

***CHAPTER 6: LAKE CHELAN COMPREHENSIVE  
FISHERY MANAGEMENT PLAN***

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## **SECTION 1: INTRODUCTION**

The relicensing of the Lake Chelan Hydroelectric Project brought fishery Agencies together in a forum that provided an opportunity for comprehensive review of current and future management priorities for Lake Chelan fisheries. Representatives from various stakeholders in the relicensing process formed the Natural Sciences Working Group (NSWG), principally NOAA Fisheries, the WDFW, the USFWS, the USDA Forest Service, the NPS, the WDOE, the Lake Chelan Sportsman's Association (LCSA), the City of Chelan, the People for Lake Chelan, and Chelan PUD. These stakeholders used the relicensing process as an opportunity to develop a Comprehensive Fishery Management Plan (CFMP) for Lake Chelan, now contained in this Chapter. For more information on Lake Chelan fisheries and management alternatives, see Viola and Foster (2002).

The WDFW has primary responsibility for fishery management in Lake Chelan, as provided under RCW 77.04.012. However, other stakeholders have significant roles in managing the Lake Chelan fishery. These include:

- The USDA Forest Service, as a manager of large tracts of land adjacent to Lake Chelan, and of tributaries to the Lake, has fishery management responsibilities regarding habitat.
- The NPS manages the natural resources of the national parks in accordance with NPS-specific statutes, including the National Park Service Organic Act and the National Parks Omnibus Management Act of 1998. In addition, it is bound by general environmental laws, such as the Clean Air Act, the Clean Water Act, the Endangered Species Act of 1973, NEPA, the Wilderness Act, relevant Executive Orders, and applicable regulations.
- The USFWS, particularly through the Endangered Species Act, has an interest in the restoration of Westslope cutthroat and bull trout to the Lake Chelan watershed.
- The WDOE has responsibility for maintaining water quality and quantity.
- Native American tribes, especially the Yakama Nation, are interested in exploring the feasibility of introducing sockeye salmon into Lake Chelan.
- LCSA seeks to protect and maintain a viable sport fishery on the lake. To support this effort, it seeks cooperative efforts with other stakeholders to educate sport fishers. It also contributes funds and volunteer labor for stocking and habitat improvement efforts.

The responsibilities of various resource managers and others currently involved in managing some portion of Lake Chelan waters and/or its tributaries, biological resources, and surrounding lands sometimes overlap or conflict with one another. A major objective of the CFMP is to coordinate the plans and actions of these stakeholders in developing and implementing fishery management measures in Lake Chelan.

## ***SECTION 2: COMPREHENSIVE FISHERY MANAGEMENT PLAN GOALS***

The CFMP is designed to: 1) provide guidance for the management of the fishery resources in Lake Chelan; 2) maintain a healthy recreational sport fishery in Lake Chelan; 3) and develop a monitoring and evaluation program to assess the efficacy of management actions.

It describes a set of proposed management actions for each species currently inhabiting Lake Chelan, and a process for developing a monitoring and evaluation program, which will ultimately lead to the development of specific species management goals and objectives. The CFMP will be reviewed on a periodic basis to allow for planning and future adjustments over the term of the license.

The primary management objectives of the CFMP for Lake Chelan are to:

1. Emphasize restoration/enhancement of native species, where feasible;
2. Support the recreational sport fishery;
3. Manage the lake elevation to enhance tributary production and recreation (see section 3.1 and Figure 1);
4. Determine compatibility of management actions with potential future bull trout re-introduction;
5. Develop a monitoring and evaluation program that provides flexibility for future changes (see section 5).
6. Monitor and address entrainment of fish from Lake Chelan into the Project intake per section 4.6.4.

The Lake Chelan Hydroelectric Project Area is shown in Figure 6-1.

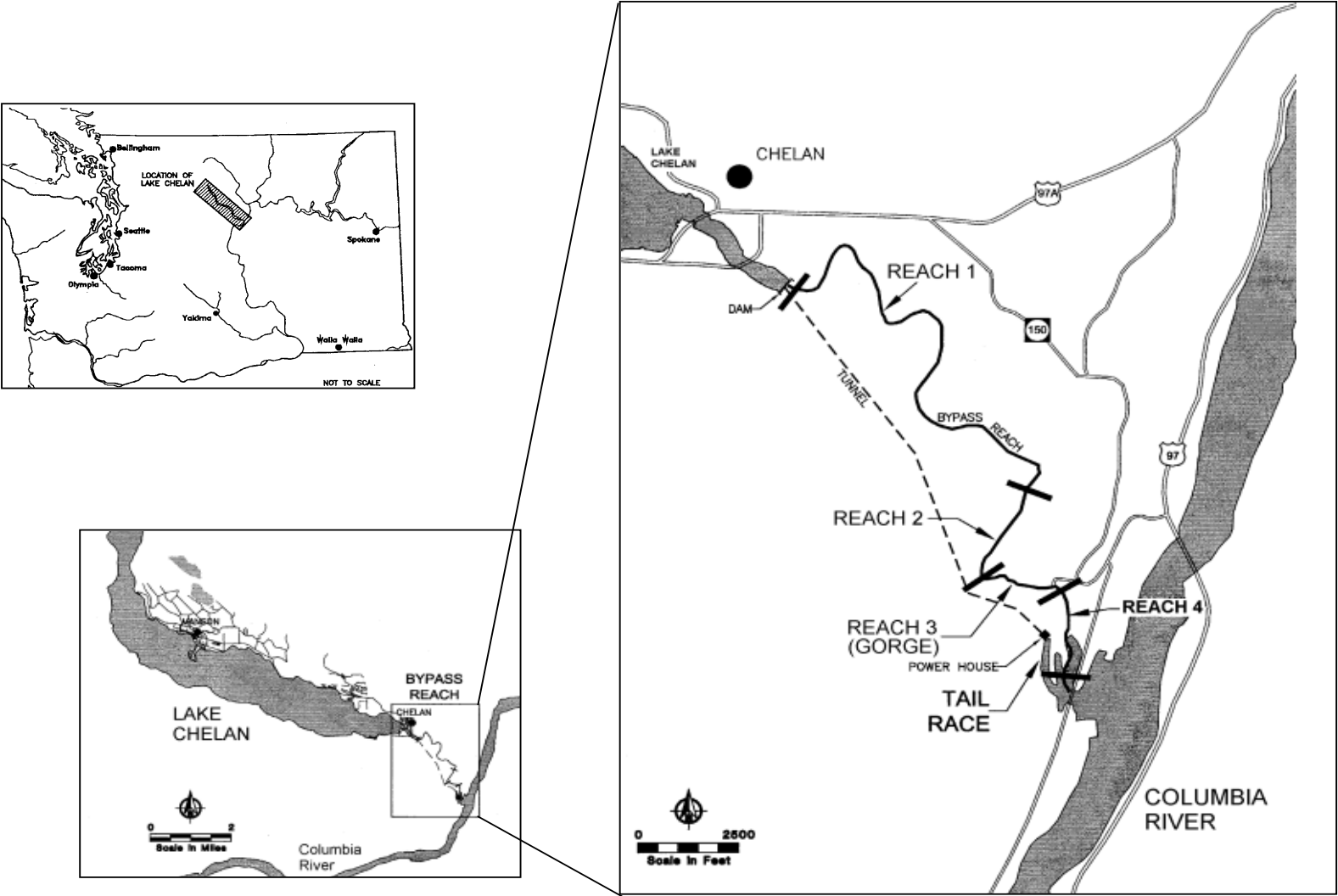


Figure 6-1: Lake Chelan Hydroelectric Project Area

### **SECTION 3: FISH SPECIES IN LAKE CHELAN**

The CFMP is based on relicensing studies that were conducted in 1999, 2000, and 2001 to determine the current status of fishery resources in Lake Chelan. The studies investigated: (1) sport catch through a creel survey; (2) the incidence of barriers to upstream spawning migration in lake tributaries; (3) timing of fry emergence; (4) tributary spawning and rearing habitat availability; (5) tributary fish populations; (6) limnological conditions; (7) habitat availability, fish species and use, and recreational fishing in the Stehekin River; and (8) the role of large woody debris (LWD). Much of the relicensing work repeated studies conducted by Brown (1984), so that current conditions could be compared with conditions that existed in 1982 and 1983.

This section provides an overview of the history and significance of each Lake Chelan fish species, and then lists the management issues considered important by one or more fishery agencies or organizations regarding that species. Alongside each issue is the acronym identifying the agency or organization that raised that issue. Following the issue list for each species is a list of management recommendations regarding that species, based on areas of agreement among all of the Agencies and organizations participating in the development of the CFMP. These management recommendations form the starting point for implementation of the CFMP. Based on the monitoring and evaluation program created by the CFMP, it is expected that modifications will be made to these management recommendations over the course of the license period. The Lake Chelan Fishery Forum (LCFF), consisting of most of the same Agencies and organizations that helped develop the CFMP, will be responsible for making those recommendations (section 4).

Although the CFMP was developed as part of the Lake Chelan relicensing process, it is important to note that ultimate authority for fishery management activities on Lake Chelan rests with each of the relevant resource agencies. Agency authorities and obligations regarding the CFMP are outlined in sections 4.1 through 4.4. Chelan PUD's obligations regarding implementation of specific items are detailed in section 4.6.

#### **3.1 Westslope Cutthroat Trout**

Few Westslope cutthroat trout (WSCT) were captured during relicensing studies, either in the creel survey or tributary investigations (DES 2000). The few WSCT caught in the creel survey indicates that the current juvenile WSCT stocking effort, approximately 90,000 annually from 1980 to 1999, is not contributing to the WSCT population in the Chelan Basin. Tributary trout populations estimated during relicensing studies, particularly WSCT, are lower than those estimated by Brown (1984). Barriers to upstream spawning migration were identified in most tributary mouths investigated (DES 2000). Barriers identified were in the form of depth, gradient, and/or velocity barriers. The NSWG concluded that these barriers were created as a result of Project operations since 1981 (when the second license was issued), and are, most likely, contributing to trout population decline in the Lake Chelan tributaries. The fishery Agencies have stated a strong desire to restore native species in the Chelan Basin, particularly

WSCT, as part of the relicensing process. Local community representatives have also stated a strong desire to maintain the existing recreational trout fishery.

#### Primary Issues Raised by Stakeholders

- Phase out rainbow trout (RBT) stocking - WDFW, USDA-FS, LCSA, NPS
- Re-establish/supplement tributary populations where suitable – USDA-FS, WDFW
- Maintain present angling restrictions for WSCT- USDA FS, NPS, WDFW
- Restrictive harvest of WSCT until population rebuilds – USDA-FS, NPS, WDFW
- Manage water levels to optimize spawning, incubation and rearing - NPS, USDA-FS, WDFW
- Monitor levels of hybridization between WSCT and rainbow trout - NPS, WDFW
- Minimize loss from entrainment/spills - NPS, LCSA, WDFW
- Support habitat enhancement - WDFW
- Delay stocking until spill completed - LCSA
- Develop a monitoring and evaluation program - WDFW, USDA-FS, LCSA, NPS

#### Management Recommendations

1. Over a four-year period, with careful monitoring and evaluation, replace the current allotment of 100,000 rainbows with increasing proportions of Twin Lakes WSCT until only WSCT are stocked. WSCT from Twin Lakes, Washington, is the preferred donor stock because WSCT from Lake Chelan were planted in Twin Lakes in the early 1900s. Thus, Twin Lakes WSCT are genetically very similar to the WSCT that originally inhabited Lake Chelan.
2. Eliminate, immediately, stocking of rainbow trout in high lakes and tributaries of the Chelan watershed.
3. Move toward stocking WSCT of Twin Lakes origin. Accomplish through:
  - stocking catchable-size Twin Lake WSCT
  - planting Twin Lake WSCT eyed eggs in tributaries
  - maintain recreational trout fishery with Twin Lake WSCT
  - fish management needs of Lake Chelan will take priority over other waters throughout the state in the allocation of Twin Lake WSCT eyed eggs
  - locate an alternative source of Twin Lakes WSCT or other stocks of WSCT to be used in other waters throughout the state.
4. Manage lake water levels and conduct mechanical barrier removal to provide tributary access for spawning, incubation, and rearing.
5. Develop a monitoring and evaluation program to assess the efficacy of management actions.
6. Close fishing season at mouths of lake tributaries to protect spring spawning adult salmonids until the WSCT population recovers.
7. Delay stocking of catchable WSCT until after spill is terminated, to allow stocked fish to survive the winter in the lake, return to Lake Chelan tributaries to spawn, and contribute to natural reproduction.

### **3.2 Rainbow Trout**

Rainbow trout have been stocked in Lake Chelan since the early 1900s (DES 2000). Recent stocking efforts, since 1990, have been conducted to make up for a shortfall in kokanee

production, and to support a recreational fishery in the Wapato Basin of Lake Chelan. However, it has been well documented in other systems that introduction of rainbow trout has detrimental effects on WSCT populations, due to competition and hybridization. The NSWG concluded that reducing, and eventually eliminating, rainbow trout stocking would be an important step in restoring WSCT populations in the Chelan Basin.

#### Primary Issue Raised by Stakeholders

- Phase out rainbow trout stocking - WDFW, USDA-FS, LCSA, NPS

#### Management Recommendations

1. Over a four-year period, with careful monitoring and evaluation, replace the current allotment of 100,000 rainbow trout with increasing proportions of Twin Lakes WSCT until only WSCT are stocked.
2. Eliminate, immediately, stocking of rainbow trout in high lakes and tributaries in the Chelan Basin, and in the Lucerne Basin of Lake Chelan.
3. Investigate feasibility of stocking triploid rainbow trout to support recreational fishery if fish in addition to WSCT are needed.

### **3.3 Kokanee**

Kokanee are the most popular recreational fish in Lake Chelan (DES 2000). Recreational fishers have indicated a strong desire to maintain the size and number of fish at current levels. Spawning surveys conducted in recent years show that the Lake Chelan kokanee population is as high or higher than historical numbers (Fielder 2000). Expanding kokanee populations in the Stehekin River are a growing concern among NPS managers, particularly in light of continued stocking. Major NPS and USFWS concerns regarding kokanee include impacts to native fish and invertebrate communities, alteration of natural nutrient levels in the Stehekin system, bear/human interactions related to use of kokanee carcasses as a food source, changes in the distribution of other wildlife species that feed on kokanee carcasses or derive benefits from enhanced nutrient levels related to carcass decomposition, and transfer of metals and pesticides from the lake to the Stehekin River via movement of the large numbers of kokanee into the river.

The NSWG recognized the need to re-evaluate the effectiveness of kokanee and landlocked chinook stocking in light of the potential biological benefits (i.e. WSCT establishment; increased kokanee survival) that will result from the discontinuation of lake trout stocking in the lake. However, population objectives and methods for monitoring population size, species interactions, competition, and other factors first need to be developed for Lake Chelan for all species.

### Primary Issues Raised by Stakeholders

- Conduct annual spawning ground surveys - WDFW, NPS
- Adjust stocking numbers to balance population with other species - WDFW
- Develop Lake Chelan strain of kokanee for planting - WDFW, USDA-FS
- Adjust stocking methods: scatter release from barge - WDFW, LCSA
- Remove 25 Mile Creek barrier and rehabilitate spawning channel - WDFW, USDA-FS, LCSA
- Remove tributary mouth barriers – WDFW, USDA-FS
- Develop population management objective compatible with recovery/protection of native species - NPS, USDA-FS, WDFW
- Supplement population if objective is not met, and only if it can be shown that stocking increases population - NPS, USDA-FS, WDFW
- Improve tributary habitat - USDA-FS
- Rely on natural production - USDA-FS
- Manage as principal sport fish species - USDA-FS
- Delay stocking until spill is completed - LCSA
- Reduce predation loss by discontinuing stocking of lake trout - NPS, WDFW
- Balance chinook and kokanee abundance to provide an optimal number of kokanee of an acceptable size and as many salmon as needed for this balance -WDFW, USDA-FS, LCSA
- Minimize loss from entrainment/spills - NPS, LCSA
- Develop monitoring and evaluation program - WDFW, USDA-FS, LCSA, NPS

### Management Recommendations

1. The first priority of the LCFF is to develop an Interim Stocking Plan for all species stocked in Lake Chelan and its tributaries, with particular emphasis on addressing the issue of stocking kokanee. It is expected that this Interim Stocking Plan will remain in place until the monitoring and evaluation program can be implemented, thereby providing better information upon which to make longer term management decisions.
2. Develop population size objectives compatible with recovery and protection of native fish species, and compatible with NPS management goals for the Stehekin River.
3. Monitor population:
  - stock when a population declines below the established population objective use locally adapted or “naturalized” Lake Chelan stock for supplementation, instead of Kootenai or Whatcom stocks
  - maintain a recreational kokanee fishery
  - develop a monitoring and evaluation program to assess the efficacy of management actions, particularly whether the stocking of kokanee increases the kokanee population in the lake, and whether it increases the kokanee spawning population in the Stehekin basin.
4. Stocked fish should be released after spill has stopped (September/October).

### 3.4 Landlocked Chinook Salmon

Landlocked chinook salmon are considered the trophy fish in Lake Chelan. Landlocked chinook supported a very strong recreational and commercial (guided) fishery in the late 1980s and early 1990s. The LCSA depends heavily on the annual Chinook Derby on Lake Chelan to raise funds

for implementing fishery enhancement projects in the Lake Chelan basin. Additionally, the Chinook Derby is a significant economic event for the community of Chelan, as it draws participants from all parts of Washington and adjoining states. The LCSA and the Chelan community strongly desire to rebuild the chinook fishery and maintain the annual Chinook Derby.

Conversely, the NPS and USFWS believe that chinook, like kokanee, lake trout, and rainbow trout have been stocked in Lake Chelan in spite of continuing declines in native fish populations, and without careful evaluation of primary and secondary trophic level impacts. The NPS and USFWS believe that the LCFE should develop an Interim Stocking Plan, which would remain in effect until the effects of stocking can be further evaluated.

The population of chinook has declined over the past several years, according to harvest statistics (DES 2000). The NSWG examined many possible causes of decline, such as low survival of stocked fish, low natural reproduction, changes in race/deme of stocked fish, changes in rearing conditions of stocked fish, smolt emigration from the lake, and excessive harvest. As with other Lake Chelan species, an important part of the CFMP is development of a monitoring and evaluation program to assess species interactions and the affects of management actions.

#### Primary Issues Raised by Stakeholders

- Rear 19-20 months prior to release - WDFW, LCSA
- Release no earlier than mid to late September (after spill terminated) - LCSA
- Stock identified spawning areas with eyed eggs - WDFW, LCSA
- Reduce daily limit - WDFW, LCSA
- Experiment with different stock - WDFW
- Employ coded wire tag (CWT), ventral clip - WDFW
- Balance kokanee and chinook population - WDFW
- Reduce stocking of chinook by 50 percent - USDA-FS
- Limit future stocking to triploid chinook only - WDFW, NPS, USDA-FS
- Collect data on species interactions during the monitoring and evaluation period (perhaps 5 yrs.), and then use the results as the basis for future management decisions - USDA-FS, WDFW, NPS
- Allow natural production to sustain fishery long-term - USDA-FS
- Significantly reduce stocking until evaluation of impacts to native species is completed - NPS
- Monitor natural production and evaluate effects on native fish - NPS

#### Management Recommendations

1. The first priority of the LCFE is to develop an Interim Stocking Plan for all species stocked in Lake Chelan and its tributaries, with particular emphasis on addressing the issue of stocking landlocked chinook. It is expected that this Interim Stocking Plan will remain in place until the monitoring and evaluation program can be implemented, thereby providing better information upon which to make longer term management decisions.
2. Focus on landlocked chinook as primary predator species:
  - investigate feasibility of stocking triploid chinook
  - set interim harvest restrictions to protect population size

- support recreational fishery
- 3. Evaluate impacts of chinook on native fish species in Lake Chelan, and investigate management actions that would limit potential impacts. Support recreational fisheries for chinook if impacts on native fish populations are minimal.
- 4. Discontinue lake trout stocking:
  - discontinue stocking juveniles
  - reduce adult population
  - study presence/absence of natural reproduction of lake trout in Lake Chelan and associated tributaries
- 5. Develop monitoring and evaluation program to assess efficacy of management actions.

### **3.5 Bull Trout**

Bull trout have not been observed in Lake Chelan or its tributaries since the early 1950s. The causes of decline, and apparent demise, of the bull trout population, have been speculated to be a catastrophic epizootic event (disease outbreak), unsuccessful spawning and loss of spawning habitat during floods in the late 1940s and early 1950s, excessive harvest, or a combination of the above (Brown 1984).

Several relicensing stakeholders, and primarily the USFWS, want to investigate the feasibility of restoring bull trout to the Chelan Basin. The USFWS is currently preparing a Bull Trout Recovery Plan, which may address Chelan Basin recovery efforts. However, NSWG members expressed serious concern about Chelan Basin perturbations i.e., non-native species introductions, remaining presence of pathogens, availability of bull trout donor stock, etc., that may preclude bull trout re-introduction. Due to these concerns, the CFMP focuses, initially, on conducting a bull trout restoration feasibility assessment before actually attempting to re-introduce the species into the basin.

If feasible, the ultimate goal of the state and federal Agencies is to attempt to reintroduce self-sustaining populations of bull trout in waters they historically inhabited in the tributaries that drain into the Stehekin River or directly into Lake Chelan. The first step will be to conduct a survey designed to locate any bull trout population that might still exist in the system. If a fluvial bull trout population is found, the second step will be to determine if habitat conditions exist which have limited their re-colonization of the system. The next step would be to eradicate the factor(s) that have been limiting bull trout or determine if enough fish exist to use as a brood stock, so we could avail them the survival advantage of the hatchery system. If no bull trout population is found, then, if feasible, an appropriate stock of fluvial fish from another river may be chosen to use for reintroduction. Possibly bull trout from the Chiwawa River stock, which are adfluvial, could be used.

### Primary Issues Raised by Stakeholders

- Reintroduce fluvial bull trout - WDFW, USFWS
- Conduct survey to locate possible remaining population in Lake Chelan and the Stehekin watershed - WDFW, USFWS
- If feasible, attempt to reintroduce using identified stock - WDFW, USFWS, City of Chelan
- Determine appropriate donor stock - WDFW, USFWS
- Delay re-introduction until the following issues are resolved - USDA-FS, NPS, USFWS, WDFW:
  - Determine interactions between bull trout and brook and lake trout;
  - Determine fish pathogens present;
  - Identify and evaluate bull trout donor source(s);
  - Determination for the potential of angling restrictions affecting sport fishing;
  - Identify appropriate locations for re-introduction.
- Maintain recreational fishing opportunities for other species as a high priority (similar to Lake Wenatchee mgt.) - USDA-FS, NPS, LCSA, WDFW, City of Chelan
- Do not attempt bull trout re-introduction - LCSA, PFLC
- Phase out stocking of RBT and discontinue stocking of lake trout - NPS, WDFW
- Manage kokanee and chinook populations at levels to minimize interference with potential bull trout recovery efforts - NPS, USDA-FS, WDFW
- Disease screening of hatchery fish - NPS, WDFW
- Manage water levels for fish - NPS
- Minimize loss from entrainment/spills – NPS, LCSA, WDFW
- Develop monitoring and evaluation program - WDFW, USDA-FS, LCSA, NPS, USFWS

### Management Recommendations

1. Investigate feasibility of re-introducing fluvial and adfluvial bull trout.
2. Maintain recreational fishing opportunities for other species as a high priority (Lake Wenatchee mgt.)
3. Develop management and evaluation program to assess efficacy of management actions.
4. Discontinue stocking brook and lake trout;
5. Reduce adult population of brook and lake trout;

### **3.6 Lake Trout**

Lake trout have also contributed significantly to the trophy fish fishery in Lake Chelan. The Washington State record, a 35.7 oz. fish, was caught in December 31, 2001. Additionally, a 33 lb. 6.5 oz. fish was caught in August 2001; a 31 lb. 2.5 oz. fish was taken in May 2000; and another 30 + lb. fish was taken in May 2000. Popularity of the lake trout fishery has increased in recent years as the landlocked chinook salmon fishery has declined. A primary concern of the CFMP is restoration of native species. Management objectives are aimed at minimizing the impacts of non-native apex predators on native species and to provide additional sportfishing opportunity. Literature acquired from other systems that include lake trout indicate strong potential for adverse species interactions between lake trout, kokanee, landlocked chinook, WSCT, and bull trout. Due to the potential adverse effects on native species and landlocked chinook salmon, continued stocking of lake trout is being questioned at this time. However, an

important aspect of the monitoring and evaluation program is to investigate these potential impacts and develop appropriate management actions for lake trout.

Studies conducted in 1999 and 2000 for relicensing support indicate that lake trout are reproducing naturally in Lake Chelan (DES 2000). A lake trout fry, approximately 32 mm in length, was observed off the mouth of First Creek during snorkel surveys conducted in July 2000. This fish was much smaller than the lake trout planted on June 15, 2000. The two biologists who observed the fry were confident that the fish was not any of the *Oncorhynchus* species or a bull trout. Additional evidence supporting lake trout natural reproduction in Lake Chelan is observation of three lake trout juveniles (75-100 mm) in a side channel in lower mainstem Stehekin River on September 12, 2000 during snorkel surveys.

#### Primary Issues Raised by Stakeholders

- Discontinue stocking program - WDFW (Alt. 1), USDA-FS, NPS
- Continue stocking program - LCSA
- Survey to determine number and origin of fish - WDFW, LCSA
- Increase limit - WDFW
- Explore the need for active removal programs - NPS
- Assess kokanee population - WDFW, LCSA
- Attempt to balance kokanee and lake trout populations - WDFW, LCSA
- Develop monitoring and evaluation program - WDFW, USDA-FS, LCSA, NPS
- Do not support any efforts to significantly reduce population of lake trout - LCSA, City of Chelan

#### Management Recommendations

1. Discontinue lake trout stocking program.
2. Evaluate population size, recruitment, distribution, spawning areas and investigate feasibility of potential eradication methods.
3. Develop monitoring and evaluation program to assess efficacy of management actions.
4. Study presence/absence of natural reproduction in Lake Chelan and associated tributaries.

### **3.7 Burbot**

Little is known of the burbot biology and population characteristics in Lake Chelan. The only data currently available are harvest data. Burbot population dynamics need to be investigated more thoroughly in order to develop better management actions.

#### Primary Issues Raised by Stakeholders

- Assess burbot population trends via index sampling - WDFW, LCSA, NPS
- Use otoliths for age structure - WDFW
- Routine sample gonads - WDFW, USDA-FS, LCSA
- Angling restrictions if population continues to decline - USDA-FS, NPS
- Disease screening - NPS
- Investigate life history requirements of burbot in the Chelan watershed - NPS
- Assess hydro Project related impacts - NPS

### Management Recommendations

1. Develop monitoring and evaluation program to assess efficacy of management actions.
2. Monitor trends in abundance, survival, recruitment and evaluate effects of angling regulations and disease screening.

### **3.8 Smallmouth Bass**

Smallmouth bass were introduced illegally into Lake Chelan some time around 1990. The smallmouth population has increased in the lake and supports an active sport fishery. This species will require some management to maintain control/confinement of the population. The CFMP recommends no enhancement measures for this species at this time.

#### Primary Issues Raised by Stakeholders

- No change in angling regulations - WDFW
- Monitor isolation to Wapato Basin - USDA-FS, LCSA, NPS, WDFW
- Remove any developing populations in the Lucerne Basin - NPS, WDFW
- WDFW will not direct any enhancement measures toward smallmouth bass
- Develop enforcement efforts necessary to ensure population is controlled and no further “illegal relocations” take place

#### Management Recommendations

1. Develop monitoring and evaluation program to assess efficacy of management actions.
2. No enhancement measures for this species is recommended at this time.
3. Conduct water temperature and smallmouth distribution and abundance monitoring in the Lucerne Basin and Stehekin Flats.
4. Implement management actions to remove smallmouth if found in the Lucerne Basin.

### **3.9 Eastern Brook Trout**

Eastern brook trout have become established in Twenty-five Mile Creek and the Stehekin River from historic stocking efforts. The NSWG had a strong desire to remove brook trout from the Chelan Basin due to adverse impacts from this species through competition and disease on native salmonids. Any recovery efforts for WSCT and bull trout populations would be hampered by the presence of Eastern brook trout in the Chelan Basin.

#### Primary Issues Raised by Stakeholders

- Eradicate, if possible, Eastern brook trout from Twenty-five Mile Creek and Stehekin River – USDA-FS, NPS, WDFW, USFWS
- Angling regulations should be adopted to encourage selective harvest of Eastern brook trout, unless bull trout restoration is pursued and there is a possibility of incidental catch of bull trout due to misidentification – USDA-FS, NPS, USFWS

#### Management Recommendations

1. Take all feasible actions to eradicate Eastern brook trout from Twenty-five Mile Creek and the Stehekin River.
2. Monitor success of eradication efforts.

### **3.10 Other Native Fish Species**

- Pygmy whitefish
- Mountain whitefish
- Threespine stickleback
- Peamouth chub
- Chiselmouth
- Northern pikeminnow

The effects of non-native fish stocking on these native species is unclear. Pygmy whitefish, of particular concern, are listed as a Washington State species of concern. Additional data collection on Pygmy whitefish and other native species need to be included in CFMP monitoring and evaluation program in order to develop sound management actions.

#### Primary Issues Raised by Stakeholders

- Periodic surveys to assess population trends and to evaluate status of populations - USDA-FS, NPS
- Avoid management actions that would push these species to extirpation - USDA-FS

#### Management Recommendations

1. Develop monitoring and evaluation program to assess efficacy of management actions.

### **3.11 Other Non-native Introductions**

#### Primary Issue Raised by Stakeholders

- No new introductions of non-native species - USDA-FS, NPS, WDFW, LCSEA
- Investigate feasibility of sockeye introduction - YN

#### Management Recommendations

1. No new introductions of non-native species.
2. No introductions of anadromous fish to the lake - USDA-FS, NPS, WDFW, LCSEA (CRITFC/YN dissenting).

## ***SECTION 4: IMPLEMENTATION***

The WDFW has primary responsibility for implementing the CFMP. However, the LCFF, which will be created and function as provided in section 18 of the Agreement, will provide guidance and recommendations to WDFW and other resource agencies with management authority.

A number of low risk actions have been identified by WDFW for immediate implementation. Some of these actions do not require Chelan PUD funding (e.g., eliminate stocking of lake trout, eyed-egg plants of WSCT into tributary creeks) and are currently being implemented by WDFW. Actions that are within the scope of measures identified in the current license and funded by

Chelan PUD (e.g., conversion of stocked catchable trout from rainbow to WSCT) also are being implemented immediately.

Actions requiring funding or action by Chelan PUD, but not within the scope of the current license, will be implemented as soon as possible after Chelan PUD has accepted the New License. These actions could include development of an Interim Stocking Plan for kokanee, barrier removal at tributary mouths, and initiation of the monitoring and evaluation program. Other actions not requiring funding or action by Chelan PUD (chinook stocking, habitat work on federal lands, fishing regulations) may be implemented at any time by the relevant management agencies.

The LCFF may compile a list of these and other actions, based on results from the monitoring and evaluation program, as recommendations to the management Agencies. These and other management actions, which may evolve from the results of the monitoring and evaluation program, will be reviewed by the LCFF as necessary.

As noted in section 1, the CFMP resulted from a need to coordinate management authorities over fishery resources in Lake Chelan. The following provides an overview of individual management agency commitments under the CFMP. Chelan PUD's license obligations are identified in section 4.6.

The extent to which the federal and state Agencies may be able to raise funds through cost-sharing in order to implement the monitoring and evaluation program may be limited by budgetary constraints. These agency funding limitations will not affect Chelan PUD's funding of the monitoring and implementation program, as provided in sections 4.6.1 (1) and (2), below. Chelan PUD's funding under these sections may not be sufficient without substantial agency cost-sharing, particularly with respect to the estimated cost of the Food Web Model. In addition, Chelan PUD's matching obligation under section 4.6.1 (3) does not apply unless there is a dollar-for-dollar match (either in funds, in-kind services, or a combination of the two) from one or more agencies.

#### **4.1 WDFW**

WDFW intends to continue funding all programs at the Chelan Falls Hatchery other than those that Chelan PUD is required to fund in this Chapter. WDFW will also diligently pursue cost-sharing opportunities with federal, state, and private entities in order to fund the monitoring and evaluation program.

#### **4.2 USDA Forest Service**

The USDA Forest Service will also diligently pursue cost-sharing opportunities with federal, state, and private entities in order to fund the monitoring and evaluation program. The USDA Forest Service will continue to provide data as part of its ongoing monitoring and evaluation program on its lands. It will also seek grants to provide additional funding for CFMP implementation.

#### **4.3 NPS**

The NPS will also diligently pursue cost-sharing opportunities with federal, state, and private entities in order to fund the monitoring and evaluation program. The NPS will continue to provide data as part of its ongoing monitoring and evaluation program on its lands, particularly in the lower Stehekin River. The NPS will also diligently pursue grants to provide additional funding for CFMP implementation.

#### **4.4 USFWS**

The USFWS will also diligently pursue cost-sharing opportunities with federal, state, and private entities in order to fund the monitoring and evaluation program. The USFWS will provide data sharing and bull trout monitoring in the Stehekin drainage. The USFWS will seek grants to provide additional funding for CFMP implementation.

#### **4.5 LCSA**

The LCSA has provided funding for projects in the past, such as First Creek culvert replacement, eyed WSCT egg plants, fish stocking programs, funding and labor to improve docks, an annual kids fishing program, and continued community efforts to raise awareness about the Lake Chelan fishery. LCSA members have stated that they are willing to fund measures that provide enhancement to Lake Chelan fisheries. The LCSA has also been a strong proponent of developing a sound monitoring and evaluation program to determine effectiveness of management decisions, and could provide funding for a portion of the monitoring and evaluation program.

#### **4.6 Chelan PUD**

Chelan PUD will implement the following in accordance with Proposed License Article 6:

##### ***4.6.1 CFMP Monitoring and Evaluation (M&E) Program***

- 1) Chelan PUD shall make available \$100,000 for developing a Food Web Model.
- 2) Chelan PUD shall provide annual funding of \$20,000 for monitoring and evaluation.
- 3) Chelan PUD shall make available an additional \$20,000 per year, for matching funding.

##### ***4.6.2 Tributary Barrier Removal***

Chelan PUD, in consultation with the resource Agencies, will be responsible for:

- 1) Mechanical excavation of existing tributary barriers in up to 10 high priority tributaries over the first five years of the New License;
- 2) Monitoring of up to 10 tributaries (paired test) with existing barriers to determine if the new lake level operating regime is sufficient to naturally remove existing barriers;
- 3) Monitoring of up to 10 selected tributaries (post-treatment), with modified barrier analysis methodology,<sup>1</sup> every two years or frequency as recommended by LCFF to determine if barriers are present or have reformed; and

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<sup>1</sup> This methodology is being developed by the consultant, Framatome ANP DE&S, which conducted the original barrier analyses, and will be approved by the LCFF.

- 4) Treatment of up to two tributaries within the drawdown zone annually to remove barriers (reformed or previously untreated) for the life of the license, unless barriers are clearly non-Project related (e.g., fire, earthquake, landslides, etc.).

The Estimated Cost of these activities is \$100,000.

The USDA Forest Service has developed Table 6-1 of Lake Chelan tributary status, which can be used as a compilation of current information, and as a potential prioritization tool for barrier removal efforts.

**Table 6-1: Information on Trout Populations, Habitat Availability and Potential Migration Barriers for Selected Tributaries to Lake Chelan (excluding the Stehekin system)**

Stream	Trout Population Estimate <sup>1</sup>	Density: Trout per square meter <sup>1</sup>	Habitat accessible: square meters <sup>1,2</sup>	Cutthroat present? <sup>1,2</sup>	Barrier Analysis Needed? <sup>2</sup>	Reason*
<b>Bear</b>	67	0.21	319	Y	Y	H,CT
<b>Big</b>	236	0.85	278	Y	Y	P,D,H,CT
<b>Cascade</b>	453	1.63	278	Y	Y	P,D,H,CT
Castle	3	0.13	23	Y	N	
Coyote	18	0.37	49	N	N	
<b>Deep Harbor</b>	130	2.36	55	N	Y	P,D
First	2483	0.46	5398	N		
Fish	773	0.36	2147	Y		
<b>Four Mile</b>	431	0.48	898	Y	Y	P,D,H,CT
Gold	1478	2.10	704	N		
Grade	824	0.49	1682	N		
<b>Graham Harbor</b>	109	1.52	72	N	Y	P,D
<b>Lightning</b>	26	0.22	118	Y	Y	H,CT
<b>Little Big</b>	9	0.07	129	Y	Y	H,CT
Lone Fir	24	0.37	65	N	N	
Mitchell	480	0.36	1333	N		
<b>Poison</b>	234	1.60	146	N	Y	P,D,H
Prince	1146	0.68	1685	Y		
<b>Pyramid</b>	522	0.53	985	Y	Y	P,D,H,CT
Railroad	430	0.06	7167	Y		
<b>Riddle</b>	77	0.32	241	Y	Y	H,CT
Safety Harbor	1032	0.85	1214	Y		
25 Mile	7776	0.50	15552	N		

1 – From: Brown (1984)  
 2 – From: USDA Forest Service sources and other relicensing studies (USDA Forest Service, 2000b)  
 \* - P = Population D = Density H = Habitat CT = cutthroat present  
 Streams in bold: High priority streams for study and barrier analysis  
 Shaded Areas: Study streams included in Lake Chelan Fisheries Investigation (Chelan PUD 2000)

**4.6.3 Fish Stocking in Lake Chelan and its Tributaries**

For stocking in Lake Chelan and its tributaries during the term of the New License, including any subsequent annual licenses, Chelan PUD shall make available to WDFW for the Chelan Falls Hatchery site sufficient funding adequate to rear annually approximately 5,000 pounds of

salmonid fingerlings (for example: 500,000 fish at 100 fish/lb., presently kokanee) and 33,000 pounds of catchable-sized salmonids (for example: approximately 100,000 fish at 3 fish/lb., presently rainbow/WSCT). Rearing includes costs of egg collection, pathology, and marking and release.

The Estimated Cost of these activities is \$30,000 per year.

If WDFW, after coordination with the NPS, USDA Forest Service, and USFWS, and after consultation with the LCFF, decides, at any time during the term of the New License or any subsequent annual licenses, to reduce or eliminate fish stocking into Lake Chelan, the resulting savings shall be available to WDFW for other Lake Chelan fish management activities. Funds to be made available from reductions in fish production shall be determined as equivalent to the proportion of fish production poundage reduced. The funds saved shall be calculated as follows: take the number of pounds of fish production reduced, divide by the 38,000 pounds of fish initially to be produced, and multiply by the \$30,000 (as adjusted under section 19 of the Agreement up to the year of the decision to reduce production). For example, if 5,000 pounds of kokanee production was eliminated,  $\$3,950$  would be available for other fish management activities ( $5,000/38,000 \times \$30,000$  escalated =  $\$3,950$  escalated).

#### **4.6.4 Entrainment**

Chelan PUD shall conduct no more than 140 days of entrainment sampling over four sampling years, using the same methodology used during the 2000 and 2001 field seasons, or another methodology of comparable cost recommended by the LCFF, and approved by WDFW, USFWS, and WDOE. Upon request of WDFW, Chelan PUD shall develop a sampling plan in consultation with USFWS, WDOE, and the LCFF, subject to approval by WDFW. The plan shall specify the sampling years and the allocation of sampling days among such years. The first sampling year shall be not be prior to year seven of the effective date of the New License, and the last sampling year shall be no later than year 35 of the effective date of the New License. The purpose of the sampling is to determine if significant numbers of adult spawnable age/size adfluvial westslope cutthroat trout are entering the power tunnel entrance.

If less than 500 adult spawning age/size adult adfluvial westslope cutthroat trout are captured within any calendar year prior to completion of the four years of sampling, Chelan PUD in consultation with LCFF, shall prepare an evaluation of the results of the entrainment monitoring and the method used. Chelan PUD, WDFW, USFWS, and WDOE shall determine whether the remainder of the four years of sampling should be conducted, at what intervals and what method should be used.

If more than 500 adult spawnable age/size adult adfluvial westslope cutthroat trout are physically captured within a calendar year in the immediate vicinity of the power tunnel entrance, the WDFW, USFWS, or the WDOE may request that Chelan PUD install fish protection or exclusion devices for the power tunnel entrance, or that Chelan PUD implement other actions recommended by the LCFF and approved by WDFW, USFWS, and WDOE. Chelan PUD may object to the request on the grounds that such fish protection or exclusion devices, or such other actions, as the case may be, are not necessary. To assist in the determination of whether such fish protection or exclusion devices, or other actions, are necessary, Chelan PUD may conduct

entrainment sampling in the power tunnel. If Chelan PUD so objects, and it cannot reach agreement with the agency or agencies making the request, the matter shall be referred to dispute resolution under section 16 of the Agreement. If Chelan PUD does not object, or the dispute resolution process results in a decision to install fish protection or exclusion devices, Chelan PUD shall seek recommendations from the LCFF regarding the design of fish protection or exclusion devices or such other actions. Chelan PUD shall conduct such tests as necessary to determine the effectiveness of such fish protection or exclusion devices or such other actions. Upon development of a successful design, Chelan PUD shall install such fish protection or exclusion devices or implement such other actions.

For purposes of this Chapter, “adult” is defined as naturally-produced (non-stocked), spawnable age or size adfluvial westslope cutthroat trout. The size of adult westslope cutthroat is defined as 9-12 inches in total length, based on current Twin Lakes stock spawner size, but such definition may be adjusted upon a recommendation by the LCFF to WDFW, USFWS, WDOE, and Chelan PUD.

As of the date of this Agreement, the species identified in this Chapter are not listed species under the ESA. If any identified species become a listed species under the ESA, this Chapter may be superseded by the ESA.

## ***SECTION 5: MONITORING AND EVALUATION PROGRAM***

A monitoring and evaluation program is necessary to assess the efficacy of management actions, and to allow for changes to the plan as future conditions and data analyses dictate. One option is to develop a bioenergetically-based food web model for Lake Chelan. The model can be used as a tool for evaluating the potential impacts of species interactions, production potential, and environmental conditions (i.e., inter-annual changes in temperature regimes) within a temporal, spatial, and size-structured framework. The model, ultimately, would be used to support development and evolution of this plan. This approach would allow fishery managers to evaluate current and/or proposed fish stocking strategies and management regulations within the context of ecological feedback from the lake food web. The ultimate goal of the monitoring and evaluation program is to provide information to fishery managers with which to develop biological objectives and make effective management decisions that will provide for sustainable fishery resources in Lake Chelan and its tributaries.

Another important component of the monitoring and evaluation program is monitoring tributary mouth access after alluvial barriers are mechanically removed. Monitoring would involve surveying the tributary mouths on an as-needed basis (once every three to five years) to identify formation of new depth, velocity, or gradient barriers. The goal is to ensure channel integrity sufficient to maintain upstream and downstream fish passage.

Development of the monitoring and evaluation program is incumbent upon the interested Parties participating in the relicensing process, particularly the members of the LCFF. The food-web

would be a good start toward developing a monitoring and evaluation program. Objectives of the monitoring and evaluation program are to:

- Gather data for input into fishery management decisions to protect, conserve, and restore native fish populations, and to maintain quality recreational fishing opportunities;
- Evaluate whether measures implemented are providing desired results; and
- Maintain future options and prevent making any irreversible decisions regarding ecosystem function.
- Prepare annual report of monitoring and evaluation results and provide future recommendations.

**Summary of Chelan PUD obligations for monitoring and evaluation program**  
(Attachment A, Proposed Article 6)

- Food Web Modeling (The Chelan PUD share of this cost is not to exceed \$100,000)

To assist in conducting a monitoring and evaluation program, Chelan PUD shall make available \$20,000 annually and up to \$20,000 in matching funds (section (b)(1 and 2)). Measures in the monitoring and evaluation program may include but are not limited to the following:

- Kokanee surveys
  - current effort (20 days/year)
  - expanded effort (60 days/year)
- Creel surveys (144 days every 3 years)
- Tributary indexing
  - 10 representative reaches
  - WSCT spawning surveys (12 days/year)
  - WSCT recruitment and abundance surveys (40 days every 3 years)
  - Genetic analysis
  - Barrier analysis (4 days/year)

***SECTION 6: LITERATURE CITED***

- Brown, L.G. 1984. Lake Chelan fishery investigations. Report to Chelan PUD and Washington Department of Game.
- Duke Engineering and Services (DES). 2000. Lake Chelan fisheries investigation-final, Lake Chelan Hydroelectric Project No. 637. Prepared by Duke Engineering & Services, Inc., Bellingham, Washington. Prepared for Chelan PUD. September 26, 2000. 95 pp.
- DES. 2001. Stehekin River investigations, 2000-2001, Lake Chelan Hydroelectric Project No. 637. Prepared by DES, Bellingham, Washington. Prepared for Chelan PUD, Wenatchee, Washington. December 7, 2001. 42 pp.
- Fielder, P.C. 1999. Lake Chelan spawning ground survey - 1999. Prepared for Chelan PUD, Wenatchee, Washington.
- A.E. Viola and J.H. Foster. 2002. Lake Chelan comprehensive fishery management plan. Washington Department of Fish and Wildlife. February 4, 2002. 39 pp.