develop methodology to share any increased revenue due to reduced spill savings with the Council's Fish and Wildlife Program.

If efficient and effective use of spill, including the substantive spill experiments, results in increased volumes of water passing through active turbines for power generation, apply an equitable part of the additional financial resources that result to implement additional prioritized measures in the Council's fish and wildlife program.

Task 5. Develop a rigorous evaluation of spillway passage at each mainstem project.

The spill objectives in the amended program will require a better understanding of the spill levels that optimize passage survival at each dam and how these change at various flow levels. This task will determine an optimal passage strategy at each dam and for each passage route that maximizes improvements in life-cycle survival. This requires determining the cumulative effects on fish survival of passing multiple dams and taking that information into account. The maximum level of fish survival at each project may be different from, and not necessarily correlated with, the most spill, and spill may have negative effects on returning adults.

Task 6. Evaluate biological effectiveness and costs of spill operations.

In addition to the systematic evaluation of mainstem passage strategies involving spills, this task will look at other operations that require passage over spillways. The objective of this task is to provide a systematic evaluation of the biological and cost effectiveness of using spills as a passage strategy. An example of this could be an evaluation of the use of spills at Bonneville Dam for the passage of Spring Creek hatchery's early release of chinook salmon.

Spring Water Management Strategy

Background – The Council recognizes the continuing controversies over a) the nature, extent of, and reasons for the flow-survival relationship for migrating salmon and steelhead; b) the consistency between the flow targets and the flow measures; and c) flow augmentation in general. The Council found little scientific information to base specific flow augmentation strategies for spring migrants. The Biop similarly places a high priority on spring operations to ensure that there is a maximum likelihood of refilling the region's storage reservoirs. For this reason current spring operations should be passive following operations that provide approximately an 85 percent probability of having the reservoirs as full as possible (flood control elevations) on April 10 of each year.

Objectives – The Council has the following objectives for operation of storage reservoirs during the spring months of April through June.

- Refill should be a high priority for spring operations at Hungry Horse, Libby, Grand Coulee, and Dworshak dams.
- Operate storage reservoirs to ensure a high probability of elevations at upper flood control rule curve by April 10.
- Manage flows to benefit both anadromous and resident fish species.
- The Council calls on the federal agencies *not* to exercise active flow augmentation in the spring except under extraordinary circumstances and only after consultation with the Council.
- As much as possible manage for a natural runoff hydrograph while achieving refill.
- Two high priorities for Grand Coulee are the protection of the Hanford Reach and refill by the end of June.
- Provide suitable and stable flows in the Hanford reach including the flows required by the Vernita Bar agreement and by subsequent agreements.
- Bureau of Reclamation is specifically requested to do more for Vernita Bar flows.
- Manage flows to provide suitable Hanford Reach and mainstem spawning and rearing habitat.
- Evaluate the effect of flow fluctuations on estuary productivity for salmon and steelhead.
- Operate to maximize sturgeon spawning and rearing while in concert with salmon and steelhead needs.
- To the extent possible, provide steady/stable spring flows below Libby and Hungry Horse Dams to aid native fisheries.
- The BiOp flow targets at Lower Granite cannot be achieved in many years. Simply striving to meet flow targets regardless of the degree of biological benefit obtained is an ineffective and uneconomical strategy for salmon recovery.

Current Status – Current spring operations begin with attempting to have all storage reservoirs with the maximum content possible without impacting on the Corps flood control operations. This is not possible in every year due to natural variations in

precipitation and power system requirements. However, the Biop estimates that flood control elevations should be achievable on or about April 10 with 85 percent confidence.

Following April 10 there are a variety of operations that are frequently called for by the Salmon Managers in TMT. These include drafting Dworshak reservoir in April and May to provide additional flow augmentation in the Snake River to aid the out migration of juvenile chinook and steelhead. In order to get water out of Dworshak at the maximum amount possible without exceeding the State of Idaho's water quality limit of 110 percent dissolved gas supersaturation there are often requests for spills. This year the flow out of Dworshak was approximately 16 kcfs, which is about 6 kcfs of spill. The drafting of Dworshak reservoir into May must be balanced with the higher priority of refilling the reservoir. The judgment of when to shift from a drafting strategy to a refill strategy is a complex and controversial on because of substantial uncertainty about forecasted future runoff volumes.

At Libby there is a pulse of flow from the project during June to aid Sturgeon spawning. This volume is based on a sliding scale depending on projected runoff volumes. This too is not without risk since it involves drafting water during the refill period for Libby and has exacerbated refill misses in the past.

Until emergence of Hanford Reach Fall Chinook, the flows out of Priest Rapids dam operate within flow bands that are described in the current Vernita Bar Agreement. These flow bands are designed to limit the dewatering and stranding of Fall Chinook in the Hanford reach of the Columbia. Achieving operations within the flow bands requires the coordinated operation of both Grand Coulee and the Mid-Columbia projects. This has sometimes been difficult and flows have exceeded the desired bands.

Spring Operations Tasks

Task 7. Ensure a high priority to achieving refill at Hungry Horse, Libby, Grand Coulee and Dworshak.

Water in storage at the beginning of the summer has been shown to have the greatest biological benefits for juvenile salmon in the Snake. For this reason, refill of the region's storage reservoirs provides the greatest opportunity to provide the best possible river conditions and also provide reservoir conditions that provides benefits for resident fish. This task will ensure that reservoir refill is maintained as a high priority and that operational decisions during the spring recognize the importance of storing enough of the available runoff to refill the reservoirs.

Task 8. Operate Grand Coulee with recognition of specific priorities

Grand Coulee is a key dam in the federal system from a variety of perspectives. This task is designed to ensure that the Council's priorities are recognized by the federal agencies

and taken into account in the in-season management processes in TMT and IT. The Council's priorities are:

1. Providing Hanford Reach flows;
2. Achieving refill by the end of June;
3. Drafting evenly to the target elevation of 1283 by the end of August;
4. Attempting to maintain an elevation of 1283 from September-December (consult with Council on how to provide chum flows and Vernita bar flows);
5. Attempting to provide 40-60 days of water retention in Lake Roosevelt from June to December to benefit kokanee in Lake Roosevelt.

This task will seek to develop an operating strategy for Grand Coulee Dam from June to December that is consistent with the biological opinion operations and with ordinary hydrosystem operations. However, the Council would like to see if it is possible to evenly draft from Lake Roosevelt over the summer months and to minimize fluctuations and ramping rates so as to produce steady flows across each season and each day. The Council's objective in this operation is to minimize reservoir fluctuations and ramping rates. In addition, the Council would like the Bureau of Reclamation to attempt to draft Lake Roosevelt no lower than 1283 feet by the end of August.

Task 9. Augment spring flows in the Lower Snake River consistent with Idaho and federal laws.

There is a limited supply of water in the Snake River Basin, and many uses of water -- both consumptive and non-consumptive. This makes it particularly important that all applicable federal and state water laws are followed in the implementation of fish and wildlife and other requirements.

Task 10. BPA, Idaho Power Company and Reclamation are urged to execute a shaping agreement for flows from Brownlee Reservoir.

The objective of this task is for BPA, Idaho Power Company and the Bureau of Reclamation to execute a shaping agreement to ensure that flows from Brownlee Reservoir will occur to assist juvenile and adult migration when most needed. The water stored behind Brownlee reservoir can be valuable as a source of flow in the Lower Snake, but if it is not used early in the summer it becomes too warm to be useful. This task needs to have the relevant parties negotiate a new shaping agreement that can allow water from Brownlee to be used when it is most useful for fish at the call of the Technical Management Team (TMT).

Task 11. Implement VARQ and Montana Fish, Wildlife and Parks' integrated rule curves at Libby and Hungry Horse dams.

The Biop calls for implementation of VARQ, and it has begun to be implemented by both the Corps and Bureau while additional environmental reviews are being conducted to evaluate the possible environmental consequences. In this task VARQ will be fully

implemented, but the Corps and Bureau should seek to avoid the more extreme adverse effects at Lake Roosevelt that occur in a small percentage of years. The Corps of Engineers should consult with the Council to identify those occurrences and effects and to determine what might be done to minimize or avoid them.

This task will also implement the Montana Integrated Rule Curves (IRC) for Libby and Hungry Horse. These operational rule curves were included in previous Council fish and wildlife programs, yet the IRCs have not been fully implemented. The primary difficulty with full implementation of the IRCs has been the difficulty in determining the biological benefits in the Lower Columbia of additional flows provided by drafting the Montana reservoirs below the elevations called for in the IRCs. This task will seek to develop an integrated operation of Libby and Hungry Horse that is consistent with the summer drafts and the uniform drafting strategy called for by the Council.

Task 12. Implement tiered flows at Libby to benefit white sturgeon.

This task will work with the U.S. Fish and Wildlife Service and the Corps to develop a plan for implementation of the tiered flows shown in Figure 1 of the Mainstem Rule. This task needs to identify timeframes and advisory groups, like the Sturgeon Recovery Team, that can review actual reservoir and projected runoff conditions and propose a specific tiered flow strategy for sturgeon. This strategy needs to balance the needs of sturgeon with the high priority of refilling Libby reservoir by late July. The annual sturgeon flow strategy will be prepared and presented to TMT by late May of next year.

Task 13. Complete the Corps systemwide flood control study.

As called for in the Biop, the current flood control operations need to be reviewed and reanalyzed to incorporate the most recent information on the current floodplain and the biological benefits for fish and wildlife of a modified flood control operation. In this task the Corps will need to reevaluate current flood control operations and determine the most appropriate operations that achieve the goals of both controlling floods and providing conditions needed by fish and wildlife.

Summer Operations for Hungry Horse, Libby, Grand Coulee and Dworshak dams

Background – The region's storage reservoirs are drafted in July and August to provide flow augmentation in addition to natural stream flows. The storage operations are designed to achieve flow targets at checkpoints in the Snake and Columbia rivers. These check points are at Lower Granite and McNary dams. The summer flow targets at Lower Granite range from 50 to 55 kcfs, and the McNary flow target is 200 kcfs. These targets can be difficult to meet depending on the actual water year and the volume of water that is available in the storage reservoirs. The total volumes that can be drafted by the end of August under the Biop for each storage reservoir are: Grand Coulee, 10 to 12 feet from full, Libby, 20 feet from full, Hungry Horse 20 feet from full and Dworshak, 80

feet from full. The specific strategies for drafting the storage reservoirs during July and August are determined based on actual flow and water quality conditions combined with data on fish movement and survival. These in-season management decisions are generally made in TMT with disputes resolved by IT. (See chart on the regional forum later in this work plan.)

Objectives – Flow augmentation from storage reservoirs should attempt to meet the needs of both anadromous and resident fish species in the river and in storage reservoirs. The Council's goal is to ensure that actions taken to benefit one species do not unnecessarily come at the expense of other species. As conflicts on how best to utilize reservoir storage occur, the Council requests federal system operators, NOAA Fisheries and the U.S. Fish and Wildlife Service to identify potential conflicts and seek recommendations from the Council, fish and wildlife agencies, tribes and other affected entities on how best to balance the different needs prior to the implementation of specific flow actions and strategies.

Current Status – Summer reservoir operations are governed by the Biop requirements and the in-season decisions of TMT. These decisions are frequently controversial because of the difficulty in balancing the needs of resident and anadromous fish. The summer flow targets are frequently not met due to the lack of sufficient water, especially later in the summer. This can lead to rapid changes in flows below storage reservoirs as the draft limits in the Biop are reached with impact on resident fish in the rivers below the dams. There are also impacts on the fish in storage reservoirs due to the large drawdowns during the most productive summer months. The conflicts between the needs of resident fish and the flow targets in the Biop are particularly difficult for TMT to resolve. Generally, priority has been given to drafting the storage reservoirs to the limits in the Biop even though little information exists about the relationship, if any, between levels of flow, flow augmentation and juvenile and adult salmon survival through the lower Columbia hydrosystem reach. Research has shown survival benefits to fall chinook in the Snake River due to increased flows, turbidity and decreased temperatures, but it has not been possible to isolate the effects of each of these environmental conditions. Dworshak is drafted in the summer months to provide the maximum amount of cooling possible during the time period when the river is likely to reach its maximum temperature.

Summer Reservoir Operations Tasks

Task 14. Limit the summer draft at Libby to 10-feet from full pool elevation by the end of September.

This task will implement an experimental operation at Libby that will limit the summer draft to 10 feet from full pool by the end of September. The Council recognizes the need for additional water in the lowest 20^{th} percentile water supply (drought years) and recommends that in these years the draft would be increased to 20 feet by the end of September. The Corps is asked to help to develop a quantitative evaluation framework of

the biological effects on resident fish above and below these dams. This evaluation will be developed in consultation with the Council, ISAB, MDFWP, Salish-Kootenai Tribes, NOAA Fisheries, and USFWS.

Task 15. Limit the summer draft at Hungry Horse to 10-feet from full pool elevation by the end of September.

This task will implement an experimental operation at Hungry Horse that will limit the summer draft to 10 feet from full pool by the end of September. The Council recognizes the need for additional water in the lowest 20^{th} percentile water supply (drought years) and recommends that in these years the draft would be increased to 20 feet by the end of September. The Bureau of Reclamation is asked to help to develop a quantitative evaluation framework of the biological effects on resident fish above and below these dams. This evaluation will be developed in consultation with the Council, ISAB, MDFWP, Salish-Kootenai Tribes, NOAA Fisheries and USFWS.

Task 16. Evaluate the biological effects on salmon survivals in the Lower Columbia River of possible flow augmentation from Libby and Horse.

Little information exists about the relationship, if any, between levels of flow, flow augmentation and juvenile and adult salmon survival through the lower Columbia hydrosystem reach. This task will design and implement new survival tests in the lower river to better understand the movement and survival of fall chinook. This information will provide a survival baseline for estimating survivals of juvenile salmon during the period of time that flows are currently being augmented. This task will also measure the movement and survivals of adult salmon and steelhead in the river during the summer and fall. This will help to better identify any biological benefits of augmenting flows generally, and from Libby and Hungry Horse specifically, during the summer and early fall months.

Task 17. Provide even flows below Libby Dam during the summer period.

Draft Lake Koocanusa behind Libby Dam to provide stable and "flat" weekly average outflows from July through September. This task will develop a planning methodology that will establish a stable flow at each dam based on the volume available to be drafted and the forecast inflows over the period from just before refill to the end of September. This flat flow amount will be reviewed whenever new inflow forecasts are available and adjusted based on errors in the initial inflow forecast. The goal of this strategy is to keep the outflows from Libby as stable as possible when measured on a weekly average basis.

Task 18. Provide even flows below Hungry Horse Dam during the summer period.

Draft Hungry Horse Reservoir to provide stable and "flat" weekly average outflows from July through September. This task will develop a planning methodology that will establish a stable flow at each dam based on the volume available to be drafted and the forecast inflows over the period from refill to the end of September. This flat flow amount will be reviewed whenever new inflow forecasts are available and adjusted based on errors in the initial inflow forecast. The goal of this strategy is to keep the outflows from Hungry Horse as stable as possible when measured on a weekly average basis.

Task 19. Operate Dworshak Dam consistent with Biop and the Idaho Operations Plan.

This task will develop an operating plan for Dworshak Dam that a) recognizes the concerns and interests of the Nez Perce Tribe, the Idaho Department of Fish and Game, the Idaho Department of Water Resources, and the Idaho Legislature, as expressed in the jointly approved Idaho Dworshak Operations Plan, adopted December 21, 2000; and b) that accommodates the salmonid and resident fish objectives of the Council's program and the 1980 Northwest Power Act.

Dam Passage Improvements

Background – Since the passage of the Northwest Power Act and the listings under the Endangered Species Act there has been considerable research into those factors that adversely affect both adult and juvenile salmon as they pass the mainstem dams. This work has led to improved operations and maintenance of fish passage facilities that have helped to improve passage survivals throughout the federal system of dams. Each of the mainstem dams is unique from environmental, technical and biological perspectives. The unique characteristics of each dam make it increasingly important to customize the operational criteria and passage techniques to the specific conditions at each project.

Objectives – These tasks are designed to continue to improve fish passage survivals. This will involve continued structural and operational changes to improve the passage of both juvenile and adult salmon.

Current Status – There has been a steady stream of technical improvements that were designed to further improve fish passage survivals. These included: bypass systems, flip lips on spillways, improved ladder designs and operating criteria, tailored spill and turbine operations to improve fish passage, removable spillway weirs, minimum runner-gap turbine designs and turbine operating criteria. All of these improvements were designed and implemented to aid in fish passage in to increase survivals as fish move up and down the hydropower system.

Task 20. Evaluate turbine passage to determine the optimum fish survival through turbines.

Research into fish survivals through turbines has been conducted, but a great deal of additional work is needed to better understand the relationship between fish survivals and turbine designs, and operating parameters. This task will continue the research and design work on improved turbines and the relationship between survivals and overall turbine operating efficiencies.

Task 21. Modify turbine designs to improve juvenile salmon passage survivals

Recent research is showing that there are several improvements to current hydropower turbine designs that can significantly improve the survival rates for juvenile salmon. This task will evaluate the alternative designs and see that they are implemented as soon as possible in those dams where they would provide the greatest biological benefits.

Task 22. Improve the effectiveness of the adult passage program.

The objective of this task is to improve the overall effectiveness of the adult fish passage program. This includes expediting schedules to design and install improvements to fish passage facilities because the survival and successful spawning of adult fish determine the size and health of future fish populations. This task should also evaluate the benefits of cool water releases from reservoirs to facilitate adult migration. More emphasis should be placed on research; monitoring and evaluation; increased accuracy of fish counts; expansion of fish-counting to all species of interest; installation of PIT-tag and radio-tag detectors; evaluation of escapement numbers to spawning grounds and hatcheries; research into water temperature and spill effects on adult passage; and the connection between fish passage design and fish behavior. This task will have the Council's staff work with the Corps of Engineers to correct adult fish passage problems and prepare an annual report to the Council on progress at installing adult PIT-tag detectors at all projects, improving fish counting accuracy and conducting research on fish diseases at fish passage facilities.

Task 23. Monitor smolt to adult return ratios (SARs)

This task will investigate the possibilities of achieving the Council's interim objective of achieving smolt-to-adult survival rates (SARs) in the 2-6 percent range for listed Snake River and upper Columbia salmon and steelhead. In this task the Council's staff will work with state and federal fish and wildlife agencies and tribes, the Independent Scientific Advisory Board, and the federal operating agencies. The objective will be to evaluate the scientific soundness and achievability of, and impact of ocean conditions on, smolt-to-adult survival rate objectives. Then, in a public review process, the Council either will confirm these smolt-to-adult survival rates as program objectives or revise to different objectives. At the same time, the Council will investigate the possibility of developing smolt-to-adult survival rate objectives for other populations.

Task 24. Evaluate survival benefits of transport from McNary Dam

This task will evaluate the survival benefits of transporting juvenile fish from McNary Dam. The available research at McNary has been equivocal on whether there are greater biological benefits from transporting fish from McNary than leaving the fish inriver to pass through the three lower reservoirs and dams in the Lower Columbia. The region needs to determine the conditions under which there is justification for transporting fish from McNary dam. This task will evaluate whether the survival benefits of transport from McNary are sufficiently greater, at least under certain circumstances, than inriver passage to justify continuing (or increasing) the transport effort from that dam.

Task 25. Conduct a transportation study targeting Snake River fall chinook

The Council is aware that there has been extensive research into the effects of transporting fish from the Snake River. This research began in the 1970s. However, there are important questions that remain about the life-cycle effects of transporting fish from the Snake River and the relative success of transporting various groups of fish throughout the migration season. For these reasons, it is important to continue research into the effects of transporting fish from the Snake River. This task involves conducting a transportation study that targets Snake River fall chinook.

Task 26. Determine delayed survival effects due to transport

This task will explore a key question that surrounds the lack of information about the degree to which transported salmon and steelhead successfully spawn. Most transport experiments measure the number of returning adults to the dam where they were transported from because it is difficult to track fish as they move into the tributaries to spawn. This task will develop methods for determining the degree to which transported fish might differ from fish that have not been transported in their ability to successfully spawn and more clearly determine what delayed survival effects, if any, occur due to transport, such as adverse effects on homing behavior.

Water Quality

Background – The Clean Water Act requires the states to promulgate water quality standards for all major rivers. Idaho, Oregon and Washington have water quality standards that require specific conditions for the Columbia and Snake rivers. These regulatory requirements, called total maximum daily loads (TMDL), limit dissolved gas, temperature and heavy metals among other pollutants.

Objectives – The objective of these tasks is to achieve the water quality standards proposed by the states and approved by EPA. Achieving these standards will provide the

environmental conditions needed to support fish and wildlife in the basin and to provide environmental conditions needed by the entire ecosystem.

Current Status – The TMDL that have been proposed by the states are difficult for the system to achieve. The development of dams and large storage reservoirs has changed the temperature regimes in the rivers and at times results in inadvertent spilling of water over dams that creates severe dissolved gas problems. These problems are difficult to mitigate but additional work is needed to determine how best to minimize the problems created by the federal dams. There are opportunities to operate federal dams in ways that can help to ensure that water quality standards are met to the maximum extent possible.

Task 27. Meet state and federal water quality standards.

This task will have the Council's staff work with appropriate state and federal agencies to better understand the extent of the water quality problems in the basin and the possible actions that can be taken to mitigate water quality problems.

Task 28. Implement actions to reduce toxic contaminants.

Toxic contaminants have been documented in the Columbia and Snake rivers. The Council will work with state and federal water quality agencies to ensure that steps are taken to implement actions to reduce toxic contaminants in the water to meet state and federal standards.

Task 29. Decrease incidences of exceeding gas supersaturation limits.

State water quality standards normally limit dissolved gas to 110 percent supersaturation. During periods when water is being intentionally spilled over dams to pass juvenile salmon the states have agreed to waive this water quality standard and permit dissolved gas levels up to 120 percent. However, it is impossible to control the amount of water spilled to exactly keep the dissolved gas concentration at 120 percent. This results in times when the dissolved gas levels exceed the agreed-upon waiver amount. This task will involve the Corps in a review of operational procedures to identify efforts that could be taken to avoid exceeding total dissolved gas saturation limits of 120 percent, over a time period of the twelve highest hourly measurements at all Federal Columbia River Power System projects engaged in spill operations.

Task 30. Determine the survival benefits of lowering total dissolved gas (TDG) levels.

The biological impacts of increasing dissolved gas levels need to be better understood. This task will seek to determine the biological benefits of reducing TDG levels from the waiver amount of 120 percent to the TMDL standard of 110 percent. The Council's staff will work with state and federal environmental agencies in this review of current research to determine the relationship between dissolved gas and fish mortality.

Mainstem Habitat Tasks

Background – There has been considerable research into the current conditions of critical components of mainstem habitat. However, an overview of current conditions needs to be developed and integrated into a coordinated plan for improving specific aspects of mainstem habitat.

Objectives – The objectives of this set of tasks are to identify current and critical habitat needs in the mainstem of the Columbia and Snake rivers and seek to increase the extent, diversity, complexity and productivity of mainstem habitat by protecting, enhancing and connecting mainstem spawning, rearing and resting areas. Actions to consider in this set of tasks are such things as providing appropriate spawning, rearing and resting flows in the mainstem; excavating backwater sloughs, alcoves, and side channels; reconnecting alcoves, sloughs and side channels to the main channel; dredging/excavation of lateral channels that have silted in; enhancement of wetlands; creating islands and shallow-water areas; adding large woody debris to these systems; stabilizing the water levels of the rivers and reservoirs to the extent practicable; planting riparian and aquatic vegetation at appropriate locations and acquiring and protecting lands adjacent to the mainstem.

Current Status – NOAA Fisheries' 2000 Biological Opinion calls on the federal operating agencies, in conjunction with the Environmental Protection Agency and the U.S. Geological Survey, to develop a program to 1) identify mainstem habitat sampling reaches, survey conditions, describe cause-and-effect relationships and identify research needs; 2) develop improvement plans for all mainstem reaches; and 3) initiate improvements in three mainstem reaches. The Council adopted a similar measure in the mainstem amendments with the provision that this mainstem habitat initiative not focus wholly, or even predominantly, on the mainstem habitat needs of the populations currently listed. Salmon mitigation, enhancement, and rebuilding opportunities in the mainstem may have greater relation to non-listed populations than to listed populations.

Task 32. Evaluate the amount of spawning habitat for fall chinook core populations in the lower and mid-Columbia area and in the lower Snake area.

The Council will consult with state and federal fish and wildlife agencies, tribes, federal operating agencies, the Independent Scientific Advisory Board and the Independent Economic Advisory Board to evaluate the scientific soundness, achievability, and implications of the tribes' recommended targets for additional spawning habitat, as well as other reasonable alternatives. Then, in a public review process, the Council will consider adoption of a set of numerical objectives for additional mainstem spawning habitat.

Task 33. Enhance the abundance and productivity of white sturgeon in the mainstem.

The U.S. Fish and Wildlife Service's 2000 Biological Opinion concerning hydrosystem operations that affect listed Kootenai River white sturgeon includes specific objectives for that species, which the Council incorporated in the mainstem amendments. The water management strategies in the mainstem plan include a sturgeon operation strategy that is a refinement of the flow strategy in the Fish and Wildlife Service's Biological Opinion. The Council's strategy is intended to be a more effective operation for achieving the objectives in the opinion and in this program. The Council will advocate this strategy to the Corps of Engineers for Libby Dam operations.

Task 34. Improve Columbia River estuary ecosystem functions.

Identify, protect, and restore ecosystem functions in the Columbia River estuary and nearshore ocean discharge plume as affected by actions within the Columbia River hydrosystem. This includes evaluating flow effects, river operations, and estuary-area habitat changes, as well as local effects from activities such as dredging and pollution from urban areas, to better understand and improve the relationship between estuary and near-shore plume characteristics and the productivity, abundance, and diversity of salmon and steelhead populations.

Task 35. Where feasible, restore anadromous fish to blocked areas.

One of the Council's specific biological objectives for the mainstem is to pursue, where feasible, restoration of anadromous fish to historic spawning areas now blocked by dams. Where this is not feasible, other measures will be used to protect, mitigate, and enhance related habitat and species assemblages. The biological objective provides guidance to the Corps of Engineers and Bureau of Reclamation, which operate mainstem dams that block anadromous fish (Chief Joseph and Grand Coulee, respectively) and to the Federal Energy Regulatory Commission, which licenses nonfederal dams. If the Corps, Bureau and FERC decide not to require reintroduction of anadromous fish into blocked areas, actions to enhance habitat and species assemblages that exist above the blockages should be used in mitigation. Consistent with the biological objective, the Council recommends that dam operators/owners conduct the necessary feasibility studies.

Task 36. Evaluate the impact of predators on fish survival and smolt-to-adult return rates.

The Council recognizes the need to test certain assumptions and uncertainties in the biological opinions as they relate to spill, flow augmentation, reservoir drafting, predator control, and harvest. This particular task would evaluate and document the impact of predation in the mainstem in terms of numbers of ESA-listed fish taken and estimated impact on smolt-to-adult return ratios.

Task 37. Determine the importance of protecting mainstem habitat for recovery of bull trout.

This task would identify the importance of protecting or improving mainstem habitat for recovering bull trout populations. The Council calls on the relevant state and federal fish and wildlife agencies to conduct the necessary research and report the analysis to the Council at the earliest possible date.

Task 38. Create littoral habitat in Lake Roosevelt to diversify food and provide additional rearing habitat

This task would develop and implement actions that create littoral habitat and fish structures along the shores of Lake Roosevelt to diversify food available to fish and provide additional rearing habitat.

Task 39. Stabilize and improve burbot populations.

This task would implement actions to stabilize and improve burbot populations in the upper Columbia. Research has identified winter flows as an important aspect of successful burbot spawning, particularly in the Kootenai River. The Council intends that the amount and timing of these flows will be documented in subbasin plans and implemented by the relevant agencies when these plans are adopted into the fish and wildlife program.

Task 40. Provide stable flows for spawning and rearing habitat in the Hanford Reach.

This task is for federal and Mid-Columbia nonfederal dam operators to provide suitable and stable flows to establish and protect the habitat conditions necessary for spawning and rearing in the Hanford Reach on an equal basis as managing water to support the migration of listed species. This includes providing the flows required by the Vernita Bar Agreement and by subsequent agreements to extend stable flows to reduce or prevent stranding problems in the Reach. It also includes the need for the Bureau of Reclamation, as the operator of Grand Coulee Dam, and the operators of the mid-Columbia dams to take the steps necessary, separately and together, to further reduce flow fluctuations through the Reach that affect spawning and rearing.

Monitoring, Evaluation & Reporting Tasks

Task 41. Annual and on going reporting to the Council

The mainstem amendments request a series of reports to help keep the Council informed as to implementation. This task will schedule the requested reports for future presentations to the Council and ensure that the appropriate agencies are aware of the reporting requests and are preparing the requested reports on schedule. This task will

involve the Council's staff maintaining contact with those preparing reports and providing the Council with a schedule of when reports will be ready for presentation. The following is a table showing the requested reports and the approximate schedule. This schedule will be confirmed with the appropriate agencies and updated as necessary by the Council's staff.

Report	Agencies Involved	Schedule
Importance of improving or protecting mainstem habitat for bull trout (earliest possible date) -	Montana Fish Wildlife & Parks, Idaho Fish & Game & US Fish & Wildlife Service	Fall 2003
Passage improvements designed to improve on mainstem survivals	Corps of Engineers	Summer 2004
Annual Report to Congress on Corps reimbursable budget recommendations	Council	Annual - First Report January 2004
Effectiveness of transportation from transportation studies	NOAA Fisheries	Annual - First Report March 2004
Corps of Engineers' capital construction program for adult fish passage	Corps of Engineers	Annual - First Report February 2004
Documentation of the flow augmentation actions taken, the benefits of flow augmentation for fish survival and the precise attributes of flow that may make it beneficial.	Bonneville, in consultation with NOAA Fisheries and the U.S. Fish and Wildlife Service	Annual - First Report December 2004
VARQ implementation and problems encountered	Corps of Engineers	Annual - First Report Fall 2003
Effects of revised summer operation at Hungry Horse and Libby.	Corps and Reclamation	Annual - First Report November 2003
Review of the operation of Dworshak Dam and an assessment of the adverse impacts	Independent Science Advisory Board and the Independent Economic Analysis Board	Annual - First Report Early 2004
Fish Passage Center Oversight Board - activities and accomplishments	The Fish Passage Center	Annual - First Report February 2004

Task 42. Adopt performance standards for hydrosystem survival of non-listed anadromous fish.

The 2000 Biop introduced the concept of hydrosystem survival performance rates for inriver passage of affected life stages of ESA-listed salmon and steelhead through the eight federal dams in the lower Columbia and lower Snake rivers (Table 9.2-3, Page 9-14

of the Biop. According to the Biop, these are juvenile and adult survival levels throughout the FCRPS that are expected to directly or indirectly result from the best or most extensive actions that are biologically feasible and within the authority of the federal action agencies. . The Council adopted these performance rates (objectives) in the mainstem amendments and advised they should be achieved at the minimum economic cost. The Council also committed to consult with state and federal fish and wildlife agencies and tribes and others to determine the possibility of adopting hydrosystem performance standards for non-listed anadromous fish.

This task will investigate the feasibility of expanding the concept of performance standards to the biological performance of non-listed anadromous fish.

Task 43. Council will establish priorities for this work plan and allocate available Council staff resources

Implementation of this work plan will require a structured management approach. Obviously there are more tasks envisioned in the mainstem amendments than the Council's staff and budget resources can comprehensively cover. For this reason, the staff will work with the Council to establish priorities for the tasks included in this work plan. This will help to focus the Council's resources and those of other agencies on those tasks that offer the most immediate benefits and are likely to be the most important to achieving the Council's vision for the basin.

Task 44. Joint Council – Federal Agency sponsorship of the Regional Forum

Through the Biops, the federal agencies established an implementation structure, the Regional Forum, for deciding on annual operation plans for fish and wildlife, in-season management of hydrosystem operations for fish and wildlife and recommendations to Congress for funding of passage improvements at the dams. At present, this decision structure is insufficient to integrate fish and power considerations in a timely, objective and effective way, and it focuses on listed fish with little consideration for unlisted anadromous and resident fish species and wildlife. The Council continues to recommend to the federal agencies that this implementation structure, which includes the Technical Management Team and the Implementation Team, be jointly sponsored by the Council and the federal agencies. The implementation structure should allow for effective participation in these considerations by the relevant federal agencies, the Council and states, the tribes of the Columbia River Basin and other affected entities in a highly public forum. Discussions to this end began in 2001, but then were overcome by events. The Council will re-initiate the discussions to jointly sponsor these coordination teams.

Fish Passage Center

Background – The primary purpose of the Center is to provide technical assistance and information to fish and wildlife agencies and tribes in particular, and the public in general, on matters related to juvenile and adult salmon and steelhead passage through the mainstem hydrosystem. This information relates to the implementation of the water

management measures in the Council's fish and wildlife program and the monitoring and analysis of fish movement and survival data. The Fish Passage Center implements an annual smolt monitoring program. This program provides much of the information needed by fish and wildlife managers to monitor juvenile and adult passage. The Center's data and analysis provide a basis for making management decisions on water management and passage measures that are part of the Council's program and the Biop.

The Council established an oversight board for the Fish Passage Center with representation from NOAA Fisheries, state fish and wildlife agencies, tribes, the Council, and others to provide policy guidance and to ensure that the Center carries out its functions in a way that assures regional accountability and compatibility with the regional data management system.

Objectives – The mainstem plan calls for the continued operation of the Fish Passage Center with improved accountability to CBFWA, the Council and the region.

Current Status –The oversight board's responsibilities include conducting an annual review of the performance of the Fish Passage Center. Operation of the Fish Passage Center includes a budget for a manager and for technical and clerical support in order to perform its stated functions. The fish passage manager will be selected by, and be subordinate to, the Executive Director of the Columbia Basin Fish and Wildlife Authority, in consultation with the oversight board.

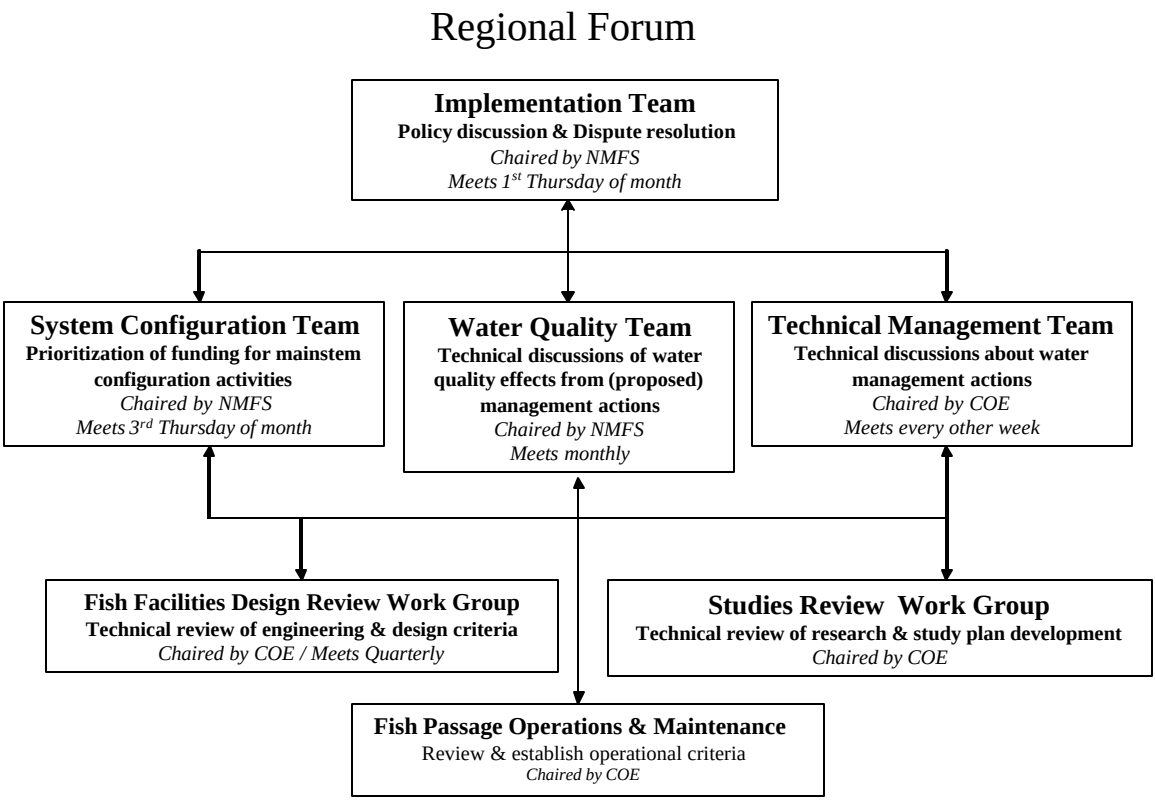
Task 45. Review Fish Passage Center and form Technical Advisory Committee

The Executive Director of the Columbia Basin Fish and Wildlife Authority and the Chair of the Council (or the Chair's designee) will conduct an annual review of the manager's performance. A technical advisory committee will be formed to establish technical protocols and scientific requirements for the Fish Passage Center and to review the scientific and technical aspects of the performance of the Fish Passage Center. The oversight board will select the technical advisory committee from the names submitted by the Executive Director of the Authority. The technical advisory committee will report to the oversight board.

Regional Forum Process for Implementation

The following figure illustrates the major implementation groups that have formed to direct and guide implementation of the biological opinions and other legal requirements pertaining to fish and wildlife and the federal hydropower system. The highest-level group is the Implementation Team (IT), which is chaired by NOAA Fisheries and involves representatives of the four state fish and wildlife agencies in the region. While some of the tribes participate in IT meetings from time to time, they have not chosen to be regular participants in IT discussions and decision-making.

Immediately below IT are three primary implementation teams. These include the System Configuration Team (SCT), the Water Quality Team (WCT) and the Technical Management Team (TMT). These three teams are the primary forums where operational decisions are discussed and debated with respect to the configuration of the hydropower system, the water quality conditions in the system and the operations necessary to carry out Biop requirements while also meeting other hydropower purposes.



The purpose and participants in the Regional Forum groups are described below.

Implementation Team (IT) – The Implementation Team is made up of program and policy level representatives from the Federal operating and regulatory agencies, States (including Alaska), Columbia River Indian tribes and Mid-Columbia Public Utility Districts. Not all of those eligible for membership actively participate.

The purpose of the IT and its technical teams is to provide a mechanism for coordination, decision making, and appropriate and timely implementation of NMFS' Biological Opinions on the Federal Columbia River Power System. IT discussions include real time operations of the hydroelectric system for the protection of migrating salmon and other listed species, needs and priority for changes to mainstem Columbia fish passage facilities, fish transportation, and research, monitoring and evaluation needs. In addition, it also serves as a forum for information exchange and discussion of related activities and issues. The IT normally meets on the first Thursday of the month at the NMFS office in

Portland, Oregon. Minutes of all meetings are available for inspection, and all meetings of the Implementation are open to the public.

IT Membership

Jim Ruff	NOAA Fisheries
Amy Skilbred	Alaska Department of Fish & Game
Jim Yost	Idaho Governor's Office
Tony Nigro	Oregon Department of Fish & Wildlife
Bill Tweit	Washington Department of Fish and Wildlife
James Litchfield	Representative for the State of Montana
Amos First Raised III	Burns Paiute Tribe
Rob Lothrop	Columbia River Inter-Tribal Fish Commission
Rhonda Swaney	Confed. Salish & Kootenai Tribes of the Flathead Res
Jerry Marco	Confederated Tribes of the Colville Reservation
Gary James	Confederated Tribes of the Umatilla Indian Res
Bobby Brunoe	Confederated Tribes of the Warm Springs Res.
Ronald Peters	Coeur d'Alene Tribe
Deane Osterman	Kalispel Tribe
Sue Ireland	Kootenai Tribe of Idaho
Dave Johnson	Nez Perce Tribe
Keith Kutchins	Shoshone-Bannock Tribes of Fort Hall
Terry Gibson	Shoshone-Paiute Tribes of Duck Valley Res
Chuck Lee	Spokane Tribe of Indians
Lynn Hatcher	Yakama Indian Nation
Suzanne Cooper	Bonneville Power Administration
Jim Fodrea	Bureau of Reclamation
Lori Postlethwait	Bureau of Reclamation
Jim Athearn	Corps of Engineers
Doug Marker	Northwest Power Planning Council
Howard Schaller	US Fish & Wildlife Service
Mary Lou Soscia	Environmental Protection Agency

System Configuration Team (SCT) – The SCT was established to review progress on planning/engineering studies, and/or collection of research data, and to make appropriate modifications to the measure or schedule where a measure is contingent upon completion of these studies.

SCT Membership

Witt Anderson	Corps of Engineers
Ron Boyce	Oregon Department of Fish & Wildlife
Bob Heinith	Columbia River Inter-Tribal Fish Commission
Bill Hevlin	NOAA Fisheries
John Kranda	Corps of Engineers
Keith Kutchins	Shoshone-Bannock Tribes of Fort Hall
Dana Knudtson	Corps of Engineers
Steve Pettit	Idaho Department of Fish & Game

Dave Ponganis	Corps of Engineers
Monte McClendon	Bureau of Reclamation
Kim Fodrea	Bonneville Power Administration
Bruce Suzumoto	Northwest Power Planning Council
Philip Thor	Bonneville Power Administration
Bob Willis	Corps of Engineers
Rod Woodin	Washington Department of Fish & Wildlife
David Wills	U.S. Fish & Wildlife Service

Water Quality Team (WQT) – The WQT represents a merger of the Dissolved Gas Team and the Water Temperature Work Group. The two teams merged in 1999 with the concurrence of the Implementation Team (IT). The mission of the WQT is to provide scientific and technical recommendations, advice and guidance on water quality issues to the Implementation Team, other Biological Opinion technical committees, and other regional Columbia River entities for decisions that impact aquatic resources.
The geographic scope of the WQT is the Columbia River Basin with initial consideration given to mainstem Columbia and Snake rivers issues. The primary technical focus is Endangered Species Act /Clean Water Act issues related to anadromous and resident fish.

Membership of the WQT is open to all regional entities including the Environmental Protection Agency, NOAA Fisheries, Corps of Engineers, Bureau of Reclamation, Fish and Wildlife Service, Bonneville Power Administration, and to the Northwest Power Planning Council, State Fisheries and Environmental Quality Agencies, Tribes, Columbia River Inter-Tribal Fish Commission, Mid-Columbia Public Utility District's, Idaho Power and other interested parties.

WCT Membership:

Jim Adams	US Army Corps of Engineers
Greg Aldrich	Oregon Department of Environmental Quality
Gustavo Bisbal	US Fish & Wildlife Service, Oregon Office
Chris Cook	Pacific Northwest National Laboratory
Jamie Davis	Nez Perce Tribe
Don Essig	Idaho Department of Environmental Quality
Kathleen Feehan	Confederated Tribes of the Umatilla Indian Reservation
Margaret Filardo	Fish Passage Center
John Gleason	Bonneville Power Administration
Russell Harding	Oregon Department of Environmental Quality
Mike Herold	Washington Department of Ecology
Patti Howard	Columbia River Inter-Tribal Fish Commission
Jim Irish	Bonneville Power Administration
Paul Lumley	Columbia River Inter-Tribal Fish Commission
Dave Mabe	Idaho Department of Environmental Quality
Alec Maule	USGS- Columbia River Research Laboratory
Chris Maynard	Washington Department of Ecology
Monte McClendon	Bureau of Reclamation

Paul Ocker	US Army Corps of Engineers
Dan Opalski	US Environmental Protection Agency
Rick Parkin	US Environmental Protection Agency
Dave Peeler	Washington Department of Ecology
John Piccininni	Bonneville Power Administration
Paul Pickett	Washington Department of Ecology
Dave Ponganis	US Army Corps of Engineers
Dennis Rohr	Mid Colombia PUD's
Jim Ruff	NOAA Fisheries
Mark Schneider	NOAA Fisheries
Donna Silverberg	Facilitation Team
Mary Lou Soscia	US Environmental Protection Agency9
Bruce Sutherland	Lower Columbia River Estuary Program
David Wills	US Fish and Wildlife Service
Dave Zimmer	US Bureau of Reclamation

Technical Management Team (TMT) – Coordinated operation of Corps of Engineers' dams and reservoirs in the Columbia River Basin is part of the measures designed to halt and reverse the declines of threatened or endangered Columbia River Basin salmon and other declining fish species. The Technical Management Team (TMT), an interagency technical group responsible for making recommendations on dam and reservoir operations to protect Columbia River salmon. The Corps representative chairs the TMT.

TMT Membership

ORGANIZATION	REPRESENTATIVE	ALTERNATES
NOAA Fisheries	Paul Wagner	Chris Ross
U. S. Army Corps of Engineers	Cindy Henriksen	Rudd Turner
Bonneville Power Administration	Scott Bettin	John Wellschlager
U.S. Bureau of Reclamation	Tony Norris	John Roache
U.S. Fish & Wildlife Service	David Wills	Howard Schaller
State of Washington	Shane Scott	
State of Oregon	Ron Boyce	
State of Idaho	Steve Pettit	
State of Montana	Jim Litchfield	
Confederated Tribes of the Colville Indian Reservations	Jerry Marco	Kirk Truscott
Shoshone-Bannock Tribes of Fort Hall	Keith Kutchins	

Staff DRAFT Mainstem Implementation Work Plan

Derived from Strategies in 2003 Mainstem Amendments to the Council's Fish and Wildlife Program

08/28/03

Task	Task Description	Current Status	Lead Agencies	Regional Forum Groups	Schedule	Usual Funding Source	BiOp Cross References	Effort Needed	Category
41	Annual and on going reporting to the Council	There are several reports from action agencies and NOAA requested by the Council	COE, NOAA, BOR, BPA		2004	Reporting Agency		3	M&E and Reporting Tasks
42	Adopt performance standards for hydrosystem survival of non-listed anadromous fish. (pg 13)	The Council will determine the possibility of adopting hydrosystem survival performance standards for non-listed populations of anadromous fish	NPPC	NPPC				3	M&E and Reporting Tasks
44	Jointly Sponsor Regional Forum (pg 29)	The Regional Form is not sponsored by the Council and there is limited involvement of the Council and its staff.	NPPC, NOAA, COE, BPA, BOR	IT, TMT, SCT, WCT	Fall 03			3	M&E and Reporting Tasks
31	Identify and protect habitat areas & ecological functions that are relatively productive. (pg 11-12)	Check to determine functions of specific reaches of subbasin planning	NPPC		2004			3	Mainstem Habitat Tasks
32	Increase the amount of spawning habitat for fall chinook core populations in the lower and mid-Columbia area and in the lower Snake area. (pg 12, 17)	Check to determine functions of specific reaches of subbasin planning	NPPC		2004			3	Mainstem Habitat Tasks
33	Enhance the abundance and productivity of white sturgeon in the mainstem (pg 14,17)	Additional work is need to determine how hydropower operations can maximize spawning and rearing success of white sturgeon in reservoirs, while also operating to meet the needs of salmonids.	COE, FWS, BPA	TMT	Spring 04			3	Mainstem Habitat Tasks

Level of Council effort needed:
1- little
2- some
3- high

pg refers to page numbers in the 2003 Mainstem Amendments (Council Document 2003-11)

Task	Task Description	Current Status	Lead Agencies	Regional Forum Groups	Schedule	Usual Funding Source	BiOp Cross References	Effort Needed	Category
36	Evaluate the impact of predators on fish survival and smolt-to-adult return rates. (pg 16)	There has been considerable research into predation problems in the Columbia however, a more systematic and complete assessment is needed.	BPA, NOAA, COE	SRWG, SCT	2004			3	Mainstem Habitat Tasks
38	Create littoral habitat in Lake Roosevelt to diversify food and provide additional rearing habitat (pg 17)	Additional work is needed to better determine what actions can provide the improved habitat and foodweb diversity in Lake Roosevelt.	BOR, FWS, WDFW		Spring 04			3	Mainstem Habitat Tasks
2	Immediately implement summer spill tests at non-transport sites (pgs 13, 19-20)	Under discussion	NOAA, COE, BPA	SRWG, IT, SCT	Planning Starts June '03, Implementation July-Aug '04	BPA	**Section 9.6.1.3.3** **Actions:** 46	3	Spill Tasks
4	Methodology to share any increased revenue from operations changes (pg 20)	Expect discussion within scope of long term fish funding MOA	NPPC, BPA		2004	none	**None known**	3	Spill Tasks
6	Evaluate biological effectiveness and costs of spill (pg 19)	Example: Spring Creek Hatchery spill. Preliminary discussions begun	COE, FWS, BPA	TMT, IT, SCT, SRWG	Feb-04	none	**Section 9.6.1.4.6** **Actions:** 82,83	3	Spill Tasks
8	Operate Grand Coulee with recognition of specific priorities (pg 24)	No discussions yet.	BOR, BPA, COE, NOAA	TMT, IT	Current	none	**Section 9.6.1.2.1** **Action:** 15 **Section 9.6.1.2.3** **Action:** 19	3	Spring Reservoir Operations
10	Execute shaping agreement for Brownlee flows (pg 25)	Not started	BPA, Idaho Power Company and BOR	TMT, IT	Jun-04	none	**Section 9.6.1.2.3** **Action**: 21	3	Spring Reservoir Operations
14	Limit the summer draft to 10-feet from full pool elevation by the end of September at Libby (pg 25-26)	Operational change not agreed to yet.	COE, NOAA, BPA	TMT, IT	Jun-04	BPA	**Section 9.6.1.2.3** **Action:** 19 (requirements differ)	3	Summer Reservoir Operations

Level of Council effort needed:
1- little
2- some
3- high

pg refers to page numbers in the 2003 Mainstem Amendments (Council Document 2003-11)

Task	Task Description	Current Status	Lead Agencies	Regional Forum Groups	Schedule	Usual Funding Source	BiOp Cross References	Effort Needed	Category
15	Limit the summer draft to 10-feet from full pool elevation by the end of September at Hungry Horse (pg 25-26)	Operational change not agreed to yet.	BOR, NOAA, BPA	TMT, IT	Jun-04	BPA	**Section 9.6.1.2.3** **Action:** 19 (requirements differ)	3	Summer Reservoir Operations
16	Evaluate survival in the Lower Columbia River due to flow augmentation from Libby and Horse (pg 26)	Research not designed yet.	COE, NOAA, BPA	SRWG, IT, SCT	2004	COE, BPA	**Section 9.6.1.2.3** **Action:** 17, 18, 19 (requirements differ)	3	Summer Reservoir Operations
17	Provide even flows below Libby during the summer period (pg 26)	Stated objective is not agreed to yet and is difficult to implement	COE, BPA, NOAA	TMT, IT	Jul-04	BPA	**Section 9.6.1.2.2** **Action:** 19 (minimum flows) **USFWS**, **Section 3.A.2** (minimum flows and ramping rates)	3	Summer Reservoir Operations
18	Provide even flows below Hungry Horse during the summer period (pg 26)	Stated objective is not agreed to yet and is difficult to implement	BOR, BPA, NOAA	TMT, IT	Jul-04	BPA	**Section 9.6.1.2.2** **Action:** 19 (minimum flows) **USFWS, Section 3.A.1** (minimum flows and ramping rates)	3	Summer Reservoir Operations
30	Determine the survival benefits of lowering TDG levels (pg 20)	Include in spill evaluation	SRWG, SCT	SRWG, TMT, IT, TMDLs	2004	COE, NOAA, BPA	**None Known**	3	Water Quality
20	Evaluate turbine passage to determine the optimum fish survival through turbines (pg 20)	Some studies completed but more study is needed. Under Development	COE, NOAA	FFDRWG, SRWG, FPOM, SCT	2004	COE, BPA	**Section 9.6.1.4.4** **Actions:** 25, 26 **Section 9.6.1.4.6** **Actions:** 88, 89	2	Dam Passage Improvements
21	Modify turbines to improve juvenile survival (pg 20)	Investigations at Ice Harbor and McNary	COE	FFDRWG, SRWG, FPOM, SCT	2005	COE, BPA	**Section 9.6.1.4.5** **Actions:** 64 **Section 9.6.1.4.6** **Actions:** 90, 91, 92	2	Dam Passage Improvements
22	Improve the effectiveness of adult passage (pg 13, 20)	Underway	COE, NOAA	FFDRWG, SRWG, SCT	Current	COE	**Section 9.6.1.6.2** **Actions:** 107-118	2	Dam Passage Improvements
23	Monitor smolt to adult return ratios (SAR's) (pg 13)	Some studies completed and more studies underway	COE, NOAA	SRWG,SCT	2004	NOAA	**Appendix A, Page A-5** Not the indicator used in the BiOp	2	Dam Passage Improvements

Level of Council effort needed:
1- little
2- some
3- high

pg refers to page numbers in the 2003 Mainstem Amendments (Council Document 2003-11)

Task	Task Description	Current Status	Lead Agencies	Regional Forum Groups	Schedule	Usual Funding Source	BiOp Cross References	Effort Needed	Category
24	Evaluate survival benefits of transport from McNary Dam (pg 18)	Studies are underway	COE, NOAA	SRWG, SCT	Current	COE	**Section 9.6.1.3.1** **Actions:** 41, 42 **Section 9.6.1.3.3** **Actions:** 45,46	2	Dam Passage Improvements
25	Conduct a transportation study targeting Snake River fall chinook (pg 18)	Studies are underway	COE, NOAA	SRWG, SCT	Current	COE	**Section 9.6.1.3.3** **Actions:** 43,46	2	Dam Passage Improvements
26	Determine delayed survival effects due to transport (pg 18)	Studies underway	COE, NOAA	SRWG, SCT	2004	COE	**Section 9.6.1.3.3** **Action:** 47	2	Dam Passage Improvements
45	Review of Fish Passage Center and formation of Technical Advisory Committee (pg 28)	The Council and the Executive Director of CBFWA will prepare annual reviews of the FPC and also form a Technical Advisory Committee	NPPC, CBFWA		Fall 03			2	M&E and Reporting Tasks
34	Improve Columbia River estuary ecosystem functions. (pg 12-13)	Effort is underway to evaluate the Columbia River estuary and nearshore ocean discharge plume to determine the effects of flow regulation on changes to estuary-area habitat.	COE, NOAA					2	Mainstem Habitat Tasks
35	Determine the feasibility of restoring anadromous fish to blocked areas. (pg 13,17)	Additional study and evaluation of the feasibility of restoring anadromous fish in mainstem areas blocked by dams.	NPPC, COE					2	Mainstem Habitat Tasks
37	Determine the importance of protecting mainstem habitat for recovery of bull trout. (pg 17)	There has been considerable research into the needs of Bull Trout but the Council requests that this work be consolidated and reported to the Council.	MTFWP, FWS, COE, BOR	TMT	ASAP		10.A.1.1, 10.A.1.2, 11.A.1.1, 11.A.1.2 (monitor effectiveness of flow mgt on BT below Libby and Hungry Horse); 10.A.2.1., 11.A.2.1.a-d, 11.A.3.1.a-f (determine BT use of the lower Snake and Columbia mainstems)	2	Mainstem Habitat Tasks
39	Stabilize and improve burbot populations (pg 17)	There is currently ongoing research into the needs of burbot. This work has identified winter flows as an important aspect of successful burbot spawning.	IFG, FWS, COE	TMT	Fall 03			2	Mainstem Habitat Tasks

Level of Council effort needed:
1- little
2- some
3- high

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Task	Task Description	Current Status	Lead Agencies	Regional Forum Groups	Schedule	Usual Funding Source	BiOp Cross References	Effort Needed	Category
40	Provide stable flows for spawning and rearing habitat in the Hanford Reach. (pg 22-23)	Hanford Reach operations are guided by a Vernita Bar Agreement and controlled by federal and non-federal dam operators.	NOAA, Grant PUD, WDFW, FWS, BOR, BPA	TMT	2004			2	Mainstem Habitat Tasks
1	Optimize spillway passage at each dam and for the system as a whole (pg 18-20)	Tests this summer at Ice Harbor, John Day, The Dalles and Bonneville	COE	SRWG, SCT	July	COE	**Section 9.6.1.4** **Actions:** 82, 83	2	Spill Tasks
5	Implement an evaluation of spillway passage at each mainstem project (pg 19)	Research underway at IHR, JDA, TDA and BON. More system-wide work needed and additional research at all mainstem dams.	COE, NOAA, BPA	SRWG, SCT	2004	COE, BPA, Task 4 savings	**Section 9.6.1.4** **Action:** 54, 82, 83	2	Spill Tasks
7	Ensure refill at all storage reservoirs (pg 23)	Stated objective but difficult to implement	COE, BOR, NOAA	TMT, IT	Current	none	**Section 9.6.1.2.1** **Action:** 14	2	Spring Reservoir Operations
11	Implement VARQ & IRCs at Libby and Hungry Horse (pg 23)	Implementation and NEPA compliance underway.	COE, BOR	TMT, IT	Current	COE, BOR	**Section 9.6.1.2.3** **Action**: 22	2	Spring Reservoir Operations
12	Implement tiered flows at Libby to benefit White Sturgeon (pg 23)	Being implemented with revised flow volumes	COE, FWS	TMT, IT	Current	BPA	**USFWS Section 8.1.d, 8.1.c**	2	Spring Reservoir Operations
13	Complete the Corps systemwide flood control study (pg 23)	Reconnaissance Study Underway	COE	TMT, IT, SCT, SRWG	March 04 complete recon	COE	**Section 9.6.1.2.6** **Action:** 35	2	Spring Reservoir Operations
3	Design, test, and implement RSW's (pg 20)	Under way at LWG and IHR	COE	FFDRWG, SRWG, SCT		COE, BPA	**Section 9.6.1.4.1** **Actions:** 53, 72, 75, 77, 80	1	Spill Tasks
9	Augment spring flows in the Lower Snake River consistent with Idaho and federal laws (pg 25)	Current operations are consistent.	BOR, BPA, COE, NOAA		Summer 2004	none	**Section 9.6.1.2.3** **Action:** 20, 21 **Section 9.6.1.2.3** **Action:** 32	1	Spring Reservoir Operations

Level of Council effort needed:
1- little
2- some
3- high

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Task	Task Description	Current Status	Lead Agencies	Regional Forum Groups	Schedule	Usual Funding Source	BiOp Cross References	Effort Needed	Category
19	Operate Dworshak consistent with BiOp & the Idaho Operations Plan (pg 27)	Being implemented	COE, NOAA, BPA	TMT, IT	Current	COE	**Section 9.6.1.2.3** **Action:** 19	1	Summer Reservoir Operations
27	Meet State and Federal water quality standards (pg 13)	Studies and analysis underway. TMDLs are under development by states and EPA	COE, BOR, EPA, WA, OR, ID, MT, tribes	IT	Current	COE, BOR	**Section 9.6.1.7.1** **Actions:** 130-143	1	Water Quality
28	Implement actions to reduce toxic contaminants (pg 17)	Studies and analysis underway. TMDLs are under development by states and EPA	COE, BOR, EPA, WA, OR, ID, MT	IT	Current	COE, BOR	**None Known**	1	Water Quality
29	Reduce gas supersaturation exceedances (pg 20)	Ongoing efforts to improve on operations and avoid exceedances.	COE, NOAA, EPA	TMT	Current	none	**Section 9.6.1.7.1** **Actions:** 132-133 (partial)	1	Water Quality
43	Council will establish priorities for this work plan and allocate available Council staff resources	The Council needs to develop a methodology to apply the criteria included in the Mainstem Rule and any other criteria relevant to the implementation of this work plan to establish implementation priorities.	NPPC	NPPC	Summer 2003	NPPC			M&E and Reporting Tasks

Level of Council effort needed:
1- little
2- some
3- high