The Tribe is concerned about the impacts to anadromous fish resources posed by Phase I, as well as Phase II. In the face of the growing literature about the importance of natural flow regimes to biotic integrity, none of which are referenced in the DCAR, tribal technical concerns about Phase II impacts are even more serious. Storage and diversion in Phase II will raise the cumulative spring instream flow reduction to approximately 40% of the median natural streamflow as estimated for the USGS Near Palmer Gage. Some researchers suggest that negative effects may occur at a 25% flow reduction - this level of reduction will be exceeded by Phase I. A good compilation of these concepts can be found in Poff, N.L et al. *The natural flow regime: a paradigm for river conservation and restoration,* BioScience, Dec. 1997. The CAR should weigh these concepts against the benefits of the AWSP.

11

Page 49: Recommendations

Suggested edits for Recommendation #5: The potential storage of <u>up to</u> 5000 acre-feet in non-drought years should be implemented ...decision on how much <u>if any</u> of this water to store in any given year...

Consider adding a recommendation related to reservoir migration delay and other fisheries concerns such as "<u>The Monitoring and Evaluation Plan elements and details of the adaptive management approach should be should be fully identified along with funding commitments</u>. "

Most importantly, the CAR should recommend that flexibility for use of careful supplementation should be allowed as it may be an essential tool to mitigate and compensate for project impacts and existing habitat limitations.

Again, we appreciate the opportunity to review the DCAR, and the complexity involved in assessing the AWSP. If you have any questions, please contact Eric Warner, Biologist, at 939-3319 ext. 125.

Sincerely,

· FOR ·

Isabel Tinoco
Fisheries Director

Cc: Dave Fredericks
Tim Thompson
Office of the Tribal Attorney

CORPS RESPONSES TO U.S. FISH AND WILDLIFE RECOMMENDATIONS

RECOMMENDATION	CONCUR	PARTIALLY CONCUR	NONCONCUR
FISHERY RESOURCES			
1. The fish passage facility should be designed to maximize fish survival. Additional refinements should be pursued during PED.	X		
2. Impacts from pool enlargement need to be fully mitigated for. The Service requests participation in developing mitigation during PED.	X		
3. All restoration should be implemented. The Service requests participation in developing restoration during PED.	X		
4. Adopt an adaptive management approach to project operation.	X		
5. Store up to 5,000 ac ft in non-drought years beginning in Phase I. It would include joint responsibility for the storage and use of the water.	X		
6. The "dampened dam" should be included as a project feature.	X		
7. Begin reservoir refill by Feb 15 and target 5,000 ac ft storage for the month. Analyze measures to resolve flood protection issues.		Agree with refill start, analysis as needed to resolve flood protection, and total February storage for Phase II, 5,000 ac. ft. The Corps has agreed to store 3,000 ac. ft. between 15 Feb and 28 Feb during Phase I, and will evaluate whether 5,000 ac. ft. can be stored in February during PED.	
8. Initially, use the proposed maximum refill rates and evaluate benefits.	X		
9. Storage volume of 25,400 ac ft should be evaluated further to see if the entire quantity is necessary for 98% reliability for minimum flows.		In high run-off years 25,400 ac ft may be more storage than is required to meet 110 cfs at 98% reliability. We can evaluate the need for meeting or not meeting current rule curve based on resource agency and MIT agreement to share risk in not meeting low flow augmentation storage targets and based on evaluation of run-off forecasts.	

RECOMMENDATION	CONCUR	PARTIALLY CONCUR	NONCONCUR
10. Continuous staff coverage should be provided, as needed, during refill and early conservation season. More frequent coordination will be necessary.	X		
11. Continue to develop hydrologic database and improve snowpack surveys for predicting run-off.	X		
12. All large trees in new inundation zone should be retained for fish habitat.	X		
13. Measures to protect TPU's water supply (turbidity) should not be at expense of fish conservation storage. Loss of storage to flush turbid water or to delay refill should be counted against M&I water supply unless replacement can be accomplished without adverse affects to fish.		We agree that measures to protect TPU's water supply will not come at the expense of existing conservation storage. The decision to flush turbid water or delay refill to protect water supply, that may also risk adaptive storage of Section 1135 water or Phase II fish conservation storage, would be a cooperative process involving resource agencies, MIT, Tacoma and the Corps.	
14. The trap and haul of sufficient adult steelhead and salmon to meet Upper Watershed natural production objectives should not be constrained by TPU's water quality concerns.	X		
15. The Service, other resource agencies, and MIT, should be included in development of the monitoring and evaluation plan during PED.	X		
TACOMA LAND MANAGEMENT PLAN (TLMP)			
1. The TLMP is major component of mit. plan. Service recommends adoption of plan as part of mit. package, and used to further refine components.		Concur—the Corps has asked Tacoma to adopt the TLMP as part of the mitigation package. Tacoma has indicated its willingness to do this.	
2. The TLMP should be modified to reflect current recommendations for snag densities and coarse woody debris		The Corps concurs—however, depending on forest stands, snag densities may not be achievable in some areas.	

RECOMMENDATION	CONCUR	PARTIALLY CONCUR	NONCONCUR
ELK AND OTHER SPECIES USING PASTURE AND FORAGE			
1. Elk forage should be increased by:			
a. expanding existing meadows	X		
b. creating new meadows	X		
c. increasing forage value in ROW's	X		
d. increasing forage value in existing meadows	X		
The Service has provided suggested seed and fertilizer mixes	X		
2. Plant evergreen trees and shrubs in ROW areas.		Agree with all suggested species, although BPA and Puget Sound Energy will have ultimate approval in their ROW areas.	
3. Select sites from Raedeke's report. Monitor sites for forage production.	X		
4. Devote small areas of each meadow to testing of productivity, including selection of fertilizers.		Test areas will be established, but probably not on every meadow. Areas with similar soils, topography, and aspect will have only one test area.	
5. Place salt or mineral blocks to attract elk to created pastures.	X		
6. Sow cereal rye, winter wheat, and perennial rye on mudflats in fall to provide additional winter forage for elk.	X		
7. Use a wide variety of plant species to re-vegetate drawdown zone.		Agree. However, due to tremendous seasonal fluctuations of the reservoir, most species can only be planted along the edge of the highest reservoir elevation (including willows, cottonwoods, rushes, and most sedges).	
8. Optimal thermal cover is significantly lacking in project area. Plant shade-tolerant shrubs and conifers under forest canopy.	X		

RECOMMENDATION	CONCUR	PARTIALLY CONCUR	NONCONCUR
PILEATED WOODPECKERS OTHER PRIMARY EXCAVATORS, AND RED-BACKED VOLES			
1. Accelerate late-successional characteristics by:			
a. providing at least .5 snag ≥20" dbh per acre	X		
b. providing at least 11 snags 6" to 20" dbh per acre	X		
c. providing raptor perch trees and snags at edge of reservoir	X		
d. thin even-aged stands to stimulate understory development	X		
e. maintain dominant trees in uneven-aged stands and cut subdominant conifer and deciduous trees.	X		
f. leave felled trees on ground.	X		
g. underplant with shade tolerant shrubs and conifers.	X		
2. Develop natural snags to extent possible. Preferred tree species are Douglas fir and Western red cedar.	X		
3. Recommended topping technique is blasting above at least one live lower branch.		Concur, as long as Tacoma can accommodate this request (i.e., blasting may not be an acceptable method in the watershed, or be allowed by OSHA, etc.)	
4. Provide nest boxes or constructed cavities in areas devoid of snags.	X		
5. Artificial snags should be randomly erected in natural and conservation zones to increase pileated woodpecker HU's.		Concur, though this will be limited by the availability of acceptable logs.	
WOOD DUCKS AND OTHER WETLAND DEPENDENT SPECIES			
1. Sub-impoundments should be created along perimeter of upper reservoir to function as shallow open water habitat during drawdowns.	X		

RECOMMENDATION	CONCUR	PARTIALLY CONCUR	NONCONCUR
2. Sub-impoundment behind old railroad grade should be included as a project element. Fish passage would be required.		Fish passage is currently not included in the design for the 1135 study, as the sub-impoundment is not intended to be over-topped by the reservoir. For the AWS, fish passage will need to be discussed.	
3. Improve habitat within upper reservoir sub-impoundments by installing wood duck boxes, LWD, and planting of emergent vegetation and willows.	X		
MONITORING AND EVALUATION			
1. Recommend development of a management plan for project mitigation lands. Plan would be approved by agency representatives and include an annual SOP and annual reports in years 1-5. In years 6-20, reports would be done every 5 years; years 21-50, reports would be prepared every 10 years.		MIT would also be included in development and approval of management plan. We feel evaluation would not be necessary every year the first five years. Rather, in the first year, and then again in year five. Assume reports would be prepared by the mitigation land manager.	
Tacoma's forest land management plan should be used as the basis for the management plan.	X		
2. Detailed monitoring plan should be developed. Annual reports should be prepared years 1-5; every 5 years (years 6-20); every 10 years (years 20-50)		The Corps plans to have an evaluation of the mitigation sites every 5 years through year 15. Reports would be prepared at the close of each evaluation year. Annual evaluations should not be necessary; the program should be well in hand by year 15.	
3. A contingency plan and process are needed to guide management changes to correct for undesirable results. An adaptive management approach should be used.		Agree; however, by its nature, adaptive management will be developed as we proceed with management (i.e., it cannot be fully developed prior to implementing the mitigation plan).	

SECTION 2. COMMENTS AND RESPONSES

2.0 COMMENTS AND RESPONSES

This section documents the public and agency review of the Howard Hanson Dam Additional Water Storage (AWS) Draft Feasibility Study/ Draft EIS (DFR/DEIS) and how the Seattle District used the review to formulate the Final Feasibility Report/Final EIS (FR/EIS). The section includes a summary of the review process, a discussion of the nature of the comments, a list of commenters, reproductions of comment letters, and responses to the comments. Changes in the FR/EIS text in response to comments are noted in the responses.

2.1 DRAFT EIS REVIEW PROCESS

The Draft EIS was officially filed with the U.S. Environmental Protection Agency and released for public and agency review on May 1, 1998. Approximately 400 copies of the Draft EIS were distributed to elected officials, government agencies, tribal organizations, associations, businesses, individuals, and public libraries. The review period for the Draft EIS lasted 45 days; it ended on June 15, 1998.

One public meeting was held at the Tacoma Public Utilities Building on May 28, 1998, to enable review of the DFR/DEIS. Approximately 17 people attended the meeting.

The meeting consisted of four parts. The first part was an open house where individuals could review posters and displays showing the major features of the AWS Project and issues raised by resource agency and tribal technical staff during the course of the Feasibility Study. The second part was an overhead presentation addressing the purposes, alternatives, issues involved, and anticipated effects of the AWS Project. The third part of the meeting was a question and answer session and in which the audience asked questions of a technical panel. The panel included key staff from the Corps, the City of Tacoma, and staff from R2 Resource Consultants. The fourth part of the meeting was a formal public hearing open to all speakers who wished to provide testimony. A court reporter recorded all hearing testimony (including the panel discussions). Transcripts of the hearing are available for purchase from the Starkovich Reporting Services, PO Box 22884, Seattle, WA 98122; be sure to include the date of the meeting (May 28, 1998).

The Corps encouraged recipients of the DRF/DEIS to submit written comments on the document. Over 80 letters were received. The Corps reviewed these letters as part of the Final EIS.

2.2 DRAFT EIS COMMENTS

The Corps received written or verbal comments from nearly 90 people during the review process. This included 84 letters, and two comments written on comment cards issued at the public meeting. The comment letters ranged from a one paragraph note, to 65 copies of a form letter signed by 65 individuals, and large packages with lengthy reviews. All comments received full consideration, regardless of their style or volume.

The Corps reviewed all comment letters, comment cards, and hearing records and identified all substantive comments with a number. Comments were numbered sequentially to provide a unique identifier for each comment. This process resulted in the identification of 275 separately numbered comments from all the comment sources.

Table I-1 summarizes the types of commenters and comments received during the comment period on the DFR/DEIS. Seventy-six percent of the letters and written statements were from a single form letter sent in a package by the Washington Recreational River Runners. Comment letters were received from two state agencies and two federal agencies[1]. The Muckleshoot Tribe sent in one response package that was treated as four separate letters (cover letter, general remarks, DFR/EIS, and Wildlife Appendix) that generated 172 separate comments.

In addition to these official comment letters, the Draft Feasibility Report and EIS was reviewed by 1) the U.S. Fish and Wildlife Service (USFWS) pursuent to their responsibility under the Fish and Wildlife Coordination Act. The Service's Coordination Act report provides their official comments and recommendations on the AWS Project (Appendix I Part-1); and 2) pursuant to the Endangered Species Act, USFWS and National Marine Fisheries Service reviewed two Biological Assessments (BA) that discussed project impacts relevant to terrestrial and aquatic species proposed or listed under the Act.

[1] Additionally, the U.S. Department of Interior sent in comments on June 19, 1998, four days following the official closure date of the comment period. The U.S. Environmental Protection Agency sent comments dated July 7, 1998, twenty-two days after the close of the comment period. To be fair to all respondents, we are listing their comment letter but we did not prepare an official reply to the comments and have not included the letters in this appendix.

TABLE I-1. SUMMARY OF DRAFT EIS REVIEW INPUT.

Category	Number of Letters	Number of Comments
Letters		
Tribal (T)	5	172
Federal Government (F)	2	2
State Government (S)	2	27
Local Government (L) (incl. 1 hearing comment card)	5	32
Association/Organization/Business (O) (incl. 1 hearing comment card)	7	41
Individual (I)		
Non-Form Letters	0	0
Form Letters	65	1
Total Letters	86	275
Testimony at Hearing		0
Total	86	275

Table 1-2 is a complete list of all commenters. This table, which follows the introduction to this section, functions as a table of contents for the comments reproduced here. Attachments to the comment letters that do not contain substantive comments directly addressing the EIS are omitted. No formal verbal comments were received during the public hearing, most of the hearing testimony is in the form of question and answer. Copies of the hearing transcript are available on request. The complete printed record of all comments received on the Draft EIS is maintained by the Corps and is available for public review at the U.S. Army Corps of Engineers, Seattle District Office, 4735 E. Marginal Way S., Seattle, WA 98124-2255.

2.3 RESPONSE TO COMMENTS

The Corps prepared a response to each of the 275 comments received on the Draft EIS. Certain issues were mentioned repeatedly in the comments. These broad, recurring themes frequently involved the factors contributing to the current status of ESA – listed salmon stocks or to issues generated by the specific focus of the DFR/DEIS.

Other recurring themes involved specific criticisms of the DFR/DEIS an/or particular resource concerns. Comments relating to these recurring themes have been grouped into 9 common issues. These issues are discussed below, followed by a synopsis of each issues and the Corps response.

TABLE I-2. COMMENTERS ON THE DRAFT EIS.

Letter	Organization	Name
	Tribal Letters	
T01	Muckleshoot Indian Tribe	John Daniels, Jr.
T02	Muckleshoot Indian Tribe	John Daniels, Jr.
T03	Muckleshoot Indian Tribe	John Daniels, Jr.
T04	Muckleshoot Indian Tribe	John Daniels, Jr.
T05	Muckleshoot Indian Tribe	John Daniels, Jr.
	Federal Letters	
F01	US Dept of Commerce, NOAA	Susan B. Fruchter
F02	Department of Health & Human Services,	Kenneth W. Holt,
	State Letters	
S01	WA Dept of Ecology	Barbara J. Ritchie
S02	WA Dept of Fish and Wildlife	R. Gary Engman
	Local Letters	
L01	Tacoma Public Utilities - Water Division	John Kirner
L02	King County Dept of Natural Resources	Pam Bissonnette
L03	Pierce County Public Works & Utilities	Tim Ramsaur
L04	City of Seattle - Seattle Public Utilities	Diana Gale
L05	Covington Water District	Judith L Nelson
	Organizational Letters	
O01	Burlington Northern and Santa Fe Railway	J. M. (Mike) Cowles
O02	Sierra Club - Cascade Chapter - Water and	Harrison Grathwohl,
O03	Friends of the Green River	Patricia Sumption
O04	Washington Kayak Club - Conservation Chair	Dara Mueller
O05	Center for Environmental Law & Policy	Rachael Paschal
O06	Washington Recreational River Runners	Mark Burns
O07	Washington Kayak Club - Conservation Chair	Dara Kessler Mueller
	Individual Letters	
I01	Ned Sickels	
I02	Jill Langhorst	
I03	Larry Riscl	
I04	Brett Kerin	
I05	Ryan Kerin	
I06	Nick Music	
I07	P. Cimusbo	
I08	Nancy McLeod	
I09	Sara J. Smith	
I10	Teresa Platt	
I11	Martha Gigier	
I12	Jim Sheflojr	
I13	Eric Naumann	
I14	Jeff Weiss	
I15	Shane Turnbull	
I16	S. Down(difficult to read)	
I17	Pat B.(unable to read)	

	Table I-2. Commenters on the DEIS -CONT	
I18	Celia J. Parker	
I19	Martha Parker	
I20	Kelly C.(unable to read)	
I21	Sarah George	
I22	Robin Strong	
I23	C. Darots	
I24	Larry Burke	
I25	Mark Tennant	
I26	Dan Mencocci	
I27	Sara Williams	
I28	Kimberly Schaive	
I29	Todd Turnbull	
I30	Paul Seter	
I31	Lee Price	
I32	Steven Tore	
I33	Veronica Shy Ro	
I34	Samuel N. Smith	
I35	Jim Sutton	
I36	Al Stevens	
I37	Scott Marshall	
I38	Ehren Wiener	
I39	Gerald Elles	
I40	John Miesaloski	
I41	Richard Landino	
I42	Mark Burns	
I43	B. Scott	
I44	Jessica Scott	
I45	Ron Jenkins	
I46	John Hawes	
I47	Jeffery Lynn	
I48	Clay Wood	
I49	Roger Bowles	
I50	Melinda Burns	
I51	Peter Gott	
I52	Jan Cowen	
I53	Donald Hulse	
I54	Sara Kaye	
I55	David Boder	
I56	Shelly Becker	
I57	Amy Thurner	
I58	Charles W Den Tex	
I59	Rick Klug	
I60	Brad McCarrell	
I61	Scott Gollerlieve	
I62	Matt ?(unable to read)	
I63	Gabby Leol	

	Table I-2. Commenters on the DEIS -CONT	
I64	Haven Heidlik	
I65	Julie Albright	

2.4 COMMON ISSUES AND RESPONSES

Several common issues were identified in the comments received. A brief discussion of those issues, is presented below. The issues are presented in no particular order and additional information on individual issues can be found later in this report in response to specific comments:

1. Recreational Interests
2. Endangered Species Act and the HHD AWS Project
3. Restoring Self-sustaining Runs of Chinook Salmon in the Upper Watershed
4. Dual Project Purpose: Municipal Water Supply and Ecosystem Restoration
5. Basin-wide Restoration
6. Schedule for Reviewing Draft EIS and the Technical Appendices
7. Tribal Interests
8. Priority of Springtime Water Storage and Release
9. Phase II Implementation

2.4.1 Common Issue No. 1: Recreational Interests

Issue:

Proposed project negatively impacts recreational activities on the Green River.

Response:

As described throughout the DFR/DEIS, the AWS Project will be managed to mimic the natural flow conditions in the Green River Basin. To do this, the Corps and Tacoma Public Utilities will be developing a reservoir refill and release schedule that will mimic the natural highs (freshets) and lows (baseflows) in river flows during late winter and spring. The proposed operating strategy is described in Section 4.2 Recommended Plan: Hydrologic Considerations. Under Phase 1 of the proposed project, refill timing and release rates will be based on target instream flows that will be adjusted yearly in response to weather conditions, snowpack, the amount of forecasted precipitation and biological input from fisheries resource managers. Proposed refill rules are designed to meet project objectives for protecting instream resources, meeting existing conservation storage requirements, and providing reliability for storing additional water for M&I and low flow augmentation. Non-fishery resource needs are not a designated downstream delivery objective; however, where those non-fishery resource needs do not conflict with fishery objectives, every attempt will be made to satisfy multiple uses.

2.4.2 Common Issue No. 2: Endangered Species Act and the HHD AWS Project.

Issue:

How does the proposed listing of the Puget Sound Chinook impact the HHD AWS Project?

Response:

The National Marine Fisheries Service (NMFS) and the United States Fish & Wildlife Service (USFWS) recently proposed to list several salmonid species in the Puget Sound region as threatened or endangered under the Endangered Species Act (ESA). The NMFS proposed to list the Puget Sound Chinook salmon evolutionarily significant unit (ESU), which includes the Green River stock, as threatened; and the USFWS also proposed to list bull trout in the Puget Sound distinct population segment (DPS) as threatened. The two federal agencies are also considering other anadromous species for listing under the ESA. The listing of a Green River stock of fish under the ESA adds a complexity to the permitting process of the AWSP, but by itself does not support or reject project need or project benefits.

In the 9 March 1998 Proposed Rule for chinook salmon (50 CFR parts 222, 226, and 227), the NMFS note a variety of habitat problems contributing to escapement problems for Puget Sound chinook. Reduction of slough and side-channel habitat, changes in flow regime, high water temperatures, loss of large woody debris, loss of sediment transport and blockage of fish passage associated with flood control projects were cited as major habitat impacts in the ESU. The AWSP involves a variety of mitigation and restoration measures that as a whole, significantly improve habitat conditions for chinook salmon in the Green River. Reconnection of side channel habitat, modified springtime storage and release operations, provision of a two-level water outlet for water temperature control, and transport of large woody debris and gravel-sized sediments into the Middle Green River represent major habitat improvements. The HHD-AWS also provides important structural and operational features that provide the opportunity to extend the range of anadromous fish to historic habitats. The reconnection of the Upper watershed, through combined upstream fish passage by Tacoma and downstream passage by the Corps, may be the single greatest measure available for restoring significant anadromous fish habitat to the Green River basin. Since the upper watershed contains more than 40% of the historic anadromous stream reaches, restoring anadromous fish access to the upper watershed significantly increases the availability of anadromous fish habitat in the Green River basin.

Biological assessments were prepared for bull trout and Puget Sound chinook (January 15, 1998 and May 22, 1998, respectively) and sent the USFWS and NMFS, respectively for their concurrence. Bull trout was a candidate species at the time and USFWS did not comment on our finding of not likely to adversely affect. NMFS has not yet responded to

our BA on Puget Sound chinook. The AWS Project was developed to provide limited restoration of selected ecosystem processes in the Green River Basin, to restore selected aquatic habitats in the Lower watershed, and to provide the opportunity to restore self-sustaining runs of anadromous salmonids in the Upper watershed. The Corps believes that Phase 1 of the HHD-AWS Project provides significant benefits to the Green River ecosystem in general, and may benefit chinook salmon and bull trout. As both species are currently proposed for listing, the Corps will be seeking NMFS and USFWS concurrence during pre-construction engineering and design (PED).

2.4.3 Common Issue No. 3: Restoring Self-sustaining Runs of Chinook Salmon in the Upper Watershed.

Issue:

Many commenters noted that with all the many measures that need to be implemented in concert, and with the perturbations that have been occurring to natural processes in the upper watershed (e.g., clear-cutting that removes a source for large woody debris, and leads to sedimentation of spawning gravels) that goal of restoring sele-sustaining salmon and steelhead runs, especially Chinook, may be unrealistic.

Response:

The AWS Project was initiated in 1989 to address how the existing Howard A. Hanson Dam Project could meet the water supply needs of Puget Sound residents. In response to a change in federal policy in 1994, the study objective was expanded to include environmental (ecosystem) restoration. The goal of restoration is to return the environmental study area to as near a natural condition as is justified and technically feasible. The original HHD project reduces the function of natural processes within the Green River by blocking the downstream movement of gravel-sized and larger sediments and large woody debris and presents an impediment to the migration of anadromous salmonids. The AWSP was designed to provide limited restoration of ecosystem functions of sediment and large woody debris transport and includes the opportunity to re-establish self-sustaining anadromous fish runs in the upper watershed.

Spawning anadromous fish have been recognized as a critical link in the aquatic food webs of the Pacific Northwest. Rearing in the ocean, adult anadromous salmon return to streams with ocean nutrients, enriching the food web from primary producers to top carnivores. At the top of the food web, at least 22 species of wildlife, including black bear, mink, river otter, and bald eagle, feed on salmon carcasses. At the base of the food web, salmon carcasses provide a significant amount of nitrogen to streamside vegetation as well as large amounts of carbon and nitrogen to aquatic insects, and other macroinvertebrates. Re-establishing naturally reproducing, self-sustaining runs of anadromous fish in the upper watershed was considered a reasonable and effective project objective since it provided the greatest opportunity to restore ecosystem functions.

The City of Tacoma is responsible for providing adult upstream fish passage at their Headworks as part of a Settlement Agreement between the City and the Muckleshoot Indian Tribe. Their proposed ladder and trap-and-haul facility will provide passage from their Headworks to above HHD. Anadromous fish can be introduced to the upper watershed by transporting above HHD unmarked adults returning to the Tacoma Headworks, or if found to be beneficial, juvenile salmonids from the Muckleshoot Indian Tribe's Fish Restoration Facility (FRF) could be used to accelerate restoration of upper watershed fish runs. Unlike recent hatchery practices in the Green River, the FRF could provide a short-term rearing program to provide additional production of salmon and steelhead to "jump-start" the recovery and restoration of salmon and steelhead to the Upper Green River. Unlike traditional hatchery production, where natural production is replaced, supplementation is meant to assist in the recovery or maintenance of salmon populations. Integrated planning, management, and operation would be used to minimize impacts to existing natural production and to maximize recovery of populations. Operation of the FRF would utilize features constructed to "naturalize" the rearing of juvenile hatchery fish. The opportunity for supplementation of the Upper watershed is provided by the City of Tacoma's commitment to fund a Fish Restoration Facility for the for the Muckleshoot Indian Tribe. This could be a short-term measure meant to complement (not replace) the natural rebuilding of the runs. The decision to supplement upper watershed recruitment will not be made by the Corps or Tacoma, but will be made by fisheries resource agencies responsible for management of the Green River fishery resource.

The City of Tacoma is responsible for transporting adult fish to the upper watershed, but the HHD-AWS provides for successful downstream fish passage to secure the opportunity to establish self-sustaining runs. Juvenile coho salmon and steelhead migrate downstream at a large size and should pass downstream through the reservoir and dam at a high rate of survival. Given the suite of mitigation and restoration measures proposed in Phase 1 of the HHD-AWS, restoring self-sustaining runs of steelhead and coho to the upper watershed appears promising.

Restoring self-sustaining runs of coho and steelhead appears promising, but there is greater uncertainty for chinook relative to the other species. Chinook are also proposed for listing as a threatened species under the ESA and will receive added attention from NMFS and other fisheries resource agencies during PED. In addition to loss of estuary rearing habitat and low ocean survival, one of the problems facing chinook in the upper Green River is their potential susceptibility to predation and/or delay during downstream passage through the reservoir. In order to maximize the opportunity to restore self-sustaining chinook runs, a fish passage facility was designed to pass the median daily flow during the outmigration season and maximize outmigrant survival. Although the selected fish passage facility is more costly than simpler and smaller designs, the potential to restore runs of chinook, coho and steelhead to the upper watershed justifies the selected fish passage alternative.

In the case of chinook, which are less likely than steelhead to develop self-sustaining runs, supplementation of adult recruitment from the FRF may be especially beneficial in addressing temporary or long-term shortfalls in the restoration goal of self-sustaining runs and harvest. Supplementation on a temporary basis may reduce the period of time required to reach adult escapement goals. If limiting aspects of the chinook life-cycle do not provide sufficient adult escapement on a sustainable basis, long-term supplementation may be considered as a fall-back measure. Again, the decision to supplement upper watershed recruitment on a short-term basis, or on a long-term basis if found to be beneficial, will not be made by the Corps or Tacoma, but will be made by fisheries resource agencies responsible for management of the fishery resource. The Corps of Engineers does not have the authority to decide fisheries management, but the responsibility to ensure that the HHD-AWS is complementary to Green River fisheries management decisions.

2.4.4 Common Issue No. 4: Dual Purpose Project: Municipal and Industrial Water Supply and Ecosystem Restoration.

Issue:

Commenters felt that municipal and industrial (M&I) water supply should not be a project purpose, particularly since it seems to be in conflict with ecosystem restoration.

Response:

This is a dual purpose project water supply and ecosystem restoration. Tacoma is the local sponsor for both purposes and the project must meet both objectives. The project began a single purpose water supply project at a time when the Corps authority did not include ecosystem restoration. In 1994 federal law changed and ecosystem restoration was added as a Corps authority. The Corps, however, cannot bring forth a project on its own and is required, by law, to have a non-federal sponsor to share the costs. Tacoma recognized that ecosystem restoration was a worth while goal and agreed to sponsor, and cost-share that part of the project along with the water supply. While Tacoma is willing to sponsor a single purpose water supply project and a dual purpose water supply/ecosystem restoration project there is no local sponsor who has expressed willingness to sponsor a single purpose ecosystem restoration project. Therefore, both objectives of this project need to be met.

The Howard Hanson Dam (HHD) Additional Water Storage (AWS) Project provides a regional water supply for three areas: 1) metropolitan Seattle; 2) South King County; and 3) Pierce County. Phase I of the AWS Project provides a means to more efficiently use 20,000 acre-feet of water from Tacoma's second diversion water right. It will be stored behind Howard Hanson Dam during the spring for use during the summer as municipal and industrial (M&I) water. Under Phase II it is proposed that an additional 2,400 acre-feet of water be stored behind Howard Hanson Dam for M&I water use. Phase II is

contingent upon achieving Phase I objectives and consensus from all resource agencies and the Muckleshoot Indian Tribe (MIT). Even if the AWS Project were not to occur, TPU has indicated they would find another means to store and use this water to meet projected future demands. Mitigation planning for the AWS Project was designed to occur on site to the greatest extent possible.

Restoration efforts were intentionally restricted to areas near Howard Hanson Dam, to restore habitats that may have been initially affected by construction of the dam. By definition all ecosystem restoration features go beyond what is required to mitigate for impacts from storing additional water. As described in the DFR/DEIS we address several key limiting factors that affect salmon and steelhead in the Green River basin. The factors we address include 1) reconnecting the Upper Watershed to the Lower Watershed with a downstream fish passage facility (in combination with the Tacoma Public Utilities adult truck and haul); 2) improvement of water quality (temperature) with use of the selective withdrawal system and flow augmentation; 3) improvement of instream flows by mimicking natural flow fluctuations in refill and release and with summer low flow with flow augmentation; 4) improvement of spawning habitat with gravel nourishment; 5) increased off-channel habitat with restoration of Signani Slough; and 6) addition of large woody debris with truck and haul of wood collected in the reservoir.

The storage of water for flow augmentation (an environmental or ecosystem restoration features) and water supply does create negative impacts to areas below and above the dam. We avoid or minimize the downstream impacts with the phased-implementation of the project: Phase II impacts will be reduced or conditioned by resource agency consultation. Under Phase II storage of 9,600 acre-feet of water for low flow augmentation is proposed. If we store additional water for either ecosystem restoration or water supply we cannot avoid impacts from inundating terrestrial and wetland habitats: the areal loss of habitat around the reservoir will be fully mitigated.

The ecosystem restoration goal was developed over a year-long process of collective work by staff from all of the resource agencies, the MIT, Tacoma Public Utilities, and the Corps. This collaborative process resulted in the defined ecosystem restoration goal and focus for the AWS project and the opportunity for self-sustainability is provided for chinook, coho, and steelhead through construction and operation of the Tacoma Public Utilities (TPU) upstream fish passage and the AWS Project downstream fish passage facilities.

2.4.5 Common Issue No. 5: Basin-wide Restoration.

Issue:

The comments range from statement of support for ecosystem restoration; concern that restoration has a lower priority than water storage; too little restoration is proposed; restoration is needed both upstream and downstream; restoration needs to mimic

historical conditions, especially instream flows; restoration should include the entire watershed; restoring the river's natural floodplain and estuary; protection of riparian habitat; reducing impacts of development; acquiring as much land in federal ownership as possible; restoration should increase quality and quantity of habitat (not maintain status quo); restoration is held hostage by the water storage project; overlap between AWS restoration and Green-Duwamish Restoration study; restoration should not include water storage; restoration goals are in conflict with MIT goals; the distinction between restoration and mitigation measures is unclear.

Response:

This is a dual purpose water supply and ecosystem restoration project. Tacoma is the local sponsor for both purposes and the project must meet both objectives. The project began as a single purpose water supply project at a time when the Corps' authorities did not include ecosystem restoration. In 1994 federal law changed and ecosystem restoration was added as a Corps authority. The Corps, however, cannot bring forth a project on its own and is required, by law, to have a non-federal sponsor to share the costs. Tacoma recognized that ecosystem restoration was a worth while goal and agreed to sponsor, and cost-share that part of the project along with the water supply. While Tacoma is willing to sponsor a single purpose water supply project and a dual purpose water supply/ecosystem restoration project there is no local sponsor who has expressed willingness to sponsor a single purpose ecosystem restoration project with a new downstream fish passage. Therefore, both objectives of this project need to be met.

By definition all ecosystem restoration features go beyond what is required to mitigate for impacts from storing additional water. As described in the DFR/DEIS we address several key limiting factors that affect salmon and steelhead in the Green River basin. The factors we address include 1) reconnecting the Upper Watershed to the Lower Watershed with a downstream fish passage facility (in combination with the Tacoma Public Utilities adult truck and haul); 2) improvement of water quality (temperature) with use of the selective withdrawal system and flow augmentation; 3) improvement of instream flows by mimicking natural flow fluctuations in refill and release and with summer low flow augmentation; 4) improvement of spawning habitat with gravel nourishment; 5) increased off-channel habitat with restoration of Signani Slough; and 6) addition of large woody debris with truck and haul of wood collected in the reservoir.

We recognize the concern regarding potential negative effects of additional water storage on fishery resources. This concern resulted in the Phased Project Implementation of the project. It also resulted in our accepting the recommendation of the Fish Passage Technical Committee (FPTC) for the MIS/Fish Lock fish passage facility over other design alternatives. The design of the surface collector provided for the capacity to pass a large volume of water to maximize fish collection efficiency at the dam and to speed fish passage through the enlarged reservoir. We recognize that no fish passage modification at the dam can totally compensate for the pool environment created by existing or

additional water storage; however, there is no compelling evidence that the size of HHD reservoir is a fatal flaw to the goal of restoring salmon runs in the Upper Watershed.

The mitigation requirements for impacts to inundated forest and stream habitats under Phase I and II were developed based on standard mitigation assessment protocol. As described in Sections 3 and 4 of the DFR/DEIS and Sections 3 and 8 of the Appendix F1, we have identified impacts based on the areal extent of inundation and mitigated for those impacts by providing an equivalent areal extent of stream improvement. Beginning in 1999 and continuing into 2001, the MIT and other resource agencies will be involved in final design development of these mitigation measures during the plans and specifications phase (PED).

Restoration goals of the Corps of Engineers for the Howard Hanson Dam Additional Storage Project are necessarily restricted to those areas originally affected by Howard Hanson Dam construction and operation. The Corps is committed to restoring habitats in the watershed

The proposed new fish passage goes far beyond that which would be required to mitigate for the pool raise for municipal and industrial water supply. This new fish passage allows for the possibility of achieving self-sustaining runs of fish above HHD which would not be possible without a 'restoration level' downstream fish passage.

This project recognizes the need for additional Lower Watershed restoration measures of which Signani Slough, Gravel Nourishment, Large Woody Debris Transport and Water Temperature Improvements are examples of measures being proposed in this project. The Additional Water Storage (AWS) Project is proposed to provide for the expected growth of the region. However, since all M & I water available under Phase I of the project is part of Tacoma's second supply water right, which they expect to exercise even if the AWS project is not built, most of the growth in the region would take place with or without the AWS project. Population growth results in cumulative impacts and resource problems in all environmental arenas (not just to salmonids). However, since these effects are future effects, and cannot be accurately quantified, a detailed analysis is not possible. Qualitatively, we can predict that more roads will be built, as will houses and support services, such as strip malls, golf courses, play fields, churches, and schools. Terrestrial habitat will be lost, and aquatic habitats may be lost, and will certainly suffer impacts due to increased runoff and pollution from sedimentation, metals, toxic organics, and nutrients from human uses. At the same time, the AWS Project offers an opportunity to provide benefits to salmon through restoration of habitats and fish passage through and around Howard Hanson Dam.

This spring and summer we have begun to modify dam releases to improve downstream habitat by instituting a version of a natural flow regime and by augmenting flows for steelhead redd protection. We have also begun additional studies (side-channel habitat use) to determine what additional modifications to dam releases will optimize the Lower Watershed habitat.

The geographic scope of the AWS Project DFR/DEIS, while focusing on the Howard Hanson Dam and reservoir area, as well as functional aspects of the Green River below the dam, addresses the Green River Watershed above the reservoir in the cumulative impact section, and in various other sections where reference is made to other landowners and agencies that are conducting studies or completing work in the watershed. The Corps is committed to restoring habitats in the watershed, but is limited in what it can do by Congressional authority, agency missions, and sponsor objectives. In addition, the Corps owns very little land in the watershed, and is unable to participate in a land exchange with other entities. Our land holdings are directly related to the dam and areas immediately surrounding the dam. Congress had not authorized purchase of lands by the Corps, except as required to complete construction projects. Thus, the Corps is unable to purchase lands for restoration. This is a major restriction when it comes to protecting wetland, riparian, and other floodplain resources. However, we can and do provide engineering, geotechnical, fish and wildlife biology, and other forms of expertise in the watershed restoration study.

The Corps is also the major action agency in the parallel Green-Duwamish River Basin Restoration study, with sponsorship from King County. These two studies are separate, and authorized by separate Federal statutes, with funding targeting specific actions. The Corps has worked to minimize any overlap.

2.4.6 Common Issue No. 6: Schedule for Reviewing DFR/DEIS and Technical Appendices.

Issue:

The 45 day comment period was felt to be too short, especially considering the length of the document and appendices, and the complexity of the project.

Response:

We recognize that this is a complex project and over the past eight years of the study we have worked hard to include the resource agencies and the Muckleshoot Indian Tribe in each step of the process and hope to continue this cooperative effort during the PED phase of the project. See response to comment O04-2 on page 2-135 of this document for further clarification.

2.4.7 Common Issue No. 7: Tribal Interests

Issue:

Comments generally reflect the lack of the DFR/DEIS to accurately depict tribal treaty rights; effects of the project on cultural resources, and fish and wildlife; effects of MIT

harvest on fish and game; tribal positions and/or acceptance on/of certain issues; that tribal positions are not given equal weight to agency positions; and failed to confirm with the tribe certain statements regarding tribal positions.

Response:

The Muckleshoot Indian Tribe is a federally recognized tribe located on the Muckleshoot Indian reservation in King and Pierce Counties. MIT has rights under and is successor to certain bands and tribes who were parties to the Treaty of Point Elliot (12 Stat. 927) and the Treaty of Medicine Creek (10 Stat. 1132). MIT holds federally guaranteed rights under the Treaty of Point Elliot, including fishing and hunting rights, in the Green/Duwamish River system. These rights were retained in exchange for lands ceded by the Tribe in the treaties and are considered property rights. MIT has rights and responsibilities for the management of the fish and wildlife resources and other natural resources of the Green/Duwamish basin, including the protection of those resources from environmental degradation. While salmon and steelhead fishing remains the center of tribal culture, subsistence, and economy, fishing opportunity has been severely restricted in recent years due to low abundance. We recognize the treaty rights of the Muckleshoot Tribe to hunt in the watershed, as well as the agreement between MIT and TPU for ceremonial hunts. We also recognize that E.O. 13007, "Indian Sacred Sites", allows tribal access to Corps project lands (and other Federal lands) for ceremonial purposes.

The identified prehistoric archeological sites in the vicinity of the Howard Hanson reservoir are in the process of being evaluated for National Register eligibility. If they are determined eligible for listing, an Historic Properties Management Plan (HPMP) will be prepared that will address the impact of season inundation for both the current and proposed projects, and a memorandum of agreement will be prepared to stipulate conditions for their management within Howard Hanson reservoir. The historic sites in the pool raise area for Phase II lack site integrity and are, to a large extent, dismantled or destroyed. These identified historic sites appear not to meet the criteria of eligibility for the National Register. These issues will be specifically addressed in the HPMP. This course of action will satisfy requirements of Section 106 NHPA

We recognize that this is a complex project and over the past eight years of the study we have worked hard to include the Muckleshoot Indian Tribe in each step of the process and hope to continue this cooperative effort during the pre-construction engineering and design (PED) and construction phases of the project. Where the MIT have expressed concerns regarding potential project impacts, good faith efforts have been made to address those concerns. Additional studies have been commissioned to evaluate potential issues and in response to identified impacts, measures have been designed to avoid, minimize, or mitigate those impacts. In response to significant concerns raised in the planning process, and as a result of the Agency Resolution Process, a two-phased project approach was implemented. The phased approach incorporated an adaptive management process that conditioned Phase II of the project on the demonstration that impacts could

be sufficiently minimized and mitigated and agreement of the MIT and resource agencies. These efforts are meant to provide assurances of project acceptability.

The environmental quality criteria, see Section 3.3.3.3 of the DFR/DEIS, were intended to address, among other things, tribal economic and spiritual sustenance needs for fishing, hunting, gathering of native plant material, and access to the river, wetlands, and forests of the basin. In some cases, tribal interests were not explicitly identified but were addressed by underlying assumptions. For instance, a level of tribal harvest of the Green River fishery was assumed to be an inviolate component of the process of meeting the goal of self-sustaining fish runs

We applied no harvest restrictions in our analysis. We applied a realized long-term average harvest rate which incorporated periods of high harvest, 1980's, and low to no harvest, 1990's. Natural trends in wild and hatchery salmon and steelhead productivity are characterized by periods of high and low productivity. Harvest rates for wild and hatchery fish tend to follow these trends as evidenced by the high degree of variation in Puget Sound salmon and steelhead harvest. We used an average in our analysis for selecting the recommended fish passage facility. Other fish managers may apply harvest restrictions as per their required policy and legal mandates. It is stated within the state Wild Salmonid Policy that higher natural escapements may be necessary to recover wild stocks but that the goal of the policy is greater harvest opportunities for all parties. National Marine Fisheries Service described the ESU for Puget Sound Chinook Salmon as having high harvest rates during the 1980's. The Corps and Tacoma Public Utilities (TPU) are not fish managers and we cannot mandate or require changes in harvest policy. We hope the combined Corps/TPU fish restoration measures will provide a real opportunity for restoration of Upper Watershed salmon and steelhead runs along with protection and substantial recovery of Lower Watershed runs. Full restoration throughout the basin will require cooperative efforts between all resource agencies, MIT, the Corps and Tacoma

The Corps acknowledges that the Muckleshoot Indian Tribe has not indicated approval for or opposition to the Project.

2.4.8 Common Issue No. 8: Priority of Springtime Water Storage and Release.

Issue:

This issue is very similar to issue No. 4; however, comments addressed under No. 4 relate more to the policy decisions of water supply versus fish management. Comments addressed under No. 8 relate more closely to actual use of the water stored behind Howard Hanson Dam.

Response:

The current springtime operating strategy of Howard Hanson Dam reflects the authorized project purposes of flood control and water storage for low flow augmentation. The Corps has also attempted to respond to flow management requests from natural resource agencies, recreational groups and local communities where they do not interfere with authorized project purposes. In some instances, complying with requests from various groups has had unanticipated effects on downstream fisheries resources. Under the proposed AWS, a revised operating strategy will be implemented that gives environmental resource agencies and tribes much greater opportunity, and responsibility, for managing flows in the Green River.

The proposed AWS operating strategy is described in Section 4.2 Recommended Plan: Hydrologic Considerations. Under Phase 1 of the proposed project, refill timing and release rates will be based on target instream flows that will be adjusted yearly in response to weather conditions, snowpack, the amount of forecasted precipitation and biological input from fisheries resource managers. Proposed refill rules are designed to meet project objectives for protecting instream resources, meeting existing conservation storage requirements, and providing reliability for storing additional water for low flow augmentation and municipal water supply. Rules to provide for recreational, community and other non-fishery resource needs were not included in the description of the proposed storage and release strategy. Non-fishery resource needs are not a designated downstream delivery objective; however, where those non-fishery resource needs do not conflict with fishery objectives, every attempt will be made to satisfy multiple uses.

The proposed operating strategy involves the use of dedicated and non-dedicated blocks of storage. The quantity of water available to Tacoma under the second supply water right (also known as SSWR or P5 water right) will be held on a daily basis as dedicated storage. Water stored behind HHD for Tacoma's use will be accumulated at the rate of 100 cfs a day (64 mgd) and conditioned on meeting minimum flow levels established in the TPU/MIT Agreement. The decision to dedicate water to the municipal storage block will be conducted on a real-time basis to maximize the flexibility available with non-dedicated storage while ensuring the reliability of municipal storage is not exacerbated beyond the constraints of the TPU/MIT Agreement.

The non-dedicated storage (Dampen Dam) can be directed for release to meet immediate fishery resource needs or stored for later low flow augmentation to benefit fishery resources. Springtime operation of HHD, where it does not conflict with flood control responsibilities, will be responsive to fishery resource agency and tribal direction. Providing fishery resource agencies and tribes greater input to water storage and release patterns will help minimize the effects of water storage on downstream fisheries resources. The rate of water storage can be designed to increase the rate of water storage during periods of least environmental impact and reduce the rate of water storage during periods of high environmental impact. For instance, under baseline conditions assumed for the AWS, water for low flow augmentation is stored at the rate of 400 cfs per day from 15 April through 31 May (see DFR/DEIS, Appendix F1, Section 9). Based on observations of outmigrating juvenile chinook in the Green and other Puget Sound rivers,

the peak outmigration of chinook smolts occurs during May and early June. Storing water during the peak of the chinook smolt outmigration period exacerbates the impact of water storage on the survival of outmigrating chinook. Shifting the majority of water storage from May to March may reduce the impact of water storage and increase chinook survival. Assumptions regarding the effect of different water withdrawal patterns must be confirmed through monitoring, but the proposed adaptive management process provides the opportunity to alter operations to minimize impacts.

In addition to identifying the period of greatest risk to smolt outmigrants, and allowing for subsequent modifications to the storage rules, the proposed monitoring and adaptive management process will help assess flow enhancement scenarios to optimize flow releases. Under the proposed AWS, non-dedicated storage can be released as a freshet to speed downstream movement of outmigrating chinook and increase survival. Monitoring the effects of freshets will help fishery resource agencies and tribes decide whether to release water as a freshet, release water to augment baseflows, or to reduce the rate of water storage. Each of these flow management alternatives may help or hinder production of the various fisheries resources in the Green River. The proposed AWS monitoring and adaptive management package provides increased opportunity to manage water storage and release to meet fishery resource needs, and is a dramatic improvement over 1996 baseline operating conditions. Provided the authorized project purposes of flood control and storage of 22,400 acre-feet of water for low flow augmentation are not compromised, storage or release of non-dedicated water will be responsive to input to fishery resource managers. Where non-fishery resource needs do not conflict with fish protection objectives, every attempt will be made to satisfy multiple uses.

2.4.9 Common Issue No. 9: Phase II Implementation

Issue:

Commenters felt that the DFR/DEIS was vague about the future implementation of Phase II, and, though they understood that Phase II would not be implemented without agreement of resource agencies and the MIT, the statements made in the DFR/DEIS seemed to imply otherwise. They also wondered if additional NEPA documentation would be required.

Response:

The Corps agrees that Phase II would be implemented only following evaluation of monitoring results showing that Phase I objectives have been achieved and with consensus of resource agencies and the MIT. Additional NEPA documentation would be required for Phase II.

2.5 Individual Comments and Responses

MUCKLESHOOT INDIAN TRIBE

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June 15, 1998

Colonel Rigsby
U.S. Army Corps of Engineers
Seattle District
4735 E. Marginal Way S.
Seattle, WA 98124-2255

RE: ADDITIONAL WATER STORAGE PROJECT, DRAFT FEASIBILITY REPORT AND EIS: HOWARD HANSON DAM, GREEN RIVER, WASHINGTON.

Dear Colonel Rigsby:

T01-1 The Muckleshoot Indian Tribe has received the referenced draft documents regarding the proposed Howard Hanson Additional Water Storage Project (AWSP) and offers the following comments. Because of the extremely large volume of technical material provided for our review and the refusal of our first requested deadline extension, these comments should not be viewed as a complete response to all issues presented in the draft report and its nine appendices. Therefore, we reserve the option to comment further on this proposal as future opportunities arise. By way of this letter we formally request that the Tribe be given an extension to complete its review of the DEIS and its technical appendices and submit additional comments.

The Muckleshoot Indian Tribe is a federally recognized tribe whose reservation is located in King and Pierce Counties. The Muckleshoot Indian Tribe has rights under and is the successor to certain bands and tribes who were parties to the Treaty of Point Elliott (12 Stat. 927) and the Treaty of Medicine Creek (10 Stat. 1132). The Muckleshoot Indian Tribe holds federally guaranteed rights under the Treaty of Point Elliott, including fishing and hunting rights, in the Green/Duwamish River system. These rights were retained in

T01-1 We recognize that this is a complex project and over the past eight years of the study we have worked hard to include the Muckleshoot Indian Tribe in each step of the process and hope to continue this cooperative effort during the PED phase of the project. However, we must hold to the close of the public review period as scheduled.

T01-1 cont. exchange for lands ceded by the Tribe in the treaties and are considered property rights. The Muckleshoot Indian Tribe has rights and responsibilities for the management of fish, wildlife, other natural resources, and cultural resources of the Green/Duwamish system, including the protection of those resources from environmental degradation. These comments have been generated in the interest of protecting the Tribe's treaty resources.

T01-2 Due to the complex nature of the DEIS and its appendices and the need to place its project impacts in context of the other federal actions above the Dam, Tribal staff have not had sufficient time to thoroughly evaluate the proposed mitigation measures, the magnitude of the impacts of the project upon salmon and their habitat, and the potential benefits of the project. The Tribe is concerned that the proposed fisheries mitigation measures will be insufficient and that the purported benefits will not be realized. The project is fraught with uncertainty, with even the Corps admitting that it is unable to provide a determination on project effects for chinook below the Dam.

T01-3 Numerous simultaneous federal actions are occurring above Howard Hanson Dam that, individually and cumulatively with the Additional Water Storage project, will impair Treaty rights and could limit the potential benefits for this project. For example, the DEIS failed to consider the effects of two Habitat Conservation Plans, a major federal land exchange, and other federal actions. The DEIS is also filled with inaccuracies, inconsistencies, assumptions, and misrepresentations. The FEIS should analyze the effects of multiple federal actions occurring in and around the project area and correct errors as noted in our page specific comments.

T01-4 The DFR/DEIS and its recommendations imply that Phase II implementation will inevitably follow Phase I. The approval and implementation of Phase II requires a consensus of the agencies and the Muckleshoot Indian Tribe, as agreed in the October 28, 1997 Howard Hanson Dam Additional Water Supply Proposal document put forth by TPU and the Corps of Engineers. The agency resolution process seeking federal funding support for the AWSP was explicitly limited to Phase I due to the higher level of ecosystem risk in Phase II. The entire phased implementation approach was predicated on postponing Phase II, perhaps indefinitely, subject to the outcome of adaptive management learning, the details of which remain only vaguely defined. We request that this commitment be reinforced within the FEIS. We also request that a new environmental impact analysis be completed for Phase II of this project.

T01-5 The Tribe's view of the project's potential restoration encompasses a wide range of possible alternatives that include supplementation, and an evaluation plan with specific actions tied to results of the evaluation. Instead, the DEIS appears to approach salmon restoration from the narrow perspective of self-sustaining, naturally reproducing salmon colonizing the upper basin in numbers. While the Tribe holds the same ideal outcome to heart, a number of tribal and agency biologists do not believe that self-sustainability is a probable outcome for chinook and/or coho. However, analyses regarding hatchery

T01-2 The Corps recognizes the uncertainty regarding this project. This concern resulted in the Phased Project Implementation. It also resulted in our accepting the recommendation of the Fish Passage Technical Committee (FPTC) for the MIS/Fish Lock fish passage facility over other design alternatives. It also resulted in an adaptive management approach and proposed long term monitoring plan which will help to optimize the project benefits.

T01-3 Agree that the DEIS does not address the habitat conservation plans (of Plum Creek Timber Co., Tacoma, Department of Natural Resources (DNR), and King County). The omission of the Plum Creek HCP was an inadvertent oversight; neither Tacoma nor King County had begun development of their HCP's at the time of preparation of the DEIS, so the effects of those plans could not be considered. DNR's HCP is state-wide in scope and, while it has been completed, the Corps has not seen a copy of this plan. The Corps did not have information from any of these HCP's prior to preparation of the DEIS, and thus analysis could not reflect any of these actions. The land exchange between the USFS and Plum Creek Timber Co. was briefly addressed in the cumulative impact section of the DEIS (Section 6.11). We agree that all of these actions result in cumulative effects in the watershed and that overall treatment and analysis of this aspect in the DEIS could have been better. For instance, the Corps recognizes that increased acreage devoted to clearcutting sometimes results in increased runoff, erosion, and sediment loads in streams, particularly in areas without adequate stream and wetland buffers. These effects are unquantified and difficult to address with regard to specific impacts to salmonids. However, Plum Creek's HCP establishes 200' buffers for the 130 miles of DNR Types 1-3 streams on its lands, and 100' buffers on 75% of the Type 4 streams (152 miles) on its lands. This is an improvement over existing conditions, and, as Plum Creek puts it, results in, "....in most instances, up to 100 percent of the large woody debris inputs that occurred under natural conditions." With regard to snowmelt, the Corps and Tacoma have been concerned with the effects of clearcutting in the watershed on increased flows resulting from snowmelt in late winter and spring. We will be looking at implementing state of the art snowpack monitoring in the PED phase of this project to better predict runoff and lead to better operations of Howard Hanson Dam flows.

Management by USFS was briefly addressed in Section 1.6.6. The result of land exchanges, adaptive management areas, and other actions by USFS suggest improvements to habitats on Forest Service lands over the next several years. Many lands recently acquired by USFS through the land exchanges were recently cut, and will, through succession of forests, result in less runoff and stream degradation over time.

T01-3 Cont. The USFS has implemented 300' buffers on 179 miles (100%) of Types 1-3 streams on its lands, and no less than 150' buffers on Type 4 streams. Some roads will be obliterated, which will further improve overall habitat quality on Federal lands in the watershed. Thus, on balance, it appears to the Corps that salmon restoration efforts in the upper watershed proposed in the HHD AWS DFR/DEIS will in general coincide with improved habitat management by other watershed landowners over the next several years.

Concerning "inaccuracies", the Corps utilized the best information available, using the knowledge of local experts from the USFWS, Washington Department of Fish and Wildlife, recognized experts from private consulting firms, as well as MIT, to develop the assessment of environmental impacts. Although we acknowledge the presence of errors in the document, "inaccuracies, inconsistencies, assumptions, and misrepresentations" may simply be differences of professional opinion between MIT and the Corps. The Corps intends to continue working closely with MIT and the resource agencies to resolve differences and develop mitigation and restoration plans that will satisfy all stakeholders.

T01-4 Agree—Phase II will not be implemented unless and until the agencies and MIT agree that Phase I management and restoration is successful. A new environmental document will be prepared prior to implementation of Phase II.

T01-5 The ecosystem restoration goal was developed over a year-long process of collective work by staff from all of the resource agencies, including technical staff from MIT. This collaborative process resulted in the defined ecosystem restoration goal and focus for the AWS project. This goal and focus also was required to conform to the Ecosystem Restoration guidance. The opportunity for self-sustainability is provided for chinook, coho, and steelhead through construction and operation of the Tacoma Public Utilities (TPU) upstream fish passage and the AWS Project downstream fish passage facilities. The Corps and TPU do not set fish management policy, and our ecosystem restoration goal and project features do not attempt to set fish management policy. It is up to the NMFS, WDFW, and MIT to define what the fish management policies of the Upper Watershed will be, including whether the goal is natural reproducing, self-sustaining salmon and steelhead or some other species-specific combination of hatchery and wild fish production.

See also Common Issue and Response No. 5.

T01-5 cont. supplementation and potential adult survival relied too heavily on optimistic assumptions on natural production, and should be re-evaluated jointly with tribal staff.

T01-6 The narrow viewpoint of self-sustainability of salmon runs in concert with implied harvest management restrictions may not be realistic. Neither past fisheries management nor current discussions between the co-managers support this viewpoint. The DEIS suggests that changes in harvest management are needed to achieve the goal of self-staining runs above the dam. Given the projected 40% mortality for chinook through the reservoir and dam, it would be necessary to curtail all fishing in Canada and substantial reductions in Puget Sound to offset this mortality rate. Full restoration should not rely on decreases in harvest to compensate for production losses due to regional water supply needs.

T01-7 We are also concerned that the Corps has not given the restoration goals and objectives of the Tribe the same weight as state and federal agencies and King County. The DEIS discusses the goals of establishing runs of chinook and coho salmon and steelhead trout above Howard Hanson Dam and maintaining existing anadromous salmonid populations by ensuring no net loss of lower watershed habitat. However, the DEIS lacks any recognition of the Tribe's goal to substantially **increase** the quality and quantity of habitat downstream of the TPU Diversion Dam so as to increase salmon production. It is unclear why the Tribe's goals have not been included into the project objectives given the Corps fiduciary responsibility to protect the Tribe's treaty resources. The Corps has the power to significantly improve habitat downstream of the dam independent of this project by simple modification of procedures at the dam and should conduct such activities in the interest of the Tribe's goals for the Green River.

We have also some major specific concerns regarding the impacts and alleged benefits of the project as follows:

T01-8 • The DEIS does not accurately reflect the positions taken by Muckleshoot Indian Tribe through its Fisheries Department staff, and does not accurately present the Tribe's involvement in discussions or activities part of or tangential to the project.

T01-9 • The DEIS narrowly defines the extent of the project area to minimize the magnitude of the project's impacts upon cultural resources and avoids a discussion of the existing project impacts upon cultural resources.

T01-10 • The rigor of the underlying review of the HHD AWS is suspect when primary citations are not used or citations are lacking. For example, the DEIS contains numerous, unsubstantiated statements claiming that the habitat quality above the HHD is good or prime, despite the presence of other documents produced by the Corps and the US Forest Service containing statements to the contrary.

3

T01-6 See Comment-Reply T01-5 regarding self-sustainability. We applied no harvest restrictions in our analysis. We applied a realized long-term average harvest rate which incorporated periods of high harvest, 1980's, and low to no harvest, 1990's: See also Comment-Replies S02-13, T03-8, T03-48, T03-53, T03-87, and T03-103. Natural trends in wild and hatchery salmon and steelhead productivity are characterized by periods of high and low productivity. Harvest rates for wild and hatchery fish tend to follow these trends as evidenced by the high degree of variation in Puget Sound salmon and steelhead harvest. We used an average in our analysis for selecting the recommended fish passage facility. Other fish managers may apply harvest restrictions as per their required policy and legal mandates. It is stated within the state Wild Salmonid Policy that higher natural escapements may be necessary to recover wild stocks but that the goal of the policy is greater harvest opportunities for all parties. National Marine Fisheries Service described the ESU for Puget Sound Chinook Salmon as having high harvest rates during the 1980's. The Corps and Tacoma Public Utilities (TPU) are not fish managers and we cannot mandate or require changes in harvest policy. We believe the combined Corps/TPU fish conservation measures will provide a real opportunity for restoration of Upper Watershed salmon and steelhead runs along with protection and substantial recovery of Lower Watershed runs. Full restoration throughout the basin will require cooperative efforts among all resource agencies, MIT, the Corps and Tacoma.

T01-7 Based on MIT technical and policy staff comments we (Corps and TPU) received throughout the Feasibility Study and in particular during the Agency Resolution Process, we believe we have given equal or in some cases greater than equal, weight to MIT goals and concerns. Examples include: 1) MIT staff collaborated in the year long development of the ecosystem restoration goal defined before and during the Agency Resolution Process; 2) staff were strong proponents of mimicking natural flow regimes which we have incorporated in our reservoir and release plans; and 3) staff emphasized the need for additional Lower Watershed restoration measures of which Signani Slough, Gravel Nourishment, Large Woody Debris Transport and Water Temperature Improvements were selected. This spring and summer, as your staff advised us to pursue, we have already begun to implement your goal of modifying dam releases to improve downstream habitat by instituting a version of a natural flow regime and by augmenting flows for steelhead redd protection. We have also begun additional studies (side-channel habitat use) to determine what additional modifications to dam releases will optimize the Lower Watershed habitat. Outside of the AWSP, the parallel Corps/King County Green-Duwamish Feasibility Study will provide additional opportunities to substantially increase the quality and quantity of habitat below both

T01-7 Cont. dams.

Conversely, as you stated clearly in your letter (T01) when you question the ability to achieve our project benefits and state that failure is a real possibility, we believe the same uncertainty and caution must be applied to major Lower Watershed restoration. Since most of the Lower Watershed stream, floodplain, and estuarine habitat is permanently hydro-modified by a flood protection dam, extensive levees, and by urbanization, the quantity and quality of substantial habitat restoration is reduced or of a high degree of uncertainty. In addition, because the Lower Watershed natural river processes are so highly modified, it is likely that any successfully completed restoration will be highly dependent on ongoing human maintenance activities. Considered in this light, the achievement of habitat restoration and salmon and steelhead recovery throughout the Basin will also depend on the collective efforts of your organization with all resource agencies, local governments, the Corps and Tacoma. We hope the AWS Project offers the right vehicle to realize a significant portion of this potential. See also Comment-Reply T03-84, T03-45, and T03-108.

T01-8 It is unclear what is meant by this statement. Muckleshoot technical staff have been involved in project planning and during baseline studies for 8 years. The Corps believes the DFR/DEIS accurately reflects the major issues identified by MIT and resource agency technical and policy staff. As discussed in Section 3 of the DFR/DEIS the Agency Resolution Process provided an intensive forum for your technical and policy staff to identify the major issues that were unresolved. This process formalized the ecosystem restoration features of the project and resulted in minimizing the impacts of the water supply features through the phased implementation. On many issues we agree, on some issues we have based our position on our interpretation of the best science available and respectfully disagree with MIT staff positions. See also Comment-Reply T03-45 and T03-108.

T01-9 Comment acknowledged. The identified prehistoric archeological sites are in the process of being evaluated for National Register eligibility. If they are determined eligible for listing, an Historic Properties Management Plan (HPMP) will be prepared that will address the impact of season inundation for both the current and proposed projects. Adverse effects of erosion and inundation will be addressed in the HPMP if the sites are determined eligible for the National Register. The historic sites in the pool raise area for Phase II lack site integrity are to a large extent dismantled or destroyed. These identified historic sites appear not to meet the criteria of eligibility for the National Register. These issues will be specifically addressed in the HPMP.

T01-10 We agree that many sections of the DFR/DEIS contain technical statements without primary references. The DFR is the summary of the feasibility study incorporating the main results of the various technical appendices. The technical reports in the appendices are fully supported with citations. Comment letter T03 points out specific statements or sections that are lacking reference: refer to Comment-Replies for Letter T03-1 to find citations for these primary references. Regarding habitat quality above HHD please refer to Comment-Reply T02-3, T03-70, T03-96 and refer to Fuerstenberg et al. (1997). Also note that unlike the Lower Watershed, stream and floodplain habitat above HHD and Reservoir has not been extensively hydro-modified by water control structures (dams), extensive levees, or by urbanization.

T01-11

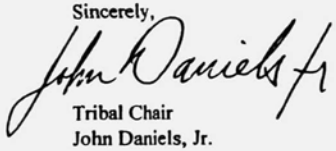
- Many of the proposed mitigation or restoration measures should not be credited to this project as they are required or are policies implemented under other programs. Also, many proposed restoration actions, often specified as contingent on the project, are actions that should be taken by TPU and the Corps to mitigate the downstream impacts caused by the existing presence and operation of the dams, regardless of this project.

T01-12

This project, as described, is a water use project, albeit with some salmon enhancement features added, that has the potential to significantly degrade salmon habitat and lower salmon production. The water generated from this project will promote continued urban growth and development within areas where chinook and other salmonids are produced. It is unlikely that the restoration and mitigation components of this project will offset these impacts.

Further page specific comments concerning, fisheries, wildlife, and cultural resources are attached to this letter. These comments are in addition to this cover letter and constitute the tribal comments on this proposal to date. Your immediate attention to all of our comments and concerns is appreciated. Isabel Tinoco, the Fisheries Department Director, will be the lead contact for the Tribe for this project. She and the other staff of the Muckleshoot Indian Tribe represent the interests of the Tribe. Please direct your questions regarding this letter and the attached comments to her.

Sincerely,



Tribal Chair
John Daniels, Jr.

Attachments

cc: NMFS- William Stelle
USFWS - Michael Spears
WDFW- Bern Shanks
EPA - Chuck Clarke

4

T01-11 Should not claim credit for mitigation and restoration measures

Federal agencies need Congressional authorization and funding to complete projects. These projects must be cost-effective and serve the public interest. Documenting benefits is required to get Congressional authorization and funding. In some cases activities taken by others is complementary to the proposed action. We described those activities to show broad support for the proposed action but did not include them as a benefit of the project authorization.

Actions Should be Taken

We agree that the proposed restoration work should be implemented: the restoration authority for this project allows the restoration work and the funding for that work—without that authority, regardless of need, the Corps would not be able to accomplish the work. This is the Federal process that allows the restoration work to be completed; there is no other way the work could be done or credited.

T01-12 The project as described is a dual-purpose project for ecosystem restoration and water supply, not simply a water supply project with some salmon enhancement features. Salmon enhancement is not part of the project purpose. Restoration of ecosystem functions or habitats affected by modified functions that are necessary for restoration of anadromous salmon and steelhead runs is the project purpose. We consider reconnecting the Lower Watershed to the Upper Watershed, which has 45% of the basin and over 100 miles of salmon and steelhead habitat, a significant restoration component of this project.

The restoration goals and objectives for the AWS Project are not keyed to offset impacts from increased urban growth and development. Therefore the restoration features of the project are not meant to offset urbanization impacts. The restoration features were specifically identified and developed to address ecosystem factors that were affected by construction and operation of the dam. Since the AWS Project cannot impact the existing authorized project purpose of flood protection, what factors and watershed areas we could address were limited. As such, we developed the recommended restoration features in concert with resource agency and MIT staff. Mitigation was specific to project impacts from either inundating Upper Watershed habitat, dewatering Lower Watershed habitat, or potential effects to salmon and steelhead survival. Mitigation is not keyed to offset impacts from increased urban growth and development.

Tacoma Public Utilities Second Supply Project provides a regional water supply for three areas: 1) metropolitan Seattle; 2) South King County; and 3) Pierce County. Phase

T01-12 Cont. I of the AWS Project provides a means to more efficiently use TPU's water right under the SSP: Phase II is contingent upon achieving Phase I objectives and consensus from all resource agencies and the MIT. Even if the AWS Project were not to occur, TPU has indicated they would find another means to store and use this water to meet projected future demands. All entities that use the SSP water, either through a completed AWS Project or other means, will be subjected to the scrutiny of the Growth Management Act, the state Wild Salmonid Policy, and the expected dramatic regulatory effects of Endangered Species Act listings. As described above, the AWS Project does not provide restoration (or mitigation) for areas affected by continued urban development; however, it does provide substantial restoration opportunities outside of current and future urbanizing areas of the basin.

GENERAL REMARKS

T02-1 The Tribe continues to have serious concerns about the environmental impacts of the Howard Hanson Dam Additional Water Storage Project. Increased storage presents a significant perturbation to the Green River that may contradict ecosystem restoration objectives. Success of the keystone AWSP restoration element - the proposed fish passage structure - is highly uncertain when combined with a greater reservoir storage burden. While the proposed passage structure is superior to existing dam outlets, even the best outlet design can restore only an imperfect connection between the lower and upper watershed due to the intervening reservoir. The enlarged reservoir would require a refill volume as much as 245% greater than the existing reservoir. Considering present Green River habitat limitations and those likely to be introduced by the AWSP, the DFR/DEIS is unconvincing that the restoration goal of self-sustaining salmon and steelhead runs is achievable, especially for chinook.

T02-2 The AWSP impact analysis relies upon a daily flow spreadsheet model and a set of biological assumptions. To its credit, the DFR/DEIS acknowledges that these impacts, particularly on downstream juvenile migration, are difficult to predict with confidence given an imperfect set of life history assumptions. The minimum baseflows proposed as a mitigation strategy offer some added protection relative to instream flow requirements, yet are frequently lower than spring flows now present in the river. The proposed maximum reservoir refill rates again will provide some protection, yet refill will be prolonged over a longer duration. The use of artificial freshets to promote outmigration survival, particularly at levels modeled, may inadvertently strand as many fish as it transports. In response to these and other concerns, much reliance is made on adaptive management to address project risks and uncertainties. As stated in Appendix F, the first essential element of adaptive management is that "the possibility of failure must be acknowledged and included in policy decisions" (Fluarty and Lee, 1988). We see little in the DFR/DEIS that provides for or acknowledges the possibility of failure.

T02-3 The position held in the DFR/DEIS that 95% salmon survival through the HHD will restore salmon runs is fallacious. Restoration of salmon above HHD is not based upon percent survival at any one part of their life history above the HHD, but upon the total number and condition of outmigrating juvenile salmon that pass beyond the HHD and reach the estuary. However, the habitat, that determines the number of salmon that can be produced, above HHD dam, contrary to statements in the EIS, are not good. Indeed, DFR/DEIS statements concerning the quality of the habitat and estimated salmon production are contradicted by statements contained in the Green/Duwamish River Basin General Investigation Ecosystem Restoration Study Reconnaissance Phase. The Corps is basing it prediction of the number of salmon produced above the dam upon comparison to other systems in much better shape and upon data collected in those systems often decades before. The futility of using such data to support estimates of production is illustrated that production values based upon those estimates failed to prevent the NMFS from being prepared to recommend that chinook salmon be listed as a threatened species.

T02-1 We share your concern about the potential negative effects of additional water storage on fishery resources and the need to complement other ongoing ecosystem restoration projects. This concern resulted in the Phased Project Implementation. It also resulted in our accepting the recommendation of the Fish Passage Technical Committee (FPTC) for the MIS/Fish Lock fish passage facility over other design alternatives. The design of the surface collector provided for the capacity to pass a large volume of water to maximize fish collection efficiency at the dam and to speed fish passage through the enlarged reservoir. We recognize that no fish passage modification at the dam can totally compensate for the pool environment created by existing or additional water storage; however, there is no compelling evidence that the size of HHD reservoir is a fatal flaw to the goal of restoring salmon runs in the Upper Watershed.

We maintain that achieving self-sustaining runs of steelhead and coho appears promising with the proposed mitigation and restoration measures, and agree that there is greater uncertainty for chinook relative to the other species. The proposed listing of chinook salmon in Puget Sound by NMFS underscores the potential benefits of extending the range of anadromous species to historic habitats.

T02-2 The Corps agrees that an essential element of adaptive management is the possibility of failure; along with the need for flexibility to adjust project conditions to avoid further failure. An extensive monitoring program is proposed for the AWS project to provide feedback on the efficacy of project operations. The proposed downstream passage facility expands the window of opportunity for springtime reservoir refill and agency and tribal decisions on the use of a non-dedicated block of storage provide the opportunity to modify reservoir refill and release. These measures significantly enhance project flexibility which is needed to address the "failure" of specific operational measures.

In addition to enhanced project flexibility to address the efficacy of proposed measures, the phased project implementation is the ultimate acknowledgement of the possibility of failure. Rather than proceed with the full project, the Corps and Tacoma agreed to a phased approach where Phase II of the project is conditioned on the demonstration that environmental impacts can be sufficiently minimized and mitigated. This phased approach presents significant risk to municipal and industrial water supply project benefits, a risk that is conditioned on a demonstration of project "success".

T02-3 95% Survival is fallacious
We agree that providing successful passage through HHD is only one component of an

T02-3 Cont. anadromous salmonid restoration program. Our analysis of restoring salmon and steelhead to the Upper Watershed included a deterministic life cycle model that examined adult returns in light of assumptions regarding each phase in the life history of salmon and steelhead. (see Appendix F1, Section 8E: Incremental Analysis of Restoration and Mitigation Projects). Assuming the preferred fish passage facility is implemented, project survival rates (reservoir and dam passage) were 89% for coho, 87% for steelhead and 60% for chinook.

Upper Watershed Habitat Quality

We agree that habitat above HHD is degraded. An analysis of pool frequency of major western Washington rivers by the U. S. Geological Survey (Black and Silkey, 1998) suggests that pool frequency in the upper Green River basin is well below historical levels, but higher than pool frequency such as the Skykomish, Snoqualmie and Cedar Rivers. The majority of land in the upper watershed has been degraded by past timber harvest practices, but ongoing timber harvest is controlled by state and federal restrictions. Under the protection of Habitat Conservation Plans and FEMAT guidelines, stream habitat quality in the upper watershed is expected to improve as should restoration opportunities for all anadromous stocks.

Black, R.W., and M. Silkey. 1998. Water-quality assessment of the Puget Sound Basin, Washington, summary of stream biological data through 1995. Prepared by the U.S. Geological Survey. Water-Resources Investigations Report 97-4164. 78 p.

Production Potential Estimates

We recognized from the outset the limitations of habitat-based production estimates and would welcome current agency and tribal production estimates specific to the Upper Green River. As described in Section 2.A of Appendix F1, we used several different methods and data sources to derive our Green River production estimates, including production estimates for the upper Green River prepared by WDF, US Fish and Wildlife Service, and Bureau of Indian Affairs (D.Chapman, under contract) biologists. Since these estimates were not developed for assessment of self-sustainability of the Upper Green River Watershed, we noted the range of estimates and developed independent assessments. For instance, R. Gerke, a WDF biologist estimated the total adult return (pre-harvest) for the Upper Watershed was 48,700 salmon and steelhead, compared to our estimate of 24,900 adults. The primary difference between the two estimates was the number of coho adults produced in the Upper Watershed.

Improving passage through the Dam will be meaningless unless, the natural spawning habitat can produced significantly greater numbers of fish than are planted above the Dam currently. The passage facility might be swapping one mortality factor for another without a net gain in production. The Corps in the Green/Duwamish River Ecosystem Study writes in regard to the estimate of producing approximately 15,000 coho, 2,500 steelhead and 5,600 chinook above the HHD that:

T02-4

> *This estimate assumes that the habitat currently above the reservoir is in excellent shape and could support juvenile densities comparable to other relatively pristine systems. ....However, it is likely that any estimates of salmonid production in the upper watershed are optimistic and that actual production might be much lower. The rearing habitat for species such as coho appears to be particularly limited.*

There is insufficient information is presented in the EIS to determine if riparian and stream habitat will be fully mitigated. Indeed, the EIS admits the applicants are unsure of many of the impacts. Additionally, the DFR/DEIS appears to attempt to hold the possibility of "ecosystem restoration" under the auspices of the Green-Duwamish River Basin General Investigation Ecosystem Restoration Study Reconnaissance Phase hostage to the successful implementation of the HHD AWS. This statement is reinforced by statements regarding actions that will not occur unless the HHD AWS is implemented, such as gravel nourishment, actions that are being considered under the Ecosystem Restoration Study.

T02-5

Reading part of the DFR/DEIS is difficult because of the liberal use of the term "ecosystem restoration" and "project". Thus, it is difficult to separate "ecosystem restoration ' allegedly attributable to the HHD AWS project with the "ecosystem restoration" proposed by the US Army Corps, Green-Duwamish Ecosystem Restoration Project. Furthermore, the Green-Duwamish Ecosystem Restoration is also known as a "project". Therefore, when ecosystem restoration is being discussed in terms of the project, it is difficult to sort out what action might be associated with what project.

T02-3 Cont. Gerke, B. 1987. Counteroffer regarding mitigation for fishery losses due to the Green River Diversion Plan. Washington Department of Fisheries, Draft Letter to City of Tacoma.

T02-4 HHD fish passage is meaningless without Upper Watershed improvements
As described in Section 2.A of Appendix F1, and in response to T02-3, we used several different methods and data sources to derive our Green River production estimates. We believe our estimates are reasonable, but would welcome current agency and tribal production estimates specific to the Upper Green River.

Insufficient information to assess riparian/stream habitat mitigation needs.
The mitigation requirements for impacts to inundated forest and stream habitats under Phase I and II were developed based on standard mitigation assessment protocol. As described in Sections 3 and 4 of the DFR/DEIS and Sections 3 and 8 of the Appendix F1, we have identified impacts based on the areal extent of inundation and mitigated for those impacts by providing an equivalent areal extent of stream improvement. Beginning in 1999 and continuing into 2001, the MIT and other resource agencies will be involved in final design development of these mitigation measures during the plans and specifications phase (PED).

Will be holding GD "hostage" to successful implementation of HHD AWS.
If the HHD AWS does not proceed, various restoration opportunities identified as AWS mitigation and restoration measures will be available for implementation under the Green/Duwamish General Investigation Study (GI). Local sponsors are required to pay 50% of the planning cost, 35% of design and construction costs and 100% of post-construction operation and maintenance of restoration measures. The local sponsor's share of only construction of the proposed downstream fish passage facility is $11,900,000.00. Several of the AWS mitigation and restoration measures would probably be instituted under the Green/Duwamish GI study; however, we are unaware of a willing, local sponsor for the proposed downstream fish passage facility.

T02-5 Section 4 of the DFR/EIS describes the recommended project plan including the specific ecosystem restoration features attributed to the HHD AWS Project. The ecosystem features of the AWS Project were limited in their location and scope by being linked to original construction impacts or processes influenced by construction and operation of HHD. The Green-Duwamish Basin Restoration Feasibility Study is being conducted under the General Investigation Authority of Puget Sound and Adjacent Waters whereas the HHD AWS is conducted under Section 216, modification of an

T02-5 Cont. existing Corps project. The Green-Duwamish Study, under the General Investigation authority, places higher restoration priority in watersheds where there has been Corps influence and is not as limited in location and scope as the AWS Project. The term "project" is used for each and every Corps study or construction project. In this case, project is used in the DFR/DEIS to describe the HHD AWS "project".

SPECIFIC COMMENTS : DFR/DEIS:

T03-1

Many of the citations used in the DFR/DEIS narrative are secondary citations, rather than primary citations. Additionally, many statements presented as fact or well founded conclusions lack supporting citations. Though, Appendix F include some of the missing citations, each statement in the DFR/DEIS narrative should be properly cited. What is speculation, rather than fact supported by the literature should be clearly specified. Furthermore, given the uncertainty regarding the benefits of the project, each debatable or open to interpretation statement should be supported by citation. For example the following statements are presented as fact, but actual are speculation:

Page 139	While this habitat is degraded from pre-management conditions, it is still considered highest quality habitat or has much greater recovery potential than much of the Lower Green River stream habitat.
Page 16	In 1929, the State Department of Game ...
Page 17	No escapement goals have been established for the Upper Green.
Page 17	Of the seven original anadromous stocks ...
Page 249	... very few areas in the upper Green exceed 14" C, which is near the optimum range for growth of most life stages of salmon
Page 249	... upper basin stream habitat is generally in good condition with percent pools ranging from 28-73%.
Page 31	Initial releases of wild salmon ...
Page 50	.... they (MIT) were the one party not granting conditional acceptance to the project...
Page 61, 138	Of the remaining side channel habitat, the HHD AWS Project could seasonally dewater an additional 8.4 acres.
Page 81	The habitat above the dam is not pristine; it has also been degraded from timber harvest, but remains high quality in comparison to most of the Lower River.
Page 84	The Muckleshoot Tribe has not accepted the HHD AWS Project but is implicitly committed to the recommended facility through the FPTC acceptance.
Page 89	A brief evaluation of the hydraulic characteristics of the Upper Green River site [RM 60 to 57] showed that gravel placement there would be transitory and largely ineffective without incorporating retention structures.
Page 89, 250	This measure is estimated to maintain 400,000 ft^2 of spawning habitat in the Middle Green River over a 50-year period

T03-1 As noted, some of the excerpts from the Appendix F technical appendices were copied without the accompanying citations. We have included citations for the specific following comments where appropriate, or have noted where comments represent hypotheses rather than fact.

Page 139 - The statement regarding "habitat recovery potential" is debatable from a semantics viewpoint. While the lower watershed has a high theoretical recovery potential, we assumed that due to extensive flow management, urbanization and industrialization of the lower river, it would be difficult to effect significant restoration. The statement that the upper and middle Green River reaches have a higher recovery potential compared to downstream areas reflects this assumption.

Page 16 - The reference did not have the proper citation. The primary citation was a 1929, Anonymous letter report on the fisheries resources of the Green River from the Washington Department of Game. In describing the availability of steelhead habitat in the Green River basin the letter states "At least 90% of the spawning area and tributaries of the Green River system are above the City of Tacoma's Dam."

Page 17 - We provided salmon and steelhead spawner escapement and juvenile production estimates to MIT and WDFW for review in 1995 (see Section 2A of Appendix F1) and asked for review of our proposed estimates or alternate estimates. Other than a preliminary steelhead escapement estimate from Tom Cropp (WDFW, pers. comm. 1996) WDFW and MIT did not reply to our request. The production estimates and spawner escapements we developed were subsequently used in 1997 as part of a deterministic life cycle model in the incremental evaluation of the fish passage alternatives: Section 8 Appendix F1.

Page 17 - (Washington Department of Fisheries, Washington Department of Wildlife, and Western Washington Treaty Tribes. 1993. 1992 Washington State salmon and steelhead stock inventory, Olympia.)

Page 249 - At the time the DFR/DEIS was written, we had stream temperature data for many of the tributaries in the Upper Watershed from several organizations including 1) U.S. Forest Service; 2) Tacoma Public Utilities; 3) U.S. Fish and Wildlife; 4) Plum Creek Timber; and 5) U.S. Army Corps of Engineers. Except for the Sunday Creek Basin, and for drought conditions, stream temperatures were usually below 14C. As reported by Reiser and Bjornn (1979) the temperature range for chinook salmon spawning is 5.6-13.9 C, the range for incubation is 5.0-14.4 C, and the preferred range

T03-1 Cont. for juvenile rearing is 7.3-14.6 C (with 12.2 C an optimum). The preferred range for juvenile coho salmon rearing is 11.8-14.4 C.

Reiser, D.W., and Bjornn, T.C. 1979. Habitat requirements of anadromous salmonids, in Meehan, W.R., ed., Influence of forest and Rangeland Management on Anadromous Fish Habitat in the Western United States and Canada: Portland, Oregon, U.S. Forest Service General Technical Report PNW-96, unpaginated.

Page 249 - (Wunderlich, R. C. and C.M. Toal. 1992. Potential effects of inundating salmonid tributary habitat due to increased impoundment at Howard Hanson Dam. Western Washington Fishery Resource Office, Olympia, WA. *as cited in* : Appendix F, Section 3: Headwaters tributary stream habitat)

Page 31 - The assumed schedule for release of salmon into the upper watershed was based on completion of the upstream fish passage facility planned as mitigation for the Second Supply Project (Tacoma City Water. 1994. Final Supplemental Environmental Impact Statement for the Second Supply Project (Pipeline No. 5) City of Tacoma, Tacoma, Washington).

Page 50 - The statement contained a reference to a description of the Agency Resolution Process (Paragraph 3.1.2.3b). Shortly after the Agency Resolution Process, the City of Tacoma and the Corps received written, conditional letters of support from state and federal resource agencies involved in the process; a similar conditional letter of support was not received from the MIT.

Page 61, 138 - The citation in the statement on pg. 138 was cited as Appendix F, Section 6 in the DFR/DEIS; the correct citation is: Appendix F, Section 7: Side Channel Habitats in the Green River, Washington.

Page 81 - (Fuerstenberg, R.R., K. Nelson and R. Blomquist. 1997. Ecological conditions and limitations to salmonid diversity in the Green River, Washington, USA [Draft]. Surface Water Management Division, King County Department of Natural Resources, Seattle, Washington 32 p.)

Page 84 - Staff from the MIT have been involved in meetings of the FPTC to review the downstream fish passage facility and have not provided any written documentation indicating their rejection of the FPTC recommendation.

T03-1 Cont. Page 89 - (Appendix F, Section 4.B: Gravel Nourishment in the Middle and Upper Green River)

Page 89, 250 - Appendix F, Part 1, Section 8D: Habitat Restoration and Mitigation Project Descriptions, Part 3.1Gravel Bar Nourishment of the Middle Green River, pg. F1-524.)

Page 81 - The statement in the DFR/DEIS should have read:
"The reconnection of the upper river, through combined upstream fish passage by Tacoma and downstream passage by the Corps, is the greatest single measure available for restoring significant anadromous fish habitat to the Green River basin." Since the upper watershed contains more than 40% of the historic anadromous stream reaches, the value of the single measure of restoring access to this habitat is self-evident.

Page 205 - This statement is the Corps determination based on observation of habitat conditions within the reach and reports by WDFW regarding spawning densities and King County regarding gravel availability. Prior to 1997, spawner surveys had not been conducted for chinook or coho salmon in the gorge so information was not available on habitat use. The 1929 letter report from the Department of Game (see Comment-Reply T03 -1 - 3) noted that the gorge has "limited spawning area because of the extensive deep pools." Steelhead spawner surveys for 1994 to 1996 showed the gorge had the fewest number of redds per mile of any reach surveyed above Auburn (WDFW unpublished data). King County has documented a loss of suitable sized spawning gravels with resultant bed armoring from below HHD to the below Flaming Geyser State Park (Perkins 1993). This armoring layer is estimated to be advancing at 700 to 900 ft per year. Given that spawner surveys have not been conducted on an annual basis, the statement in the DFR/DEIS is considered a general observation. It may not be accurate for a specific species, but is an accurate general reflection of habitat availability.

T03-1 cont.

Page 81. The reconnection of the Upper River ... is the greatest single measures available for restoring significant fish runs to the Green River basins.

Page 205 WDFW spawning surveys show that chinook, coho and steelhead use parts of this sub-basin for spawning; however, this section contains more rearing habitat than spawning habitat.

T03-2

Pages 8, 29. The DFR/DEIS should acknowledge the potential conflict between anadromous fish protection and recreational releases.

T03-3

Page 8 and 28 - There are conflicting statements in the DFR/DEIS regarding flow requirements for salmon and steelhead. A statement on page 8 claims that it is unknown what flows are necessary for salmonids, then on page 28, the DFR/DEIS claims that an unreferenced study by MIT and DOE found that flows are inadequate to meet salmonid needs. See also last paragraph on Page 74.

T03-4

Page 9. Also 4.1.1, Page 116. The DFR/DEIS notes that instead of storing 5,000 ac-ft during drought estimated to occur one in five years on average *"recent negotiations have resulted in the change to yearly storage if the Additional water storage proceeds"*. These negotiations have not resulted in tribal concurrence on annual storage, except to agree that annual storage of 5,000 ac-ft could be an option pending improved understanding of trade-offs between steelhead incubation needs and other species and life stages, and actual runoff conditions in any given year.

T03-5

Page 9. The temperature analysis notes that at times the additional storage of water will be responsible for increasing water temperatures. Since there are already temperature violations above the dam (Smay and Gale Creeks on the 303(d) lists, which means that the state and PEA recognize that these temperature violations are due to human activity)' and at the inflow, the FEIS should state if the incremental water quality standard allow for additional temperature increases, regardless of the temperature downstream. Additionally, throughout the discussion of temperatures, average daily temperatures are typically used rather than maximum, thus underestimating the level and temporal duration of exceedances of state water quality standards.

T03-6

Pages 13, 182. Discussions under headings of Treaty Tribes Rights, Corps Trust Responsibility and Native American Relationships should provide adequate background and recognize federal obligations to protect treaty fish resources and the ability of the Tribe to exercise its fisheries. The FEIS should at a minimum include the following language:

> The Muckleshoot Indian Tribe is a federally recognized tribe located on the Muckleshoot Indian Reservation in King and Pierce Counties. MIT has rights under and is the successor to certain bands and tribes who were parties to the Treaty of Point Elliott (12 Stat. 927) and the Treaty of Medicine Creek (10 Stat. 1132). MIT holds federally guaranteed rights under the Treaty of Point Elliott, including fishing and hunting rights, in the Green/Duwamish River system. These rights were retained in exchange for lands ceded by the Tribe in the treaties and are considered

T03-2 We agree that in the past there have been conflicts between flow releases for recreation and instream flow needs for fishery resources. Under the HHD-AWSP, operating conditions have been proposed to limit potential conflicts. The proposed operating strategy is described in Section 4.2 Recommended Plan: Hydrologic Considerations. Under Phase I of the proposed project, refill timing and release rates will be based on target instream flows that will be adjusted yearly in response to weather conditions, snowpack, the amount of forecasted precipitation and biological input from fisheries resource managers. Proposed refill rules are designed to meet project objectives for protecting instream resources, meeting existing conservation storage requirements, and providing reliability for storing additional water for M&I and low flow augmentation. Rules to provide for recreational, community and other non-fishery resource needs are not included in the description of the proposed storage and release strategy. The proposed operating strategy involves the use of a non-dedicated block of storage. The non-dedicated storage can be directed for release or dedicated storage provided reservoir refill rule curves are satisfied for the original 22,400 ac-ft of low flow augmentation and storage of water available to Tacoma under the P5 water right. Decisions on the use of the non-dedicated block of stored water will consider consultations with fish and wildlife resource agencies. Non-fishery resource needs are not a designated downstream delivery objective; however, where those non-fishery resource needs do not conflict with fishery objectives, every attempt will be made to satisfy multiple uses.

T03-3 We find no apparent conflict that studies funded by Ecology (Caldwell and Hirshey 1989) and the MIT (Caldwell 1992) identify that existing Green River flows are inadequate to meet salmonid needs; yet, there is a "lack of available information on the flow requirements of all fish species" in the Green River. Flow management involves changes in the quantity, timing, duration and frequency of instream flows. Several years of pre-construction monitoring and up to 15 years of post-construction monitoring have been proposed to further identify instream flow needs and minimize project impacts.

Caldwell, B. and S. Hirschey. 1989. Green River fish habitat analysis using the Instream Flow Incremental Methodology. IFIM Technical Bulletin 89-35. Water Resources Program, Washington State Department of Ecology. Olympia, WA. 149 p.

Caldwell J. E. 1992. Green River IFIM study: further analysis. Jean E. Caldwell and Associates, Submitted to Muckleshoot Indian Tribe, Auburn, WA. 70 p.

T03-4 Comment noted.

T03-5 There is no description of water temperature analyses on pg. 9 as referenced in the MIT comment. The water temperature analysis described on pg. 123 and pg. 189 acknowledge that dam release temperatures may exceed inflow temperatures during droughts of extreme duration. While state water quality standards may be occasionally exceeded under proposed project operations, the frequency of temperature excursions will be much less than under existing conditions. As described in Appendix D and Section 4A of Appendix F1 (32 years of modeled temperature releases), the fish passage facility provides a surface discharge capacity. The availability of both surface and deep outlets allows warm and cool water to be blended to meet state temperature standards in most years. Blending of the available volume of cool water extends the period of time that the water temperature of dam releases can be less than inflow temperature.

The water quality analysis showed that the reservoir does tend to warm the river, though generally not above the state water quality standard of 16 °C. The analysis showed that this standard will occasionally be exceeded due to short-term, local hydrometeorological conditions. Due to the long residence time of water in the reservoir during the summer, occasional high inflow temperatures would be attenuated and the river downstream of the dam would be cooler than the inflow. Comparison of AWS Project outflow releases vs. existing project releases, there was an improvement in total degree days for 27 of 34 years. The range of daily water temperature improvement is 0.7-1.2 °C. However, as noted by Caldwell and Associates (1994), the water temperature of dam releases reach equilibrium with air temperatures within several miles of the dam. Water temperatures of the lower Green River are independent of the temperature of dam releases.

Daily average temperatures were used in the temperature analysis, because the proposed project would affect outflow rather than inflow temperatures. With the proposed selective withdrawal system, outflow temperatures in the spring and early summer would reflect the daily variation of inflow temperature as influenced by weather. Once the water in the reservoir is thermally stratified (usually by mid-summer), outflow temperature barely changes from hour to hour. Because outflow water temperature does not undergo diel fluctuation as the inflow temperature does, so hourly analysis is less useful. With no diel fluctuation, there are no higher maximum temperatures. Outflow temperatures are not underestimated, so exceedance of the state water quality standard are not underestimated. In 1995, MIT staff reviewed and accepted the temperature analysis, including the limitation of using average daily temperatures.

T03-6 cont. property rights. MIT has rights and responsibilities for the management of the fish and wildlife resources and other natural resources of the Green/Duwamish basin, including the protection of those resources from environmental degradation. While salmon and steelhead fishing remains the center of tribal culture, subsistence, and economy, fishing opportunity has been severely restricted in recent years due to low abundance.

T03-7 Page 14. Beginning in 1992, priority for refill timing and operations was shifted to protect lower river fish instead of passage of juvenile fish stocked above HHD. The FR/EIS should clarify that the Tribe considers overall existing project conditions, including the reservoir itself and refill operations, as an impediment to permanent recovery along with habitat loss basin-wide.

T03-8 Page 14. The statement "*tribal and state fish managers have the most direct impact on the number of adult fish that spawn in the river and ultimately could spawn above the dam*" suggests that treaty and sport fisheries should bear the mitigation burden for upriver restoration associated with the AWSP. Flood control, storage and diversion impacts have an equally direct impact on the number of returning fish. The DFR/DEIS implication to further restrict tribal fisheries as a way to provide salmon for the areas above the HHD upriver escapements is inappropriate and contrary to the trust responsibility of the federal government to the Tribe. The Tribe historically has restricted its fisheries for conservation purposes, including halting all fishing of Green River chinook for four consecutive years. The Tribe is not eager to give up its meager remaining fisheries to accommodate the impacts of still another least-cost water supply development within its fishing area. Furthermore, the FR/EIS should recognize that salmon originating in the Green River are caught outside of Elliot Bay by international and other U.S. sport and tribal fisheries. By one estimate, 28% of Green River chinook are harvested by Canadian fisheries alone. The Tribe has made major investments to reduce interceptions of Green River fish, including a successful decade-long intertribal allocation case in the federal court system.

T03-9 The narrative portion of the EIS typically overlooks the current and future impacts of the HHD upon the downstream transport of large woody debris. Sentences such as the following examples should be modified to include LWD impacts:

Page 16. *Specific factors that limit anadromous fish abundance in the Green River related to HHD are:*

Page 30. *Almost 50% of the watershed is above HHD and the dam traps a large amount of sediment.*

Page 159 *Other significant impacts to the river as a result of Howard Hanson Dam include 1)*

Page 207 *Dam and reservoir operations that effect flow releases and sediment transport ...*

T03-10 Page 17. ... *comanaged by the WDFW and the Muckleshoot and Suquamish Indian Tribes.* Amend to read: ... comanaged by the WDFW, the Muckleshoot Indian Tribe and the Suquamish Indian Tribe.

T03-6 By reference to this document, the following text provided by the MIT is included in the FEIS.

" The Muckleshoot Indian Tribe is a federally recognized tribe located on the Muckleshoot Indian reservation in King and Pierce Counties. MIT has rights under and is successor to certain bands and tribes who were parties to the Treaty of Point Elliot (12 Stat. 927) and the Treaty of Medicine Creek (10 Stat. 1132). MIT holds federally guaranteed rights under the Treaty of Point Elliot, including fishing and hunting rights, in the Green/Duwamish River system. These rights were retained in exchange for lands ceded by the Tribe in the treaties and are considered property rights. MIT has rights and responsibilities for the management of the fish and wildlife resources and other natural resources of the Green/Duwamish basin, including the protection of those resources from environmental degradation. While salmon and steelhead fishing remains the center of tribal culture, subsistence, and economy, fishing opportunity has been severely restricted in recent years due to low abundance."

T03-7 Comment noted. The proposed operating strategy has been designed to minimize project impacts. The adaptive management process included in the proposal allows adjustment of the refill and storage regime as we refine our knowledge of fishery resource needs in response to project operations.

T03-8 Flood control and water storage and diversion indirectly affect adult returns in the Green River by impacting salmon and steelhead reproduction and rearing. Harvest management directly affects adult returns. There was no intent to imply the level of responsibility for recovery efforts, but to acknowledge which party's actions most directly affect which portion of the salmon life cycle. In the DFR/DEIS, the Corps and Tacoma acknowledged the need to preserve tribal harvest opportunities and assumed an adult harvest level of 70% for coho, 35% for steelhead and 55% for fall chinook to be an inviolate component of the salmonid life cycle in the Green River.

T03-9 Comments noted.

T03-10 Comment noted.

T03-11 Page 18. In discussions of fisheries management, use of Green River chinook stock data older than twenty years is not recommended. Stock data collected further back in time, while it presents an interesting history, is not relevant because catch of Green River fish were not specifically accounted for and escapement was not assessed with a consistent methodology as in more recent years. Implementation of treaty fishing rights in the 1970's marks the beginning of a period characterized by greater accuracy and consistency in estimation of catch and escapement. With few exceptions, sport catch is still not accounted for specific to the Green River, even when it occurs in the terminal area. The terminal treaty net fishery is the only fishery reliably able to collect data for evaluation. This fishery has collected 1500 tags, and a large number of scales and otoliths for evaluation purposes. Current Green River chinook management is based on passing 5,800 chinook to the spawning grounds. The run is comprised of both hatchery and naturally spawning chinook. The numbers of chinook expected to return to the hatchery and to the spawning grounds are determined by respective pre-season estimates. The number of chinook available for harvest is calculated by applying the harvest rate appropriate to the natural component to the combined hatchery plus natural run size. Typically, several thousand hatchery fish in excess of the hatchery escapement goal of 3,500 fish return to the hatchery. While attempts have been made to estimate the natural component of the run independently during conduct of an annual test fishery, no effective or statistically valid method has resulted. Straying of hatchery fish into the natural escapement is known to occur and clearly accounts for some of the difficulty encountered in forecasting hatchery and natural run sizes. The extent of straying is unknown and is a critical element in making future determinations about the status of Green River chinook. The FEIS should be updated appropriately.

T03-12 Page 18. "*These harvest rates provide one more mortality factor influencing the number of adults returning to spawn that are required to maintain existing runs or that could be necessary for recovery and restoration of natural runs...*" The Corps' poor choice of words will tend to reinforce the unfounded, but wide spread belief that harvest and particularly the Muckleshoot terminal fishery, which is the bulk of the in-river fishery, takes most of the salmon produced in the Green River.

T03-13 Page 18. It is unclear if the statement means that 90% of the coho that entered the Green River were harvested, or that 90% of the 90% of the coho originating from the Green River were harvested.

T03-14 Page 18. It is unclear if the statement stating harvest rates in the Green/Duwamish River peaked in the 1980's refers to harvest rates for populations derived from the Green/Duwamish River peaked in the 1980's or that harvest rates in the river itself peaked in the 1980s.

T03-15 Page 18, 48. WDFW has adopted the Wild Salmonid Policy through its Fish and Wildlife Commission. The tribes have not adopted what is intended to be a joint policy. The last sentence should be updated accordingly.

T03-16 Page 19. : The Washington Forest Practices Act was **adopted** in 1972. The cumulative effects rule, which requires watershed analysis, or WAC 222-22, was adopted in 1992 and is part of the larger Act. Watershed analysis is a regulatory requirement. Watershed

T03-11 Thank you for the additional information. Harvest rates used in the life cycle analysis described in the DFR/DEIS were based on harvest data from the 1970's to present.

T03-12 See response to T03-8

T03-13 It was meant that 90% of the coho salmon originating from the Green River were harvested; harvest location was not specified.

T03-14 The statement refers to harvest rates for populations derived from the Green/Duwamish River peaked: harvest location was not specified.

T03-15 Comment noted.

T03-16 Comment noted.

T03-16 cont. *Analysis produces prescriptions tailored to specific Watershed Administrative Units* (WAUs), of which 5 are located in the project area. Watershed Analysis has been completed for only 1 WAU (Lester). Two more WAUs are still under review by the DNR. Two more WAUs are undergoing analyses at this time, however for these, the private landowners and TPU have failed to submit to the DNR proposed prescriptions to *protect public resources.*

T03-17 Page 19 *This Act prompted watershed owners to form a watershed analysis team that established specific forest practices rules for the Green River watershed.* This statement is incorrect. See previous comments concerning Watershed Analysis.

T03-18 Page 19 *The rules .... as well as provide guidance on riparian areas and identified sensitive areas, which are to be avoided by new road construction and during timber harvest.* There is no requirement under the current Forest Practices Act or Watershed Analysis to avoid road construction or timber harvest on unstable slopes or in riparian areas. The prescriptions allow road construction on unstable slopes following submission of an alternate plan. Furthermore, no WSA to date has produced riparian prescriptions that even approach that considered necessary to comply with the ESA. The Corps, though a landowner in areas covered by the ongoing Watershed Analyses, is not a regular participant at meetings that are preparing to propose prescriptions to protect existing salmon habitat and allow for the restoration of additional salmon habitat.

T03-19 Page 19. The 3rd paragraph should be corrected to reflect the following : In 1994, the NW Forest Plan was adopted by various federal agencies and created the concept of the Snoqualmie Pass Adaptive Management Area. This plan and its Record of Decision modified the Mt. Baker-Snoqualmie (MBS) Forest Plan. The Snoqualmie Pass Adaptive Management area has its own plan and was likely adopted as a modification to the revised MBS Forest Plan.

T03-20 Also, the DFR/DEIS is not current regarding the nature of the land exchanges. The land exchange with Weyerhaeuser is complete., occurring 5 months before the publication of the DFR/DEIS. Furthermore, the USFS is considering transferring much of the remaining Forest Service Land to the Plum Creek Timber Company. The impact of the Weyerhaeuser and PCTC land exchanges is that the bulk of the old-growth, mature and late seral timber left above HHD will be transferred to private entities that will harvest the timber and construct roads with considerable less environmental protections than those currently in effect on Forest Service lands. Federal lands enjoy a much greater levels of protection than private and state lands, yet even the standards of protection are federal land are not guaranteed to prevent a salmon run from being extirpated, let alone ensure harvestable numbers of salmon. Yet, now no-cut buffer widths that can exceed 200 feet could be reduced to as little as 30 feet. The old growth and late seral timber that will be harvest within a tree-height of the streams will reduce the rate of habitat recovery in the system and over the long term reduce the habitat quantity and hence salmon production. The extent to which the land exchanges will degrade the overall quality of salmon habitat above the dam and hence influence the salmon production estimates has not been quantified.

T03-17 A watershed landowner indicated that landowners had worked together to achieve certain prescriptions. This was inadvertently reflected as a "team" effort in the DFR/DEIS.

T03-18 This is simply a statement reflecting the intent of the State Forest Practices Regulations, as well as King County's Sensitive Areas Ordinance.

T03-19 Comment noted.

T03-20 The Weyerhaeuser land exchange is referenced in Section 1.6.6—your comment that this exchange is completed is appreciated. The Plum Creek Timber land exchange is discussed in Section 6.11. The Corps shares your concern that large timber will be cut as a result of these land exchanges and will no longer be available as habitat or LWD recruitment. Plum Creek's HCP, and other HCP's now in preparation, will implement wider buffers near streams and wetlands. Even without the possibility of improved habitat management under these HCP's, the effects on salmon habitat resulting from too narrow buffer widths would be impossible to quantify under our study authority. We recognize that such practices often result in negative effects on streams, particularly through sedimentation, reduction in LWD, loss of shading, higher water temperatures, reduction of stream productivity, loss of spawning gravels, loss of rearing habitat, and other effects. The restoration measures the Corps and Tacoma have jointly proposed will only be effective within the framework of improved habitat management regime implemented by all landowners in the watershed. We are aware that stronger habitat protection measures will be implemented in the near future and are counting on these measures to aid in salmonid recovery efforts.
See Comment-Reply T01-3.

T03-21 Page 34. The DFR/DEIS states that additional storage capacity is needed to augment flows in the summer and early fall for salmon and steelhead rearing, and that the Tribe has been a strong proponent of additional summer flows. However, the Tribe has voiced concerns about going beyond provisions to enhance summer/fall flows already made in the 1995 MIT-TPU Settlement Agreement in light of evidence that high spring flows are functionally important to salmon production.

T03-22 Page 37. Table 2-1 is missing several other applicable federal laws such as:

Secretarial Order 3206, American Indian Tribal Rights, Federal-Tribal Trust Responsibilities and the Endangered Species Act.

Executive Order 12898 *Environmental Justice*

Executive Order 13007 Indian Sacred Sites

Executive Order 11593 Protection and Enhancement of Cultural Environment

T03-23 Page 46. Despite refill strategies presented in the DFR/DEIS, we are concerned that adequate commitments have not been made to insure that the Phase I Preferred Alternative can meet the criteria "*water supply measures must avoid any overriding environmental problems*". Notwithstanding more cooperation and adaptive learning in recent years, reservoir operations involve conflicting objectives and often harm downstream fish resources. This problem is aggravated by a limited ability to forecast widely variable inflows and precipitation, and the fact that competing interests generally receive a higher priority than anadromous fish protection. The FR/EIS should specify what financial commitments will be made by each sponsor for improved staffing and forecasting and for reservoir operations, coordination, and streamflow management, and what commitments will be made to afford improved protection for anadromous fish including during times of water shortage.

T03-24 PAGe 48, 117 *Habitat restoration measures upstream of HHD are dependent on providing adequate fish passage through the dam.* This statement does not follow from an analysis of the project goals and definition of success, which is based upon a 95% survival rate through the HHD, rather than absolute numbers of juveniles that reach the Duwamish Estuary. As mortality through the dam is density independent, then the number of fish that pass through the dam will increase with the number of fish hatched or planted above the dam, even in the absence of a new juvenile outlet through the dam. The Corps has failed to provide compelling evidence that natural production above the Dam, when all mortalities are factored in, will result in more juvenile fish reaching the estuary than current management practices.

T03-25 Page 50. *Green-Duwamish River Ecosystem Restoration Team. A multi-agency panel participated in the formulation of habitat restoration measures with representatives from the USFW, USFS, MIT.* This sentence implies that the Tribe had greater involvement with the Restoration Team than occurred. The acknowledgment section in that report does not even list the Tribe as a major participant. The Muckleshoot Indian Tribe Fisheries Department (MITFD) was not granted the opportunity to review a draft copy of the Ecosystem Restoration Study and the MITFD's comments upon the incorporated King County document were not addressed by the Corps. Furthermore, the Tribe

T03-21 Comment noted.

T03-22 Items that pertain to the Corps of Engineers will be added to the table for environmental compliance in revised section 8. Secretarial Order 3206 only applies to the Interior Department agencies.

T03-23 Water Supply Impacts

As noted in the DFR/DEIS, Section 1.8 Without-Project Condition, Section 1.8.4: Municipal and Industrial Water Supply, the without-project condition assumes that Tacoma will construct Pipeline No. 5 and withdraw up to 100 cfs from the Green River at their Headworks facility on a run-of-river basis under their existing water right. The impacts of reducing flow in the Green River below Tacoma's Headworks by 100 cfs during the spring and early summer must be addressed through Tacoma's water right. The proposed project provides the opportunity to optimize springtime flow management to satisfy fisheries resource needs and municipal and industrial water supply and mediate much of the detrimental effects of the P5 water right on downstream fishery resources.

Competing Interests

See response to T03 - 2

Staffing Commitments

Provisions for continuous project operation during the spring refill and summer storage management period have been included in the proposed operations plan. As stated in Section 4.12 Recommended Plan, Operation and Maintenance:

> "For 3½ months from 15 February to 1 June, the high activity rate at the fish passage facility will require up to 11 additional personnel to operate the gates, stoplogs, and fish discharge equipment. Coordinating the main gates and the fish passage gate is sufficiently time consuming to require additional staffing. The additional staff will work three shifts per day, generally three persons per shift. The rate of pool fill during this period and the rate of outmigration requires operation through the night. The design team will examine controlling the pool fill so as to eliminate the third shift by preventing the need for nighttime stop log installations. The pool raise staffing equates to 5 FTE.

During the summer and fall months, stoplog changes will not be so frequent, and pool elevation can be managed to allow stoplog operation during the day shift. Personnel will be needed to remove the stoplogs, but will not be needed full time. Assuming that the outflow does not exceed 1,250 cfs, the fish passage gate will control the flow and the

T03-23 Cont. main gates will not be needed. Therefore flow control will not require staffing above current levels. However, three man crews will be required for the occasional stop log removal. Upland habitat maintenance will be scheduled for this time. The total staffing for these months equates to 3 FTE."

T03-24 We disagree. Under existing conditions, an estimated 5 to 25%of juvenile salmonids survive passage through the HHD project. Under Phase I, survival through the reservoir and dam is expected to increase to 60 to 89% depending on the species. The anticipated increase in project passage survival, improved downstream flow management and proposed restoration and mitigation efforts provide compelling evidence that more juvenile salmonids will reach the estuary than current management practices.

T03-25 The referenced Reconnaissance Report was the result of extensive consultations with the MIT, local governmental organizations and resource agency representatives. King County, the Green-Duwamish Restoration Project's local sponsor, and the USFWS, as the federal coordinating agency, were the only parties provided with the opportunity to review the Recon report. A Feasibility Study Report, which represents the next phase of the ecosystem restoration process, will be submitted for review and comment in the Fall of 1999. During that process, written and oral comments from the MIT will be addressed and given careful consideration in further plan development. We will be coordinating very closely with the MIT during the Feasibility Process.

T03-26 believes that the HHD is greatly responsible for the lack of large woody debris in the mainstem of the Green River below HHD, an issue not explicitly addressed in the Green-Duwamish River Basin Ecosystem Restoration Study. Aerial overflights of the river show considerably more large woody debris above the Dam than below. Given the constrained nature of the Green River gorge and the extensive levee systems below Newaukum Creek, the area above HHD represents over 50% of the potential large woody debris contribution to the downstream reaches.

T03-27 Page 55. Aquifer storage recovery of 20,000 ac-ft of Green River water in the Federal Way aquifers (*i.e.* the Oasis Project) has been proposed as a viable alternative to the AWSP. Engineering review has shown that this project has a high likelihood of success. This alternative should be discussed in the FEIS along with any technical analysis that indicates this alternative will not meet the water supply needs of the applicants.

T03-28 Page 57. The DFR/DEIS narrative lacks a citation for the estimated 1 million salmon and steelhead smolts that could produced from the upper Green. Though, some citations are in Appendix F, the FEIS should also include the citations as previously suggested.

T03-29 Page 58. Alternative 9B, Downstream Fish Passage at the Dam Without Water Supply, would result in the most successful ecosystem restoration short of dam removal,. because it would limit the downstream effects of storage upon salmon and maximize in-reservoir migration if accompanied by careful refill operations and a new outlet facility. In tandem with the potential Oasis alternative , it could meet screening criteria for both water supply and restoration.

T03-30 page 60... *not consistent with ecosystem restoration guidance or the Basin Restoration Project.* The section in the Basin Restoration Project supporting this statement should be clearly cited. Furthermore, there has been no official announcement that the Basin Restoration Plan is a document with which plans or proposals must be consistent.

T03-31 Page 60. Discussions that refer to permanent and temporary supplementation programs should recognize that temporary and possibly permanent supplementation is a concurrent mitigation component for TPU water development impacts under the 1995 MIT-TPU Settlement Agreement and such supplementation may be required to address shortfalls in the restoration goal of self-sustainability and harvestability. Because of the AWSP impacts of reduced lower river flows during spring and the estimated 36% mortality rate on juvenile chinook passing the existing reservoir, restoring fish runs above HHD on a self-sustaining basis is questionable. Harvestable, self-sustaining runs of chinook below the HHD may not be feasible given habitat limitations, including the 97% of estuarine habitat.

T03-32 Pages 61-62. It is unclear as to which Basin Analysis the DFR/DEIS is referring to in paragraph 2. The FEIS should quantify the amount of mitigation associated with the proposed habitat improvements, so that there is clear documentation that the improvements equal the extent of habitat impacts.

T03-33 Page 63. As written, it is unclear as to whether or not if fish will be stranded as part of the sub-impoundments in Alternative 11C1. It should be stated in the EIS narrative that

T03-26 We concur that much of the large woody debris input to the Green River has been blocked by construction and operation of HHD. As described in Appendix F, Section 8.D, Habitat Restoration and Mitigation Project Descriptions, Measure 4: MS-09 Truck and Haul of Large Woody Debris, the Corps is proposing to transport select pieces of large woody debris collected during annual reservoir debris removal operations for placement into the Green River below Tacoma's Headworks.

T03-27 In Section 2.6.6e of Appendix B, is a discussion of the proposed aquifer project in Federal Way (OASIS aquifer project). The unit cost of this alternative is similar to the cost of the "generic" alternative used to help quantify project benefits - so in effect, the OASIS project is included in the water supply benefit analysis of this project. Under the OASIS project water is more expensive than that proposed in the AWS project. In addition, the OASIS project does not provide for environmental restoration activities. No local sponsor has come forward for the single purpose restoration project, which incorporates a downstream fish passage facility.

T03-28 Comment noted.

T03-29 Construction of a new downstream fish passage facility at Howard Hanson Dam would not be available under Section 1135, the Water Resource Development Act of 1986 or Section 206, the Water Resource Development Act of 1996. Under those Acts, a non-federal sponsor is required to provide 25-35% of planning, design and construction costs, and 100% of all operation and maintenance costs. Not more than $5 million may be spent at a single locality.

Investigation of a new Section 216 Project would also require a local sponsor. The local sponsor would be required to pay 35% of the planning and design costs, 35% of construction costs and 100% of post-construction operation and maintenance. The local sponsor's share of only construction of the proposed fish passage facility is $11,900,000.00. A local sponsor for a single purpose restoration project providing the downstream fish passage facility proposed under the HHD AWS has not been identified.

T03-30 While it is true that there is no requirement for the project to be consistent with the Basin Restoration Plan, it does need to meet the project objective of restoring fish runs above HHD, *and* it is not consistent with ecosystem restoration guidance." See DFR/DEIS Section 3.2.4.12.

T03-31 We acknowledge that the Fish Restoration Facility, provided by the local

T03-31 Cont. sponsor as part of the 1995 City of Tacoma and Muckleshoot Indian Tribe Settlement Agreement, will have the capacity to supplement natural salmon and steelhead recruitment in the upper watershed. While we believe that supplementing recruitment is not an absolute requirement for restoring anadromous fish production in the upper watershed, supplementation may be beneficial in addressing temporary or long-term shortfalls in the restoration goal of self-sustaining runs and harvest. Deciding on the need, and the level and duration, of supplementation are not the responsibility or authority of the HHD AWS Project.

T03-32 The referenced "Basin Analysis" is the Green-Duwamish River Basin, General Investigation Ecosystem Restoration Study, Reconnaissance Phase.

T03-33 As presently envisioned, sub-impoundments will be designed to flood during high reservoir pool elevations and maintain surface water during reservoir drawdown. Juvenile salmonids that do not exit a sub-impoundment pool during reservoir drawdown may exit the sub-impoundment when the pool overflows during precipitation events. Additional detail on the design of sub-impoundments will be developed during the PED project phase. The potential for juvenile salmonid trapping during drawdown will be one design consideration.

T03-33 cont. the elevation of the culverts in relation to the impoundments will be placed and/or replaced to prevent juvenile fish stranding in these impoundments.

T03-34 Page 66. The DFR/DEIS is overly optimistic regarding the potential for the proposed ecosystem restoration to achieve healthy, naturally reproducing self-sustaining chinook and coho runs in the upper watershed. While the outlook for steelhead is considered promising due to their large size at outmigration and other factors, it is essentially bleak for chinook. The DFR/DEIS reports that studies in the existing reservoir have estimated a 35-40% reservoir and dam passage mortality rate for chinook. This mortality will be incurred by chinook prior to additional mortality incurred during the migration from above the HHD to the sites below the HHD from which chinook are currently released. The DFR/DEIS should discuss these limitations more specifically and emphasize that while self- sustainability may be a goal, the ability to achieve healthy, harvestable naturally spawning salmon runs without continual supplementation is highly uncertain.

T03-35 Page 68. It is not clear how the Preferred Alternative meets the criteria stated as *"Mitigation needs must be addressed prior to development of restoration projects, and meet the full mitigation requirement"*. We are not convinced that the daily flow model has identified and quantified all impacts and mitigation needs associated with the AWSP, nor that the Preferred Alternative can be implemented in a manner that avoids and/or minimizes impacts to downstream migrants and early rearing habitat in the upper or the lower river.

T03-36 Page 68. It is unclear why impacts to downstream migrant fish are incorporated in side channel mitigation proposal. The proposed side channel mitigation projects, which in the DFR/DEIS are limited to two large side channels at O'Grady and Metzler Parks, address mitigation for side channel disconnection. The FEIS should specify how the mitigation for side channel habitat disconnection will address impacts to the downstream migration of juvenile salmonids. The analyses of the proposed habitat mitigation measures is insufficient to determine if the probable and significant impacts of this proposal can and will be mitigated. Leaving till the permit review stage under the guise of adaptive management and future data collection, the determination of whether or not, the impacts of this project can be mitigated is unacceptable.

T03-37 Page 68. While the goal of self-sufficiency for steelhead justifies the selected fish passage alternative, self-sufficiency for chinook and coho is uncertain considering habitat limitations.

T03-38 Page 69. Refined planning criteria (b)(14) -This criteria fails to provide any assurances as to how higher project survival rates will be met.

T03-39 page 70. *"The Muckleshoot Indian Tribe was the on study partner who did not grant conditional acceptance. They remain neutral at this stage in the coordination project."*. This statement overlooks the that fact that the Tribe expressed grave concerns about the project.

T03-34 The influence of reservoir and dam passage and instream migration below HHD have been described in Appendix F, Section 8.E Incremental Analysis of Restoration and Mitigation Projects. Reasonable assumptions regarding various phases of the salmon and steelhead life-cycle have been incorporated into a deterministic model to evaluate project benefits. The potential benefits of supplementing salmonid recruitment in the upper watershed through the Fish Restoration Facility was identified in the DFR/DEIS in Section 3.1.3 Preliminary Alternatives Considered.

T03-35 We believe that the analyses of instream migration, steelhead spawning and incubation and side channel connectivity, as described in Appendix F, Part 1: Fish Mitigation and Restoration, have appropriately identified and quantified impacts and mitigation needs. Sufficiency of mitigation is addressed in Section 8: Mitigation and Restoration Plan Summary.

T03-36 As described in Appendix F, Section 5, Green River Salmon and Steelhead Migration, the analysis of Phase I conditions indicates that instream migration survival of chinook, coho, steelhead and sea-run cutthroat below HHD would improve by 2-3 % using the 32 year period of modeled daily flows (1964-1995). Instream migration survival of chum salmon would decrease less than 1% under the same flow record. Mitigation for the 0.35% decrease in chum survival is addressed by the opportunity to conduct releases of hatchery fry under a proposed freshet regime.

Between 1992 and 1996, an average of 732,000 chum fry were released into the Green River from hatcheries. During this period, hatchery-reared chum fry have been released into the Green River at an average flow of 1,473 cfs, measured at Auburn. Instream migration survival of chum fry released at 1,473 cfs is 63 percent according to the AWSP flow : survival function. Instream survival would increase to 88 percent if chum fry were released at flows of 2,500 cfs. The 24 percent increase in survival of 732,059 fry yields an increase in survival of 178,000 chum fry each year.

Assuming 4 million wild chum fry are produced in the Green River each year, the 0.35 percent decrease in instream migration survival under Phase I conditions would cause an estimated loss of 14,000 wild chum fry. The increase in survival of 178,000 hatchery-reared chum fry associated with hatchery releases at 2,500 cfs and the reduced duration of interaction with wild fry would offset the loss of wild chum fry under Phase I conditions.

Under Phase II conditions, instream migration survival of juvenile chinook, coho,

T03-36 Cont. steelhead and cutthroat would increase up to 1.8 %. Instream migration survival of chum salmon would decrease an estimated 4.76 percent under Phase II and corresponds to an estimated loss of wild chum production by 190,400 fry. The increase in survival of 178,000 hatchery-reared chum fry associated with hatchery releases at 2,500 cfs will partially offset wild chum fry losses, but additional mitigation would be required. Since chum salmon in the Green River heavily use side channel habitats, improvements in the quality of side channel habitats associated with side channel improvements are considered a buffer to the loss of wild chum fry. Sufficient mitigation is proposed under Phase II to fully offset anticipated impacts.

T03-37 We maintain that achieving self-sustaining runs of steelhead and coho appears promising with the proposed mitigation and restoration measures, and agree that there is greater uncertainty for chinook relative to the other species. The potential to restore anadromous fish production to the upper watershed justifies the selected fish passage alternative. Providing a potentially less successful downstream fish passage facility would severely constrain restoration opportunities. The proposed listing of chinook salmon in Puget Sound by NMFS underscores the potential benefits of extending the range of anadromous species to historic habitats.

T03-38 The quality of lower Green River and estuary habitats is reflected in survival estimates from Green River hatchery releases (see Appendix F Section 8.E Incremental Analysis of Restoration and Mitigation Projects). The marine survival estimates represent one stage in the life cycle model used to derive project benefits. Low survival estimates from Green River hatchery releases must be offset by higher project passage survival if self-sufficiency is to be attained.

T03-39 Comment noted.

T03-40 Page 73. Demand management measures listed in Alternative 4A failed to consider to include water rate reform as a tool to reinforce conservation behavior and efficiency investments. Meaningful rate reform would include increased consumption prices, lower fixed monthly charges and higher summer seasonal rates. Because of this omission, the water savings estimated for Alternative 4A are very minor, amounting to less than 2% of the present TPU peak season system demand.

T03-41 Page 74. It should be clarified that Alternative 7B , Mimic Natural Hydrology During Refill and Provide Low Flow Augmentation, is intended to address refill operations for M&I purposes as well as for low flow augmentation. Although the minimum baseflow targets of 575 to 900 cfs. offer improved instream protection compared to existing instream flow requirements, these targets are not guaranteed nor are they adequate to fully protect instream resources. For example, Green River Hatchery chinook smolt releases were found to have had higher survival to the Duwamish with increasing flow: only 40% survived at approximately 650 cfs. at Auburn, while survival rates of between 70 and 100% were observed at flows higher than 2,000 cfs. (Wetherall, J. A. *Estimation of survival rates for chinook salmon during their downstream migration in the Green River, WA.* PhD thesis, Univ. of Washington, 1971).

T03-42 Pages 73-74. Alternative 4 A- This section describes varies actions that TPU could take to lessen demand and conserve water; however, the DFR/DEIS fails to disclose whether or not TPU intends to pursue any or all of these actions.

T03-43 Page 74. Evaluation of water supply alternatives-The proposed economical analysis outlined in this section is incomplete. A better analysis would look also at the mitigation costs associated with HHD additional storage compared to the costs for the other viable water supply measures.

T03-44 Page 79. The discussion regarding scientific understanding of fish passage needs provides examples of failed fish passage facility "experiments" over the last 40 years. While outlet design has been improved, it is difficult to predict how the proposed fish passage facility will perform in combination with added storage. It is reasonable therefore to assume that restoration associated with the Preferred Alternative is equally experimental.

T03-45 page 85. *The restoration objective is consistent with state and federal requirements for ...and fits within the King County sponsored Green/Duwamish Ecosystem Restoration Study.* The project is not consistent with MIT requirements to restore salmon the quantity and quality of habitat in the Green River below the dams so as to increase salmon production. In order to achieve continuity with the federal final selection authority regarding criteria regarding acceptability of ecosystem restoration plans, the FR/EIS should specify what assurances will be made to insure that the ecosystem restoration plan is acceptable to the MIT tribal government as required in the criteria.

T03-46 page 93. *..to have no net loss of lower watershed habitat while maintaining existing anadromous salmonid populations.* This conflicts with Tribal goal to increase habitat below the HHD. It is unclear why the project will not attempt to significantly restore

T03-40 The quality of lower Green River and estuary habitats is reflected in survival estimates from Green River hatchery releases (see Appendix F Section 8.E Incremental Analysis of Restoration and Mitigation Projects). The marine survival estimates represent one stage in the life cycle model used to derive project benefits. Low survival estimates from Green River hatchery releases must be offset by higher project passage survival if self-sufficiency is to be attained.

T03-41 The opening sentence in Section 3.2.3.1 of the DFR/DEIS clearly identifies that refill for M&I purposes is a project objective. No change to the text is needed.

> "Alternative 7B was developed to meet or be consistent with three preliminary project objectives: 1) provide a regional M&I water supply..."

We agree that baseflow targets offer improved fishery resource protection compared to existing instream requirements. As described in Appendix F, Section 5: Green River Juvenile Salmon and Steelhead Migration, instream migration survival was evaluated using a daily flow model of the period 1964-1995 and a flow: survival relationship based on the Wetherall data. Under Phase I, changes to existing refill and storage operations provide clear improvement in instream migration survival for chinook, coho and steelhead.

T03-42 In Section 2.6.2e of Appendix B is a discussion of the conservation (demand management) measures that Tacoma has already undertaken and implemented. In Section 2.6.6b is a discussion of the conservation measures that Tacoma has evaluated and are available to be implemented as an alternative to the proposed project. Twelve of the most cost effective measures were included as part of the alternatives analysis to Howard Hanson Dam water supply and are included in the benefit evaluation. See table B2-10 of Appendix B for the unit cost of implementing these measures.

T03-43 The economic analysis of water supply for this project compares the avoided cost of not needing to implement the most cost-effective alternatives to HHD AWS (if these alternatives require mitigation, these costs are included) to the total separable water supply costs (i.e. costs identified as only occurring directly as a result of that project purpose). Separable water supply costs of HHD include all mitigation costs associated with water supply; so the economic analysis already does what you recommend in your comment.

T03-44 In recognition of past dam passage failures at other projects in the Pacific

T03-44 Cont. Northwest, the preferred alternative was selected after more than seven years of study by federal researchers and oversight by the Green River Fish Passage Technical Committee (FPTC). The objective of the FPTC was to develop a downstream fish passage plan that the committee was confident would provide successful passage of juvenile salmonids past HHD. The proposed alternative reflects the advice of the committee and satisfies 23 different design criteria developed by the committee.

T03-45 The Corps and Tacoma have been coordinating with the MIT and other resource agencies since project inception. Where the MIT have expressed concerns regarding potential project impacts, good faith efforts have been made to address those concerns. Additional studies have been commissioned to evaluate potential issues and in response to identified impacts, measures have been designed to avoid, minimize or mitigate those impacts. In response to significant concerns raised earlier in the planning process, and as a result of the Agency Resolution Process, a two-phased project approach was implemented. The phased approach incorporated an adaptive management process that conditioned Phase II of the project on the demonstration that impacts could be sufficiently minimized and mitigated. These efforts provide assurances of project acceptability.

T03-46 Downstream Habitat

In addition to the planning objective referenced by the MIT, other objectives listed in the same sentence identify restoration opportunities downstream of the project :

> "...to provide limited habitat restoration for selected ecosystem functions, processes, or structures in the Green River Basin; to have no net loss of lower watershed habitat while maintaining existing anadromous salmonid populations; to restore natural, self-sustaining runs of anadromous salmonids in the headwaters watershed; and to restore selected aquatic habitat limiting factors of the Lower watershed,..."

Growth

The Additional Water Storage (AWS) Project is proposed to provide for the expected growth of the region. However, since all M & I water available under Phase I of the project is part of Tacoma's second supply water right, which they expect to exercise even if the AWS project is not built, most of the growth in the region would take place with or without the AWS project. Population growth results in cumulative impacts and resource problems in all environmental arenas (not just to salmonids). However, since these effects are future effects, and cannot be accurately quantified, a detailed analysis is

T03-46 cont. habitat downstream of the dam or will not attempt to restore downstream anadromous populations. Indeed, the DFR/DEIS (page 81) states *the reduced habitat capacity and habitat quality in the Lower river adds to the uncertainty of restoring fish runs in the Upper River.* Additionally, the DFR/DEIS (page 274 and 275) refers to *additional growth due to water supply resulting in habitat loss and fragmentation.* The potential impacts of this additional development upon salmon production below the dam, and the nature and uncertainty of such growth upon the potential of restoring salmon runs above the dams needs to be evaluated in the FEIS and factored into total habitat and production gains.

T03-47 Page 89. Alternative 11B2 Gravel - On this page it is unclear if the 3,900 cu. yd. of gravel placement is a one-time or an annual activity that will occur over the 50 year project life. Furthermore, without an aggressive program to replace and grow LWD to assist gravel retention, it is unlikely that the full benefits of this mitigation measure will be achieved.

T03-48 page 93 *Planning objectives... to establishing healthy, naturally reproducing, self-sustaining runs of chinook and coho salmon and steelhead trout;...* . There is considerable reference in the document to "self-sustaining runs". However, this term, "self-sustaining runs" does not appear to be defined, except by allusion to total adult production. Unless, the definition includes the provision of sufficient number of salmon for the treaty guaranteed harvest, the planning objectives fail to meet the treaty obligations of the federal government and additional mitigation would be required.

T03-49 Page 96. Table 3-4. A note should be made for Section 1135 LFA to the effect that annual storage of 5,000 ac-ft is an option depending on adaptive management results, and that Phase II implementation is subject to consensus approval by the agencies and MIT.

T03-50 page 101, 117 *The mitigation amount was dependent on defining the riparian area, the definition was provided from the Tacoma Forest Land Management Plan.* The definition should be provided in the EIS and the definition of riparian should be based upon definitions used the WDFW and the NMFS. Furthermore, the riparian areas should be specified in terms of a typical width of land paralleling a stream. It is essential to mention widths in the narrative portion of the EIS, as well as the Appendix, because the TPU definition of riparian zone if used in context with the descriptions for the Natural, Conservation and Commercial zones. Otherwise, the definition in the EIS could imply that any land landward of a road or powerline right away could be presumed not to be riparian habitat, even if that land could contribute large woody debris to the stream. Additionally, buffer widths for riparian mitigation projects should be stated, both, in absolute widths and the increase in width , if any, over the existing TPU Forest Land Management Plan. For example, a proposed mitigation or restoration buffer of 150 feet is not mitigation or restoration if the current management plan already calls for a buffer of 150 feet. Much of the riparian mitigation proposed for this project, appears to seek salmon habitat mitigation credit for actions that the current TPU Forest Plan states are

T03-51 needed to maintain water quality and quantity Furthermore, an unquantified amount of land owned by Tacoma is committed by contract for timber harvest. The FEIS should

T03-46 cont. not possible. Qualitatively, we can predict that more roads will be built, as will houses and support services, such as strip malls, golf courses, play fields, churches, and schools. Terrestrial habitat will be lost, and aquatic habitats may be lost, and will certainly suffer impacts due to increased runoff and pollution from sedimentation, metals, toxic organics, and nutrients from human uses. At the same time, the AWS Project offers an opportunity to provide benefits to salmon through restoration of habitats and fish passage through and around Howard Hanson Dam.

T03-47 As described on pg. 89, gravel placement was assumed to be an annual commitment.

T03-48 The analysis of the potential to restore self-sustaining anadromous fish runs above the project is described in Appendix F, Section 8:Restoration and Mitigation Plan Summary, Part E: Incremental Analysis of Restoration and Mitigation Project. The final incremental analysis describes potential project benefits under various assumptions of reservoir and dam passage, instream and ocean survival and adult harvest. A 70% adult harvest level for coho, 35% for steelhead and 55% for fall chinook was assumed to be an inviolate component of the salmonid life cycle in the Green River.

T03-49 Comment noted.

T03-50 Tacoma's buffer widths for riparian areas were selected because Tacoma owns all of the land surrounding the reservoir and streams along which mitigation and restoration measures will be implemented. Thus, the state guidelines apply (i.e., Forest Practices Act), not Federal regulations, which apply only to Federally-owned lands: under ESA, National Marine Fisheries Service 300 ft buffer widths do not apply for lands above HHD as critical habitat for chinook salmon has been designated only below the dam. Tacoma's lands adjacent to the reservoir and Green River are all in the Natural Zone. Even though some streams pass through the Conservation and Commercial zones, Tacoma's Forest Land Management Plan (FLMP) calls for the same riparian buffer widths regardless of the zone (75 horizontal feet on each side of the stream (total 150') for Type 3 streams). In general, the mitigation and restoration sites protect more than what is provided in Tacoma's FLMP; for example, Site MS-08 includes stream buffers of 200 feet. With regard to claiming credit for utilizing Tacoma's FLMP, there is no guarantee that Tacoma would follow through with that plan. By committing Tacoma to this mitigation plan, it also commits Tacoma to use the FLMP. The difference between commitment and non-commitment allows crediting of Tacoma's FLMP riparian areas toward mitigation.

T03-51 Cont. | clearly state which, if any, restoration or mitigation proposals, involve TPU obligated for timber harvest.

T03-52 | page 101. *It is expected that the proposed fish passage rate will allow a 95% survival rate of juveniles migrating through it. This is the survival rate considered necessary to accomplish the goal of a self-sustaining run.* The EIS should stipulate what is the required survival rate from spawning to passage through the HHD to ensure self-sustaining harvestable numbers of fish. Healey in Pacific Salmon Life Histories (eds C. Groot and L. Margolis) suggests that under natural conditions, 30% or less of the chinook eggs deposited result in emergent fry, or fry and fingerling migrants in the systems studied. Indeed, the literature values reported for chinook salmon spawning success , yield mortality rates of 40 to 96% for egg to emergence and 80- 89% for egg to fry/smolt. The literature also notes hat fry mortality rates during early rearing and outmigration can reach 70-90%. The literature values reported for coho survival from eggs to emergence are 1-27% for average conditions, and 65-85% for very favourable conditions. Using mortality rates provided in the literature and the DFR/DEIS, for egg to fry emergence, early rearing survival, current and postulated dam and reservoir mortality rates there is a considerable range of overlap between the no-action alternative and the preferred alternative regarding the total number of juvenile salmonids that reach the TPU Diversion Dam, due the much greater number of fry produced by a given number of eggs in supplementation programs compared to natural settings.

T03-53 | page 106. *Mitigation and restoration projects were developed and selected based on ecosystem or biological needs first.* The supporting narrative to this statement assumes that the restoration goals of the Corps, other federal agencies and that consistency with King County are more important than the restoration goals of the Tribe.

T03-54 | page 106. *Restoration measures must address overriding environmental problems, in particular, identified and accept aquatic habitat limiting factors. .....Mitigation and restoration projects must be ecosystem function or process driven.* The supporting narrative to this statement assumes that the restoration goals of the Corps, other federal agencies and that consistency with King County are more important than the restoration goals of the Tribe, some of which are expressed in these comments.

page 117 *Mitigation Features: These projects include maintenance of stream-corridor habitat within the inundation pool (13.3 acres) and management of riparian forest to accelerate succession on major streams above the project (10.3 acres) for a total of 121.6 acres.* The practice of thinning trees as a tool of riparian enhancement reduces the short to mid-term large woody debris recruitment into streams. This is an impact for which mitigation is required. The proposed width of stream corridors should also be specified. No mitigation credit should be granted for buffer widths less than those stipulated in the TPU Forest Land Management Plan or the WDFW Wild Salmonid Policy, whichever is greater for a respective stream type.

T03-55 | page 117 *reserving riparian forests at a ratio* of 5 acres reserved to 1 acre impacts. See previous comments concerning riparian issues.

T03-56 | page 135, 271 *Predator Monitoring and Evaluation - If there is an increase in the overall abundance in response to outmigrating presence a selective predator removal program*

T03-51 According to Dick Ryan, Tacoma forester, none of the mitigation and restoration lands are located on lands scheduled by Tacoma for timber harvest.

T03-52 The analysis of the potential to restore self-sustaining anadromous fish runs above the project is described in Appendix F, Section 8:Restoration and Mitigation Plan Summary, Part E: Incremental Analysis of Restoration and Mitigation Project. The incremental analysis includes assumptions regarding percent survival values for various stages of the salmon life cycle. Percent survival from spawning to smolt stages are inherent in the juvenile salmonid potential estimates described in Appendix F, Section 2A: Production Potential of the Headwaters of the Green River Watershed.

T03-53 The EQ criteria were intended to address tribal economic and spiritual sustenance needs for fishing, hunting, gathering of native plant material, and access to the river, wetlands, and forests of the basin. In some cases, tribal interests were not explicitly identified but were addressed by underlying assumptions. For instance, a level of tribal harvest of the Green River fishery was assumed to be an inviolate component of the process of meeting the goal of self-sustaining fish runs.

T03-54 Disagree—the type of thinning to be done in the riparian areas will only remove small trees to reduce stem density and create openings to encourage stronger shrub growth; in addition, the trees that are removed will be placed in piles in forested and wetland areas. We believe the riparian habitat will be improved through these measures and do not require mitigation.

T03-55 Replacement at a 5:1 ratio implies that the Corps partially agrees that mitigation with lands already protected does not allow 1:1 replacement. Thus, the implementation of prescriptions is intended to provide some mitigation. We feel that 5:1 (5 acres replaced for each acre impacted) is a reasonable ratio.

T03-56 The specific design of a predator monitoring program, and process for selective removal if deemed appropriate, will be developed in the PED phase of the project.

T03-56 cont. *can be initiated. The predator removal program must be coordinated through the City of Tacoma, and cooperating resource agencies.* The proposed mitigation measure is speculative and TPU appears to have the power to veto such removal. Furthermore, predation can be increased without an increase in the overall abundance of predators. The monitoring plan must be able to determine if there has been an absolute increase predation without an increase in predator number.

T03-57 Page 139. The section regarding riparian and stream improvements quantifies the acreage amount of stream and riparian habitat lost due to additional storage. However, it fails to quantify the type of habitat loss by examining existing stand conditions. If the inundated sites have mature forest conditions with large conifer trees and the proposal is to place wood of a smaller diameter and length, then there are additional impacts that should be mitigated.

T03-58 page 139 *Site MS-02 Green River- Partial mitigation for riparian areas would be accomplished by 1) retention of existing trees along the riparian zones* ....This land is most likely within the Natural zone according to the definitions in the TPU Forest Land Management Plan and hence is not typically subject to harvest except major or minor to timber practices to improve water quality, water quantity or wildlife habitat. See other comments concerning buffers.

T03-59 page 139. *While this habitat [tributary stream above HHD] is degraded from pre-management conditions, it is still considered highest quality habitat or has much greater recovery potential than much of the Lower Green River stream habitat.* See other comments addressing this issue.

T03-60 page 140 *Site MS-08 The mitigation area on the mainstem Green includes stream buffers of 200 feet and protects a total riparian areas of 400 acres.* See other comments regarding buffers.

T03-61 page 140. *Site MS-02* 140 *Site TR-01: Lower Bear Creek- This project will improve the stream channel by adding boulder or logs and includes limited excavation to recreate meanders or backwater habitat.* The number of logs to be added over the 3,000 feet of the project should be specified in the narrative portion of the EIS, as well as Appendix F. Additionally, the MITFD does not believe that adding boulders is mitigation for project impacts. Appendix F appears to suggest that more boulders will be added to the tributary streams, than LWD. The history of timber harvest has substantially increased the relative quantity of large boulders, while diminishing habitat formed by wood. Additionally, the value of boulders to providing high flow refuge habitat declines with increasing flow, while that provided by LWD increased to a threshold flow.

T03-62 page 140. *Stream Habitat - Above Reservoir.* See other comments concerning mitigation.

T03-63 page 141 *Site TR-09 .. 2) placement of one cluster of keystone logs in the North Fork channel* and page 141. *MS-08... addition of large keystone trees (60 feet or greater, 4-foot-diameter rootwad) attached) at one 2-3 tree cluster/half mile of mainstem* Both projects involve placement of wood quantities well below Watershed Analysis standards for key pieces of LWD.

T03-57 Mature evergreen trees represent a small proportion of loss of riparian forest, we maintain that the proposed riparian and stream improvements fully mitigate the impacts of increased inundation. Existing stands will not be "lost", though they will be inundated and die. They will not be cut, and will remain as snags and stems in the water to provide habitat for smolts. Immediately upslope from the inundation zone will remain a forested zone consisting of trees equally large as those that will be inundated; further, mitigation and restoration targets enhancement of riparian areas as well as upland forests, that focuses on producing larger trees. Thus, existing stands will not be replaced with smaller wood.

T03-58 Agree—this land is in Tacoma's Natural Zone, and not typically subject to cutting. However, as noted in our response to comment T03-50, there is no guarantee that Tacoma would follow through with its management scenario. Thus, some mitigation credit is claimed for this measure.

T03-59 See response to T03-1-1

T03-60 See response to T03-50.

T03-61 As described in Appendix H, Section 8E, Table 8: Project Scope for Riparian and Stream Habitat Projects..., measure TR-01 involves placement of 60 boulders and 150 logs. Siting of the boulder and log placement, and the proportion of logs to boulders actually placed in the stream, will be developed during the PED phase.

T03-62 See response to T03-61.

T03-63 The proposed addition of logs to serve as instream structure is intended to supplement existing levels of instream large woody debris.

T03-64 page 142. *TR-10 Headwater Culvert Replacement.* The provision of fish passage is a requirement of state law, hence no mitigation credit should be granted for complying with a law which mandates that passage be provided whether the HHD AWS Project is built or not.

T03-65 page 146 *Environmental Restoration Features The objective of this measure is to address impacts from the original construction and operation of HHD.* The DFR/DEIS narrative however, does not consider all impacts caused by the construction and operation of the dam. The DFR/DEIS (page 47) relies upon the Green/Duwamish River Basin Ecosystem Restoration Study and states *"Basin analysis and interagency scoping has identified six aquatic habit-limiting factors or restoration issues that the HHD AWS can address".* However, the DFR/DEIS (page 62) recognizes that the HHD traps LWD that would otherwise provide a variety of downstream biological and hydrologic functions. The NMFS also takes this position in regard to dams.

T03-66 Page 147, 250. *Gravel Placement Gravel nourishment was identified as a necessary feature to maintain mainstem spawning habitat in the Lower Green River. ... The gravel will maintain an increment of existing spawning habitat in the Middle Green River and could help maintain and proposed side channel habitat mitigation projects. ... Because of the reduction in peak flows (with decreased sediment transport ability), gravel nourishment in the Flaming Geyser area is limited and will not equal the annual transport rate for the river (estimated range 3,900 - 11,700 cu yd3/year). The replacement value for this project is approximately 50% of the median estimated loss of sediment.* The term increment should be defined. It is unclear how one of the project goals to maintain downstream habitat will be realized if the inflow of gravel is half the loss. Indeed the quantity of gravel selected was not based upon ecological or salmon habitat considerations, but instead (page 89, 250) *the least cost level, 3,900 yd3, was selected as a final restoration measures.* Furthermore, the DFR/DEIS statements conflict with Tribe's goal to see a significant increase the quantity and quality of spawning habitat below the dams. Additionally, the FEIS should stipulated that it is important to spread the gravel out in the system to account for the 30 years of gravel deprivation.

T03-67 Page 159. - The risk assessment referred to in the 3rd paragraph can be found within Washington's Dept. of Fish and Wildlife's DFR/DEIS for the Wild Salmonid Policy. This is not a National Marine Fisheries Service document as suggested here.

T03-68 Page 171 *Table 5-1* There is no reference to the signing of the Treaties with Muckleshoot Tribe.

T03-69 Page 189 *inflows to the Project above 60°F degrees occur in most years* and on page 191 that *water temperatures above 60° F are limiting for cool water adapted fish such as salmon and steelhead.* This is an admission that the summer and early fall rearing value of the mainstem is compromised by temperatures. Furthermore, the DFR/DEIS EIS (page 249) contends that *"very few areas in the Upper Green exceed 14°C".* However, MITFD monitoring of streams has noted that following streams have been observed to exceed 16°C (60°F): Green, Sunday, Intake, Charlie, Tacoma, Friday, Cougar and Sylvester. Furthermore, two upper watershed streams are on the Washington 303(d) list

T03-64 This is a federal action, as such, the Corps development of mitigation alternatives is not bound by state requirements for culvert replacement. Even if state law applied, there is nothing that would prevent counting credit for the AWS project mitigation along with credit for whatever landowner was required to provide culvert replacement on the improved stream. This is especially true considering that we are replacing existing culverts for the purpose of providing improved fish passage through the culverts (i.e., restoration of degraded habitat). Finally, since the Corps is funding, designing, and performing the work (and not the landowners in most cases), credit should accrue to the Corps.

T03-65 We concur that much of the large woody debris input to the Green River has been blocked by construction and operation of HHD. As described in Appendix F, Section 8.D, Habitat Restoration and Mitigation Project Descriptions, Measure 4: MS-09 Truck and Haul of Large Woody Debris, the Corps is proposing to transport select pieces of large woody debris collected during annual reservoir debris removal operations for placement into the Green River below Tacoma's Headworks.

Categorization of this process could be considered to fit under the stream habitat factor of the six factors/issues we identified under restoration issues that the AWS Project could address. The Green Duwamish Basin Study classified LWD reduced loading as falling under the limiting factor of -- loss of channel complexity and instream structure. Be assured that recruitment of LWD is included under the stream habitat issue of paragraph c.(1) on page 47.

T03-66 As noted, the proposed level of gravel nourishment is intended to maintain "an increment" of existing spawning habitat in the Middle Green River. The objective of gravel nourishment is to slow or stop the downstream extension of streambed armoring and replenish certain areas presently deficient of spawning-sized sediments. The extent to which gravel nourishment successfully stops continued streambed armoring will be identified through monitoring and evaluation. A major concern of adding gravel-sized sediments to the Middle Green River is the potential effect on flood control measures in the lower river. As described in Appendix F, Section 4B Gravel Nourishment in the Middle and Upper Green River, a monitoring plan is proposed to track the travel distance, redistribution and deposition of the added gravel to minimize the risk of major downstream ramifications. Annual gravel placement would be reduced or halted if monitoring identifies problematic aggradation.

As a restoration measure, the maximum rate of gravel nourishment is capped by

T03-66 Cont. financial constraints. If problematic gravel aggradation in the lower river is identified, the rate may be reduced. If monitoring identifies the value of an increased rate of gravel nourishment, funds for additional gravel must come from other sources. The Green/Duwamish River Basin Ecosystem Restoration Study sponsored by the Corps and King County is one possible source for additional funding.

T03-67 Comment noted.

T03-68 Comment acknowledged. Table 5-1 is revised in this document to acknowledge Muckleshoot treaties with the United States. See updated table on next page.

T03-69 We concur with your comment that the mainstem river (as valuable salmon and steelhead spawning and rearing habitat) in the Middle and Lower Green River may be compromised because of high water temperatures. In fact, mainstem river temperatures in the Middle Green River (RM 35) exceed the state water quality standard (18 C) in virtually every year: in 75% of the years of record (1964-84, 1992) temperatures exceeded the range of avoidance for salmon and steelhead (21 C) for one or more days (Section 4A Appendix F).

As noted in the DFR/DEIS, reservoir inflow (Upper Watershed) temperatures are generally lower than 60°F (16 C), however short-term periods of higher temperatures occur in most years. Even though the Upper Watershed has areas (within selected years) that exceed the AA water quality stream temperature requirement (16 C), stream temperatures are mostly within the preferred range for salmon spawning and rearing habitat. Also, the Upper Watershed has a greater potential for recovery of the riparian systems that provide necessary stream shading unlike much of the Lower Watershed. See comment T03 - 5 for further discussion of stream temperatures and salmon and steelhead habitat in the Upper Watershed.

TABLE 5-1. CHRONOLOGY OF EVENTS IN THE GREEN-DUWAMISH RIVER BASIN BETWEEN 1850-1997

DATE	EVENT	RESULT
1850	Oregon Donation Land Act	Land granted to settlers after 5 years homesteading
1851	First Euro-American settlers arrive in the Duwamish area	Land clearing begins - three claims filed
1852	Livestock introduced into Green River valley	Grazing begins on land
1853	Extension of Land Act through 1855	Seventeen claims filed along the river
1854	First road built in King County	Road built through the river valley
1854-55	Medicine Creek Treaty/Point Elliott Treaty	Created Muckleshoot Indian Reservation and former tribal lands ceded to U.S.
1855-58	Removal of debris from river for navigational purposes.	Elimination of LWD habitat
1855-56	Indian Wars	Settlers move to Seattle for protection - settlement slows
1856	Land clearing resumes	Duwamish area gardens planted, orchards established, timber cutting begins
1858	Drainage Laws	County passes laws permitting ditches for drainage, swamp land drainage begins
1862	Homestead Act	Settlement of territory encouraged
1866	Population of valley starts to grow in earnest	Displacement of Native Americans
1867	First railroad bridge built across Black River	Local railroad construction begins in DGB
1870	277 settlers living in valley	Displacement of Native Americans
1870s	Major railroads build lines	Pace of logging increases in Green/Duwamish River watershed
1875	Channel Improvement Act	County road funds used for improvement of rivers
1880-1910	Extensive logging occurs in the watershed	Extensive road and railroad construction
1883	RR bridge built across White River	Northern Pacific Railroad constructs east/west line through Green River valley
1893	Great Northern Railroad develops lines in north/south direction in valley	Increases population of basin
1895	Drainage District Act	County Drainage Districts formed
1895	Duwamish East Waterway construction begins	East Duwamish Waterway dredged and used for Harbor Island fill
1902	Green River Hatchery	State operated Green River Hatchery opens on Soos Creek
1901-04	Hydraulic sluicing of Beacon Hill	Fill placed in the intertidal area of the Duwamish River to raise land and decrease flooding potential

DATE	EVENT	RESULT
1906	Major flooding in rivers during fall and winter	Log jam on lower White River forces flood water into the Puyallup River
1902-27	Interurban Electric railway	Interurban rail eclipses riverboat travel
1910	Tacoma Water Diversion authorized	City of Tacoma Green River Diversion Dam construction is begun for municipal water
1911	White River Diversion	White River completely diverted to Puyallup River to reduce flooding problems
1913	Tacoma Water Diversion completed	Water diverted from Green River, complete blockage to upstream migration of fish
1916	Black and Cedar Rivers diverted from Green/Duwamish River	Ship Canal cut to Lake Union draining Lake Washington to Puget Sound. Reduced flooding in Green/Duwamish Basin
1917	East/West Duwamish Waterways finished	Dredging of channel completed, 2.2 square miles of Duwamish intertidal area filled, flooding reduced
1919	Private and county levees built to protect lowlands from flooding	Encouraged more productive agricultural use
1931	Installation of first stream gauge at Palmer	Begin to acquire river flow data
1959	One of the largest floods on record (28,000 cfs at Auburn)	Significant property damage
1960s	Extensive levee building by local and federal government	Channelization of the river
1963	Howard Hanson Dam completed	Reduces maximum flow of Green River to 12,000 cfs at Auburn to reduce flooding
1977	Tacoma completed their North Fork Valley well fields	Allows Tacoma to provide water during periods of high turbidity or low flows in the river
1980	Washington State Department of Ecology establishes instream flows at Palmer and Auburn	All but eliminates any future river diversions during periods of low flows
1995	Tacoma and Muckleshoot Agreement for future off-stream or diversions and instream flows	Further protection of fisheries resources during low flow periods
1996	Corps completes a Section 1135 Environmental Assessment for additional water supply at HHD for low flow augmentation	Further protection of fisheries resources during low flow periods
1997	Corps completes the Reconnaissance Report for the Green-Duwmaish Ecosystem Restoration Study and begins Feasibility Phase	Proposed project has restoration features that complement the HHD AWS Project

T03-69 Cont. for temperature impairment. The extent to which this has been factored into the Corps' estimate of salmon production is unknown.

T03-70 Page 193 *Timber harvest has resulted in the predominance of second-growth .... The oldest stands are 60 to 80 years olds.* The young age of the trees along most of the riparian corridors above the HHD has a direct influence upon the rate of large woody debris input in the stream and the size of the LWD recruited, hence pool formation and gravel storage. Given that large scale recruitment of suitably sized large woody debris will not occur for many decades in the bulk of the harvested areas and that LWD is declining due to flushing and decay, the habitat quality will continue to decline for many years. The extent to which the proposed mitigation and restoration measures will compensate for the overall decline in habitat over the next few decades is unknown. Hence, any statements regarding salmon production over the next few decades are speculative. To achieve the DFR/DEIS salmon production goals, habitat above HHD will require a much greater degree of habitat protection than currently in place.

T03-71 Page 201 *Substrates in the project are generally unstable in relation to biological value. Substrate stability is affected by changes in pool elevation and bedload shifts during periods of high flows.* These impacts will now occur in the new inundation area and adjacent areas.. The extent to which this has been considered in the estimate of salmon production is suspect.

T03-72 Page 203 *Federal, state, and tribal agencies manage Green River fisheries and fish habitat with cooperation from the Corps.* Though, the Corps is involved with the management of habitat, the Corps in not involved with fisheries management, which is the management of harvest.

T03-73 Page 203. Competitive and predatory interactions between resident and anadromous fish in the upper watershed, including in the 3-mile reach between the TPU diversion and the HHD, may significantly influence the success of restoration efforts. The FEIS should include a discussion of the potential impacts of the large and established resident salmonid population upon juvenile anadromous survival.

T03-74 Page 204. Summer and winter steelhead are actually reared at Palmer on the Green River. Steelhead fry planted in the upper watershed are native Green River stock. Except for chum and steelhead, all hatchery stocks were native Green River origin. Steelhead and chinook have been managed for natural escapement for the last two decades, while coho continue to be managed for hatchery fish.

T03-75 Page 204. This section does not clearly acknowledge the Keta Creek Hatchery, operated by the MIT, nor the adjacent rearing ponds that the tribe maintains and operates for the state.

T03-76 Page 204 There is no evidence that hatchery practices in the Green River have reduced the fitness of the chinook or coho.

T03-77 Page 205 *WDFW spawning surveys (1987-1993) shows this sub-basin supports the highest density of natural spawning activity by anadromous salmonids (as indicated by*

T03-70 We agree that improved habitat protection in the watershed will be increasingly important to the fate of salmonids. We believe that through the eventual completion of HCP's, as well as USFS management plans, that stream buffers and forest land management will in fact be more responsive to fish and wildlife habitat needs (see response to comment T01-3). We share your concern that the young age of the stands is not conducive to recruiting larger sized woody debris necessary to create the larger, deeper pools found along streams and rivers within more mature riparian forests. This perspective led to the development of the three aspects for fish mitigation projects along the larger tributaries above HHD including 1) forests along these larger tributaries would be permanently set-aside as riparian reserves using the buffer widths in the Tacoma Forest Land Management Plan; 2) riparian areas would be selectively thinned to accelerate the succession of these younger, smaller, even aged stands; and 3) along the mainstem Green River, large, keystone trees (minimum 4 ft diameter, 40 ft length or greater) in groups of three or greater could be placed in the river at intervals to act as anchor points to collect these younger age trees.

T03-71 Substrate instability in the inundation area were considered in developing smolt production potential estimates. Production potential estimates for the upper watershed, including the new inundation area, are described in Appendix F, Section 2A: Production Potential of the Headwaters of the Green River Watershed. Production potential estimates for coho include limited production from inundated lengths of stream and a smolt density per hectare of surface area from Beechie et al. (1994). Steelhead and chinook production potential estimates assumed 25% production from stream lengths partially inundated during the summer (Elev. 1141 to 1177 ft) and 10% production from stream reaches inundated for most of the summer (Elev. 1035 to 1141 ft).

T03-72 Comment noted.

T03-73 The design of a predator monitoring program, and process for selective removal if deemed appropriate, will be developed in the PED phase of the project. Although not specifically identified in the DFR/DEIS test, the 3-mile reach between Tacoma's Headworks and HHD would be included in the predator monitoring program since it represents the return location for the downstream fish passage bypass.

T03-74 Thank you for the additional information. We understand that NMFS, as part of their ESA review process, and in cooperation with the MIT, are reviewing the origin and status of anadromous fish stocks in the Green River.

T03-75 Comment noted. The Keta Creek Hatchery, operated by the Muckleshoot Indian Tribe, and the adjacent rearing ponds that the tribe maintains and operates for the state are referenced on pg. 205.

T03-76 Comment noted.

T03-77 Prior to 1997, the reach between RM 33.8 to 46.5 has supported the highest number of spawning salmon. Shorter segments of the river have had higher densities during specific years. We have not had the opportunity to compare MIT 1997 surveys vs. earlier years.

T03-77 Cont. | *redd counts).* It is unclear if the term density means overall numbers, or number of redds per mile of stream channel.

T03-78 | Page 205 *WDFW spawning surveys show that chinook, coho and steelhead use parts of this sub-basin for spawning; however, this section [RM 46.5 to 61.0] contains more rearing habitat than spawning habitat.* MITFD helicopter surveys from RM 45 to 61 and float surveys from RM 61 to 56 for spawning chinook found high densities of chinook spawning. Recent, helicopter surveys show a considerable quantity of spawning occurs in the Green River Gorge (MITFD, unpub. data).

T03-79 | Page 206 ... *serves as a corridor...* The area also provide rearing habitat for juvenile salmonids.

T03-80 | Page 206. 1st paragraph- Very few chinook spawn in this river reach (RM 11-20) due to poor spawning substrate. Indeed, this reach is no longer consistently surveyed by the State or the Tribe due to the lack of spawning. This section of the EIS will need to be changed to actually reflect where chinook spawn based upon actual redd counts, not upon literature review.

T03-81 | Page 207. paragraph 3, 1st sentence, WDFW and the Treaty tribes evaluated stock status in the Green River. Amend to read, WDFW, the Suquamish Indian Tribe and the Muckleshoot Indian Tribe.

T03-82 | Page 207. Though chinook salmon were collected for GSI work in 1997 as part of a cooperative effort between the WDFW and the MIT, the FEIS should include the results of the GSI analysis, if the analysis has been completed. If the analysis has not been completed, the FEIS should so state.

T03-83 | Page 209. Table 6.1- The DFR/DEIS suggest that 9000 fish above Howard Hanson dam will be released. It is unclear how this number was derived and where these fish will come from. This table also suggests that large woody debris will be transported through the dam which is inconsistent with some of the other statements about large woody debris transport. It is unclear as to how the project will *subside* initial sliding events that affect long term turbidity levels. Also in Table 6.1- The DFR/DEIS fails to consider that potential impact to aquatic resources and water quality that may occur from chemical "fertilization impacts to localized areas".

T03-84 | Page 211. Chinook are assigned a "moderate chance" of becoming self-sustaining in Phase I. It is difficult to see how this conclusion is justified or conceivable given the low migration survival rate through the reservoir and dam.

T03-85 | Page 211, 215 state that chum and sockeye salmon did not historically exists in the project area. However, the US Army Corps of Engineers Green/Duwamish River Basin Ecosystem Restoration Study, pages 26 and 27, states that chum and sockeye salmon historically were found in the project area

T03-86 | Page 212. It is unclear in the DFR/DEIS at to how the 1 acre of side channel mitigation will offset the impacts of flooding 5.9 acres of stream habitat and 11.6 acres of riparian habitat.

T03-78 Comment noted.

T03-79 Comment noted.

T03-80 We believe describing the distribution of spawning chinook salmon based on literature review is appropriate for the objective of this section of the document: a general description of Green River fisheries resources by reach.

T03-81 By reference to this document, the following text provided by the MIT is included in the FEIS.
"The WDFW, the Suquamish Indian Tribe and the Muckleshoot Indian Tribe completed a stock status report in 1993, and at that time, concluded the Green River stock of chinook salmon were healthy; determination under the Endangered Species Act may be different."

T03-82 As of July 1998, the GSI analysis has not been completed.

T03-83 Adult Escapement
The 9000 adult salmon to be released is based on the production potential of the upper watershed; this figure was submitted for review and comment to agencies and tribes in 1995 and 1996.

Large Woody Debris Transport
see response to T03-26

Mass Wasting Events
We are not suggesting that the project would "subside" the sliding events, but that, over time, as the reservoir levels reach equilibrium with the slopes and soils, the sliding events would become less frequent and less severe than the initial events that are expected to occur immediately after the pool raise. Minor bank sloughing has occurred in the past with no significant impacts to water quality.

Fertilization Effects on Water Quality
Tacoma has indicated concern with the potential effects on water quality that may result from the application of fertilizers on the elk grazing pastures; this was noted in the table, but inadvertently omitted from the main text. In fact, the Corps does not believe that fertilizing of the pastures would result in measurable degradation of water quality. The Corps will continue monitoring of water quality through the life of the project.

T03-83 Cont. Should any negative effects from fertilizer be detected, fertilizing will be halted and corrective measures taken to restore water quality.

T03-84 As described in Appendix F1, Section 2: Juvenile Salmon and Steelhead Passage through the Howard Hanson Dam Project and Section 8.E Incremental Analysis of Restoration and Mitigation Projects, we maintain that restoration of a self-sustaining population of chinook salmon to the upper Green River watershed has a moderate chance of success. Chinook salmon smolts are expected to have a high rate of passage success through the dam and an estimated 70% survival through the reservoir. The assumed 70% survival for chinook smolts passing through the reservoir was based on comparing the physical and proposed operational features of the Howard Hanson Reservoir to other reservoir systems in the Pacific Northwest supporting chinook salmon passage. The reservoir passage assumption was recognized as having greater uncertainty than dam passage. In order to gain additional insight into chinook reservoir passage, a Delphi panel of salmon migration experts was convened (see Appendix F1, Section 2.C: Assessment of Reservoir Passage Success Using the Delphi Process). We know of no chinook reservoir survival data specific to the Green River reservoir.

T03-85 The Corps Green/Duwamish River Basin Ecosystem Restoration Study incorrectly cited a 1996 USFS document as providing evidence that chum and sockeye salmon historically were found in the upper Green River basin. Native runs of chum and sockeye may have occurred in the lower watershed, but we are not aware of any documentation confirming the presence of chum and sockeye salmon above Eagle Gorge prior to construction of Tacoma's Headworks at RM 61 in 1911.

T03-86 The impacts of reservoir inundation are not mitigated by side channel improvements. The 1.0 acre of side channel improvement considers areas located below Tacoma Headworks and is achieved through changes in storage and release operations. Impacts of reservoir inundation are addressed by riparian mitigation measures as described in Appendix F1 , Section 8: Fish Mitigation and Restoration Plan Summary.

T03-87 Page 214- The DFR/DEIS fails to consider the potential for probable and significant adverse impacts to salmonids and other treaty resources and the potential impairment of the Muckleshoot Indian Tribe's treaty rights and the Tribe's treaty harvest of salmon, and the potential for this project to modify the escapement goal with resultant impacts to the Tribe's treaty harvest.

T03-88 Pages 217-218. The DFR/DEIS fails to consider the potential for new growth and development arising from this project to adversely affect the water supply of the WDFW Green River and MIT Keta Creek hatcheries. Both of these facilities experience problems with water quantity and quality as a result of upstream development.

T03-89 Page 225. If the process of passing only fine bedload material to downstream areas continues with this project as expected, then it is unclear how the proposed placement of 3900 cu. yd. of gravel will reduce or minimize the process of downcutting and bed armouring.

T03-90 pages 277-229 In general, the site locations of historic and traditional importance to the Tribe should not be specifically referenced in public documents such as this DFR/DEIS so as to protect their location and identity. One such site of contemporary importance to the Muckleshoot people is locatable on a map from the published description referenced on p. 181.

T03-91 Prehistoric sites of importance to the Muckleshoot Indian Tribe have been identified at and just below the existing water level at "elevation 1147 feet" as early as 1985 by Benson and Moura, who recommended at that time they be tested, evaluated, and data recovery made. ("An Archaeological Reconnaissance of Howard A. Hanson Dam Project" pp 36-38). This work, although required by Section 106 of the National Historic Preservation Act, was not undertaken at the time.

Again a decade later in 1996 pursuant to work for the present Additional Storage project, Larsen Anthropological and Archeological Services referred to the Benson-Moura work, the age of the sites, and compared them in age and potential importance to the comparable Chester Morse Lake sites. ("Cultural Resources Survey of the Additional Water Storage Project Area, Howard A Hanson Dam, King County Washington" at pp. 8-11.) LAAS has recommended that the Howard Hanson sites also be tested and evaluated, before elevation of water levels made data recovery tasks more difficult. The Muckleshoot Tribe made a formal request of the Army Corps of Engineers in 1996 that Section 106 procedures at 36 CFR 800.4-9 should be followed regarding these sites, in consultation with the Tribe.

The DFR/DEIS states, in regard to both the "no action" and "preferred alternative", that because the sites at issue lie below the 1147 foot elevation they would not be affected. Such is not the case, and this verbal construction cannot avoid the Corps responsibility under Section 106. The sites become increasingly difficult for archaeologists to examine, and would suffer further degradation from the increased water level. They remain within the area of affect for this federally licensed undertaking.

The Corps must finally fulfill its Section 106 responsibilities regarding evaluation and data recovery, in consultation with the Muckleshoot Tribe, for these important sites

T03-87 In the DFR/DEIS, the Corps and Tacoma acknowledged the need to preserve tribal harvest opportunities and assumed an adult harvest level of 70% for coho, 35% for steelhead and 55% for fall chinook to be an inviolate component of the salmonid life cycle in the Green River.

T03-88 The "without project" alternative assumes Tacoma's Second Diversion water right would be developed providing the opportunity for regional growth. See comment-reply T01-12 and T03-46.

T03-89 See Appendix F1, Section 4B: Gravel Nourishment in the Middle and Upper Green River.

T03-90 Comment acknowledged. Future reference to cultural resource sites or Native American traditional cultural properties will only be described generically and not located on maps for public distribution.

T03-91 The archeological sites in the existing pool are now being evaluated for their National Register Eligibility. If they are eligible, the effects of erosion and inundation will be addressed in a Historic Properties Management Plan, and a memorandum of agreement will be prepared to stipulate conditions for their management within Howard Hanson reservoir. Planning and coordination with the Muckleshoot tribe will be an important part of these efforts. This course of action will satisfy requirements of Section 106 NHPA.

T03-91 Cont. of historic and cultural interest located at or below the current water level at Howard Hanson Dam. Such requirements are independent of agreements negotiated between MIT and Tacoma, and are among required mitigations of adverse effects for this project prior to implementation of Phase II referenced on p 229 of the DFR/DEIS.

T03-92 Page 229. "*This is the alternative [Preferred Alternative: Phased Development With Environmental Restoration] the Tribe is expecting, though they have not formally accepted the project. .... It is expected that implementation of the preferred alternative would be acceptable to the tribe, with understanding that implementation of Phase II would be postponed until it could be shown that restoration and mitigation measures could offset the adverse impacts*". The writers of the EIS are presuming to have a knowledge of the policy positions of the Muckleshoot Tribe. Furthermore, it is the Tribe's understanding that Phase II would only be implemented with the unanimous consent of all the resource agencies, the Corps and the Tribe. Thus the DFR/DEIS statements misrepresents the position agreed to by the Tribe.

T03-93 Page 229. *The No Action alternative may adversely affects Tacoma's ability to meet the terms of this agreement[MIT TPU], and would strain the relationship between the MIT and Tacoma, as well as between MIT and the Corps of Engineers.* The DFR/DEIS writers presume to predict the how the Tribe would respond if the HHD AWS plan is not implemented.

T03-94 Page 243. The discussion of wetlands fails to disclose that wetlands to be inundated may provide substantial overwintering habitat that may or may not be compensated for by side channel creation at Kanaskat.

T03-95 Page 247 *Preferred Alternative: Water quantity and water quality in the lower river can limit anadromous salmonid production in most years* Tribe believes that a lack of habitat is a major factor limiting production in the system, not just water quality and water quantity. The impacts of reduced water quantity or magnified by the lack of large woody debris to create pools in which salmon rear and hold.

T03-96 Page 249. *upper basin stream habitat is generally in good condition with percent pools ranging from 28-73%.* However, an analysis of MITFD data collected while surveying more than 15 miles of stream reaches in numerous streams above the HHD, data used as part of past and ongoing Washington State Watershed Analysis, found only 24% of the stream habitat is classified as pools with a standard deviation of 15%. Additionally, many of the pools and streams lack large woody debris. Juvenile salmon rearing habitat above HHD is extremely limited. Indeed, the lack of rearing habitat above HHD is known to the Corps which stated in its Green/Duwamish River Basin Ecosystem Restoration Study that *much of the upper watershed has been subjected to heavy timber harvesting and spawning gravels and pools have been damage.* This study also citing US Forest Service Watershed Analysis for the Green River above the HHD reports:

T03-92 It appears that semantics have led to misunderstanding of the DEIS in this case. The Corps agrees that Phase II would be implemented only following evaluation of monitoring results showing that Phase I objectives have been achieved and with consensus of all agencies and the MIT. Section 6.7.4 attempted to point out that Phase II of the Preferred Alternative would not occur without tribal concurrence.

T03-93 This seemed to be a valid assumption that did not require verification, as the tribe and Tacoma have worked diligently to reach agreement, and the no action alternative would certainly effect the full and final implementation of that agreement. The Corps apologizes for not first contacting the tribe before writing this statement.

T03-94 The restoration of the side channel at Kanaskat is not intended to mitigate for the loss of overwintering elk habitat in the reservoir inundation zone. However, the Corps acknowledges the possibility that overwintering elk may use the newly restored side-channel at Kanaskat. The mitigation targeted for overwintering elk is calculated to fully compensate for the loss of foraging habitat without benefit of the side-channel mitigation at Kanaskat.

T03-95 Comment noted. In recognition of the potential benefits of large woody debris to salmonid production, a restoration measure providing for transport of large woody debris past the HHD project has been proposed. See Appendix F1, Section 8.D, Habitat Restoration and Mitigation Project Descriptions, Measure 4: MS-09 Truck and Haul of Large Woody Debris.

T03-96 We agree that in the past, habitat above HHD has degraded by timber harvest practices. An analysis of pool frequency of major western Washington rivers by the U. S. Geological Survey (Black 1998) suggests that pool frequency in the upper Green River basin is well below historical levels, but higher than pool frequency such as the Skykomish, Snoqualmie and Cedar Rivers. The majority of land in the upper watershed has been degraded by past timber harvest practices, but ongoing timber harvest is controlled by state and federal restrictions. Under the protection of Habitat Conservation Plans and FEMAT guidelines, stream habitat quality in the upper watershed is expected to improve as should restoration opportunities for all anadromous stocks.

T03-96 Cont.

Of all the tributary habitats surveyed by the USFS (1996) in the upper basin, only Twin Camps Creek and Sawmill Creek were considered to have usable fish habitat. The other tributaries were ranked poor due to lack of pools, LWD, and or spawning gravels. The pools are spawning gravels are not maintained in the system largely because of the lack of LWD. Additionally, spawning gravels in some pools have been buried by fine sediments inputs from mass wasting or road erosion.

T03-97

Page 250 *The second project is the collection, transport and hauling of large woody debris from the reservoir to the river below Tacoma's Diversion Dam for placement. The volume, timing, and placement of large woody would be adaptively managed based on the annual accumulation of large woody debris ... the final implementation of the truck and haul and placement of large woody debris would be dependent on developing a boater safety plan in conjunction with King County.* The DFR/DEIS narrative term placement of large woody debris implies that wood will be physically placed into a specific location, while Appendix F indicates much of the wood would be placed into the high flow of the channel and left to move. The FEIS narrative should clarify the proposed actions as though, some benefit will accrue from placing wood into portions of the river, over the long term, habitat quality and quantity will be improved if wood is placed into the river at the TPU Diversion Dam and then letting the river place the wood naturally. This will enable habitat restoration more consistent with the oft cited Green/Duwamish River Basin Ecosystem Restoration Study. Additionally, the DFR/DEIS proposed measures appears to be contingent upon the agreement of recreational boaters. Recreational boaters in King County have voice opposition to the placement of large woody debris into the Green River. If the Corps fails to implement the placement and release of LWD, then efforts to protect and restore salmon runs in the Green River will be compromised by the optional, recreational activities of a few people. Additionally, the statement on page 250 conflicts with that on page *...to have no net loss of lower watershed habitat while maintaining existing anadromous salmonid populations* as well as the Tribal goal to increase the quality and quantity of salmon habitat below the Dams. It is also unclear why the Corps would in the interest of the recreational interests of a few allow the habitat quality downstream of the dams to degrade when the Corps (page 81) acknowledges the reduced habitat capacity and habitat quality in the Lower river adds to the uncertainty of restoring fish runs in the Upper River. Furthermore, a considerable quantity of large woody debris is needed in the lower reaches of the river to mitigate for the impacts that will arise from additional growth due to water supply resulting in habitat loss and fragmentation.

T03-98

Page 250. 2nd paragraph, There may be an error in this paragraph. The last sentence should read 400,000, instead of 400,00.

T03-99

Page 250. The discussion should indicate how only 3.2 acres of off channel mitigation. can adequately mitigate for 8 miles of stream and side channel impacts.

T03-97 As described in the Appendix F1, Section 8. Habitat Restoration and Mitigation Project Descriptions, Measure 4: MS-09 Truck and Haul of Large Woody Debris, the wood would be deposited in the active channel. Large woody debris could be placed below Tacoma's Headworks in late fall following initial reservoir drawdown for flood control to minimize the effects of LWD on recreational boaters. Details of the large woody debris transport plan will be worked out during the PED phase of the project.

A public involvement program has been requested by King County, and as local sponsor of the original Howard Hanson Dam Project, the Corps will consider King County's request. Coordination with King County and recreational groups is needed to help design the plan to minimize impacts to recreational boating where it doesn't negate benefits to fisheries resources. Public coordination is also needed to prevent boaters, anglers and other recreationists from cutting the wood after it becomes stranded in the Green River channel.

T03-98 Comment noted.

T03-99 The 3.2 acres of off-channel habitat improvement are provided under the environmental restoration portion of the HHD-AWS. The HHD-AWS restoration goal is to take advantage of opportunities to restore ecosystem functioning where it will improve the quality of the environment, is in the public interest and is cost-effective. The two habitat restoration projects proposed for the lower watershed are not meant as full restoration for the original dam impacts.

T03-100 Page 252-253. The DFR/DEIS implies that all salmonid species are likely to be equally affected by the project without any supporting information. Elsewhere in the DFR/DEIS, there are statements about some salmonid species (i.e. steelhead trout) being more affected than others. Such conflicting statements need to be resolved in the FEIS.

T03-101 Page 258. The DFR/DEIS contends that that the enlarged reservoir constitutes mitigation and not an impact. However, information presented in the DFR/DEIS clearly indicates that lack of certainty in the purported benefits of the project.

T03-102 Page 260 ... *it is uncertain whether chum salmon spawn as far as Kanaskat.* MITFD surveys during the chum spawning season found chum as far upstream as the surveys went the Icy Creek Rearing ponds. Given the lack of dedicated surveys for chum above Flaming Geyser Park and the statements in the US Army Corps of Engineers Green/Duwamish River Basin Ecosystem Restoration Study, chum use should be considered a high probability.

T03-103 Page 265. It is possible that that the NMFS would not allow wild chinook above Howard, as allowing wild chinook allowed above the HHD would experience a higher mortality rate than exists below the dam and thus impede recovery. The DFR/DEIS should discuss the implications of this to project benefits.

T03-104 Page 270. *The fish passage facility is considered a restoration and mitigation feature of the project.* The narrative justifying the distinction between restoration and mitigation is unclear and requires further elucidation.

T03-105 page 271. *Evaluation of the adult returns of the CWT juveniles would be considered the responsibility of the WDFW and or the Muckleshoot Indian Tribe.* The applicants are attempting to get others to undertake the determination oft he mitigation and alleged restoration. The undertaking should be the responsibility of the applicants to fund and collect the data. Furthermore, project success is the successful exercise of treaty harvest.

T05-106 Page 273. The discussion of cumulative impacts should include the effects of the TPU dam and first diversion water right, existing impacts of the Howard Hanson reservoir operations, and the effect of riprapping along the Green River in the upper watershed to protect the railway and roadways lying within the channel migration zone. The discussion of existing and potential future habitat degradation due to timber harvest activities in the upper watershed, appears to conflict with judgments elsewhere in the draft that the upper watershed habitat is of high quality.

T03-107 Page 275. The DFR/DEIS fails to consider that the Endangered Species Act requirements for improved fish passage at the dams without additional storage should be discussed.

T03-108 Page 278. The conclusions of the EIS could be interpreted to assume that the MIT has accepted the proposal. The Tribe has not accepted the project nor the alleged benefits of the project.

T03-100 The referenced text on pg. 252-253 describes the effects of the "No Action" Alternative. Continued downstream extension of bed armoring will reduce the quality and availability of salmon and steelhead spawning habitat; continued bed armoring will increase disconnection of side channel habitats and will reduce salmon and steelhead rearing habitat in the Lower Green River watershed. The continued loss of habitat in the lower watershed under the "No Action" Alternative will affect all salmonid species.

T03-101 The referenced text clearly acknowledges that inundation of tributary stream habitat reduces the productivity of the affected areas for salmonid spawning and juvenile rearing and requires mitigation. The coho production potential of the areas to be inundated is estimated at 6,500 smolts. The effects of inundation are assumed to reduce coho production in the inundated stream reaches, but reduced coho production is partially offset by increased reservoir surface area and shoreline. The net effect of inundated stream reaches is a 75 percent loss of juvenile production potential. Mitigation requirements are met by a combination of riparian and stream habitat improvement measures and the 25% of the coho production potential represented by the enlarged reservoir surface area.

T03-102 We believe the statement that "it is uncertain whether chum salmon spawn as far upstream as Kanaskat" accurately reflects the state of existing knowledge. The Corps Green/Duwamish River Basin Ecosystem Restoration Study incorrectly cited a 1996 USFS document as providing evidence that chum and sockeye salmon historically were found in the upper Green River basin.

T03-103 Passage of adult and/or juvenile chinook salmon to the upper watershed is not a Corp activity, but is the responsibility of the local sponsor, the City of Tacoma. The proposed AWS project does not provide for upstream movement of fish, but increases the survival of juvenile salmonids migrating downstream from the upper watershed.

It is possible that juvenile chinook originating from the upper watershed will experience a lower rate of survival to the estuary than fish originating from below HHD, since lower watershed fish will not be exposed to the effects of reservoir and dam passage. The AWS project provides the opportunity to extend the range of chinook salmon to historic habitats and to allow increased expression of life history traits. At this time, NMFS have not given any indication that the potential for increased chinook diversity provided by the AWS would not be allowed under the ESA.

T03-104 From a cost allocation standpoint, that portion of the fish passage facility that

T03-104 Cont. is needed because of the additional water supply pool (i.e. from without project pool elevation 1147 to foot elevation 1167) is considered to be a mitigation cost associated with water supply. Moreover, that portion of the fish passage facility needed because of additional storage for low-flow augmentation(from pool elevation 1167 to 1177) is considered a mitigation cost associated with restoration.

T03-105 Monitoring of Adult Returns. Under request from Corps Headquarters Policy Review staff, the Seattle District Corps is no longer proposing to mark outmigrating smolts with coded wire tags, or to provide funding for evaluation of adult returns. Should the MIT, WDFW and NMFS believe it beneficial to supplement recruitment of anadromous salmonid in the upper watershed, the Corps assumes that marking and monitoring those outplants will be performed, and funded, as part of the supplementation program.

Tribal Harvest is the Demonstration of Success. We agree that project success must include the opportunity for tribal harvest. In the analysis of the potential to establish self-sustaining runs above HD, an adult harvest level of 70% for coho, 35% for steelhead and 55% for fall chinook was assumed to be an inviolate component of the salmonid life cycle in the Green River.

T01-106 A detailed analysis of the cumulative impacts of the issues listed by the MIT is beyond the scope of the DFR/DEIS.

T03-107 In their statement of proposed ESA listing, the NMFS did not consider the Green River above Howard Hanson Dam to be critical fish habitat for the Puget Sound chinook ESU. The proposed ESA listing of chinook salmon in Puget Sound by NMFS underscores the potential benefits of extending the range of anadromous species to historic habitats above Howard Hanson Dam; however, the opportunity for potential benefits does not suggest a requirement.

T03-108 The Recommendations Section does not say these agencies have accepted the project. At this time, the Corps acknowledges that the Muckleshoot Indian Tribe has not indicated approval for or opposition to the Project. As described in the Executive Summary, page iii, second to last paragraph, the only fish and wildlife resource agencies listed as accepting the project are NMFS, USFWS and WDFW: the MIT is not listed as accepting. Lastly, see the Reply to Comment T03 - 1 - 8.

T03-109 Page 278. Information in the DFR/DEIS does not support the conclusion that 9,600 acre feet of Phase II additional storage for summer/fall low flow augmentation will benefit anadromous fish given the trade-offs and uncertainties surrounding reduced spring flows.

T03-109 In response to significant concerns regarding potential project impacts, and as a result of the Agency Resolution Process, a two-phased project approach was implemented. The phased approach incorporated an adaptive management and monitoring process that conditioned Phase II of the project on demonstrating that impacts could be sufficiently minimized and mitigated. One objective of proposed monitoring will be to identify whether salmonids respond to changes in spring flows as anticipated.

APPENDIX F1

T04-1 F1- Page 5. The discussion and identification of the "two main competing hypotheses" regarding life history limiting factors is vastly oversimplified and fails to address the need to develop explicit hypotheses about how the system functions. This Appendix should be revised to reflect the more complex concepts of sequential habitat availability and limiting factors expressed, for example, in the 1996 Independent Scientific Group report *Return to the River* and included in the narrative portion of the FEIS. It should also address the concepts raised by Poff et al. in *The natural flow regime: a paradigm for river conservation and restoration* (BioScience, December 1997.

T04-2 F1-Page 15. The adult return rate study failed to distinguish between fish emigrating in spring versus those emigrating in fall. Conclusions about the future condition under AWSP cannot therefore be made. Studies in Duwamish estuary show that more fish from above HHD are caught the year after release than the year of release for all species.

T04-3 F1- Page 17. The results statements imply that the smolts were closely associated with wood, when only the presence of radiotags themselves were confirmed to be located near wood in proximity to loon and otter inhabitants. Most of those tags that were associated with wood remained stationary, suggesting that the tagged fish had been consumed by avian and mammal predators. The report should discuss the alternative analysis and conclusions presented in the paper *Travel time and residualism of juvenile coho salmon, chinook salmon and steelhead trout migrating through Howard Hanson Reservoir, King County, WA: An analysis of Mobile tracking and fixed receiver data*, E. Warner, MIT Fisheries Department July 19, 1997.

T04-4 F1- Page 78-79. The comparison to smolt production estimates in lakes is inappropriate because unlike in most lakes, the Howard Hanson reservoir is drawn down dramatically every year to elevation 1070 ft. Furthermore, any smolts surviving year round are likely to be significant predators on other fish.

T04-5 F1-Page 84. The water particle travel time estimates provided are misleading and oversimplified as they assume equal inflow and outflow and a uniform reservoir width. These assumptions are not consistent with spring refill or the shape of Howard Hanson reservoir. A large back eddy is created during refill that is compounded by the reservoir narrows at Eagle Gorge (see Warner, 1997).

T04-6 F1-Page 94. The discussion of reservoir size fails to recognize the greater influence of refill rate and inflow/outflow on fish passage.

T04-7 F1- Page 131. Conclusions drawn from comparison of Howard Hanson Reservoir to Lake Washington are especially weak as the discussion failed to consider differences in refill rate and water residence time. Additionally, residualization of coho and chinook has been observed in Lake Washington as well.

T04-8 F1-Page 169. It should be noted that the outmigration timing data presented is for hatchery plants. Natural or wild fish, especially wild chinook, could be expected to have

T04-1 Comment noted. The understanding of "normative river" flow regimes and how fish respond to these flow regimes is a rapidly evolving cognitive process. A similar, rapid evolution in system understanding is also occurring in the two sister watersheds, Lake Washington and the Green River. Section 1.0 of Appendix F1 provides an introduction to the concept of adaptive management including the extent of discussion the Corps has had with resources agencies and MIT staff regarding how HHD does or does not affect aquatic habitat. In writing the DFR/DEIS we were not prepared to go beyond the general professional agreement reached describing an adaptive management plan, including more explicit hypotheses on system function. An adaptive management plan, incorporating a long-term monitoring plan with explicit hypotheses to be evaluated, will be developed in the PED phase of the project. See comment-reply T04-3.

T04-2 We disagree that future conclusions cannot be made. The design of the adult return rate study was set up and agreed to by resource agency and MIT staff: survival rates for returning adult coho salmon planted as smolts above and below HHD provided a baseline condition against which future returns (AWS Project) could be analyzed. It was understood from the beginning that there would be uncertainty as to the smolt emigration timing (spring vs. fall) and how each contributes to adult returns. Because of this the Corps and Tacoma agreed to fund additional studies including a WDFW follow-on report that includes an analysis of adult-return in relation to identification of spring vs. fall emigration timing. Even if study results show that WDFW cannot identify the timing of emigration, the adult returns provide a valuable baseline to measure future smolt-to-adult returns.

T04-3 We agree that some of the tags at one location, the floating debris pile near the dam, could have been excrement from loons or other predators that had eaten radio-tagged fish. However, radio-tagged juveniles were found associated with wood throughout the reservoir, including debris jams in the upper reservoir at low pool, at the tributary confluences of the North Fork and Charlie Creek, and at the debris pile near the dam. Other than some of the tags at the dam debris pile, we did not find tags near wood in stationary positions during our mobile tracking studies indicating that these were still actively moving tagged-fish. Given any uncertainty in determining the final disposition of radio-tagged fish, it still does not remove the reasoning that additional large woody debris in the reservoir will improve habitat conditions for rearing and migratory juvenile anadromous salmonids.

The alternative analysis and conclusions in Warner (1997) will be considered in the

T04-3 Cont. Adaptive Management Plan and Monitoring Program report that will be completed in the Plans and Specifications phase, PED. This report will present an integrated monitoring and evaluation approach for all instream areas affected by dam and reservoir operations. Resource agency and MIT staff who were previously involved in the Feasibility Study will have the opportunity to provide input to development of the monitoring program and refinement in dam and reservoir operations.

T04-4 We did not use a smolt production estimate for chinook salmon or steelhead. However, we consider it self-evident that some number of smolts will be produced from an artificial lake, such as HH Reservoir, even one that varies in size from 100-763 (existing) or 100-1254 (AWSP) surface acres. As discussed in pages 78-79 and Section D of Appendix F1, HH Reservoir provides fair to good rearing conditions for juvenile salmonids. In fact, in 1991 and 1992, over 30,000 smolt-sized coho salmon pre-smolts emigrated from the reservoir. It is a simple conclusion to expect that some percentage of these fish will survive the winter to become smolt-ready fish. We also consider it self-evident to expect that additional production from reservoir-reared juveniles will occur during the AWS Project given the habitat improvements projects we are recommending for 1) areas above the reservoir (restoration), 2) within the reservoir, and 3) below the reservoir. These projects will benefit juveniles rearing in the river prior to reservoir entry, during residence in the reservoir, and after emigration below the reservoir and dam. As discussed on page F1-79, we do not expect that additional reservoir production will off-set losses from inundated stream habitat. In our mitigation planning we are recommending projects that compensate for the full area of inundated habitat irrespective of reservoir production compensation.

In the AWS Project analysis we did estimate a small production potential for coho salmon smolts, paralleling earlier work done by the US Fish and Wildlife Service (USWS). The USFWS provided an estimate of coho smolt production in HH Reservoir using an average reservoir elevation for existing and the AWS Project pool (Wunderlich and Toal 1992). In their estimate they calculated coho smolt production using a value of 1.25 smolts/yard of shoreline as reported in Zillges (1977). As discussed on Pages F1-78 and 79 we elected not to use the value from Zillges as this value appears to overestimate production when compared to estimates using smolts per surface area of lake (Baranski 1989). We did use the value for smolts per unit surface area in estimating existing and future production potential for coho smolts in the reservoir. As shown in Table 4, page F1-43, we estimated 2935 smolts for existing reservoir area (using the same average pool elevation 1105 ft as Wunderlich and Toal 1992), and 1823 additional smolts for the AWS Project pool (elevation 1123 ft as reported in Wunderlich

T04-4 Cont. and Toal 1992).

We are unsure of what is meant by "smolts surviving year round". If you mean yearling pre-smolts (1+) or smolts that were entrapped in the reservoir from the lack of a surface-outlet at the dam, we are unaware of any study that has documented that these hold-over fish are significant predators on other fish. In general, coho pre-smolts (under natural or artificial rearing conditions) can prey on other fish, but there is little or no evidence showing "smolt-sized" juveniles or entrapped pre-smolts and smolts are any greater predator than coho pre-smolts from other river systems: although it is reasonable to expect some level of predation for larger salmon and steelhead juveniles. Monitoring and evaluation of predator populations will occur before and after construction of the AWS Project.

T04-5 In consultation with US Fish and Wildlife Service and biologists from U.S. Geological Service we added modeled water particle travel times (WPTT) to provide a more complete list of physical variables that could be analyzed against juvenile travel times. The modeled WPTTs are simplified from natural conditions, requiring a steady-state condition, but they were considered adequate for the small sample-size of radio-tagged fish they were analyzed against. Our model did not assume or use a uniform reservoir width but used actual reservoir cross-sections (n=16) with measured widths and depths included in the model parameters.

Back-eddies can form at various points throughout the reservoir, including tributary confluences, the dam and at the inlet to Eagle Gorge. There is insufficient information to identify 1) under which conditions these eddies form; 2) where they form; 3) what is their duration and magnitude; and 4) what these eddies ultimately mean to the survival of migratory juvenile salmonids (for example, during the mobile surveys of radio tracking study we did not find more than one fish consistently at the constriction/inlet of Eagle Gorge). Under the next study phase, Plans and Specifications, we will be constructing three physical models (built to scale) of the lower reservoir and dam to analyze flow patterns. These physical models will identify actual and potential cross-flow fields and will be a valuable tool in evaluating fish passage facility modifications necessary to overcome or reduce these cross-flow areas. We are also recommending an adaptively-managed, 15 year cost-shared restoration monitoring program for fish passage through the reservoir: see Section 10 of Appendix F1.

We have been aware of micro or meso-habitat changes that can occur in the reservoir (specifically Eagle Gorge and the gorge inlet) since discussion of the radio-tracking

T04-5 Cont. results with Fish Passage Technical Committee member Milo Bell in 1995. Milo stated that during periods of high refill, in this case we were specifically discussing a refill rate of 500 cfs or 1000 ac ft/day vs. inflow of 1100 cfs (45% ratio of outflow/inflow), reverse flow conditions could result in Eagle Gorge and at the inlet to Eagle Gorge. The results of the FWS regression analysis and discussions with Milo Bell and other fish scientists has resulted in the AWS Project continuing and primary emphasis on minimizing refill rates (Phase I maximum of 400 cfs/day March, 300 cfs/day April, and 200 cfs/day May) and mimicry of natural flow hydrology.

T04-6 Throughout the course of the AWSP Feasibility Study, MIT staff communicated they were concerned about reservoir size and reservoir operational effects on juvenile salmonid survival. One objective of Section 2B-2 in Appendix F1 was "to compare the physical characteristics (morphometry) of various reservoirs in Washington with Howard Hanson Reservoir, Baseline to the AWS Project." It did not include discussion of reservoir operational considerations, which are reviewed in Section 2B-3 to 2B-5. The discussion on page F1-94 follows this objective for Section 2B-2. The conclusion to the review of physical characteristics is that HH Reservoir, existing and the enlarged AWS Project, is small to medium-sized. In combination with the results of the travel time study (Aitkin et al. 1996 and Sections 2B-3 and 2B-4) we believe the AWS Project reservoir size will have a minimum effect on overall survival. However, we are still taking a conservative approach in project planning, by emphasizing a variety of habitat improvement projects and flow management tools to ensure maximum smolt survival through the reservoir.

In Sections 2B-3, we describe that reservoir refill is but one possible answer explaining travel time differences: based on the UFWS analysis of smolt travel-time, which identified a variety of reservoir parameters that could influence travel time, including reservoir inflow, reservoir refill, fish condition, and turbidity. Even though these study results suggest that reservoir travel time is affected by a variety of factors, we have carried forward minimizing the AWSP reservoir refill rate as a major operational factor that could improve migratory conditions for juveniles transiting the reservoir.

T04-7 The comparison with Lake Washington is especially appropriate given that 1) hatchery coho salmon is from the same basin stock, Green River; 2) Lake Washington is the nearest neighbor watershed to the Green River; 3) MIT technical staff have provided information to the Lake Washington Ship Canal Fisheries Interagency Workgroup comparing Lake Washington coho and chinook salmon smolt-to-adult survival rates to other nearby river systems, including the Green River; 4) like the Green River, habitat

T04-7 Cont. conditions in Lake Washington have been extensively modified by urbanization and include virtually no estuarine habitat; 5) both watersheds are influenced by refill operations of the Seattle District Corps; and 6) the storage volume and timing of reservoir refill are virtually the same for Lake Washington and Phase I of the AWS Project; Phase II is greater. Lake Washington active storage volume (lake elevation between 20 to 22 ft) varies from 112, 966 ac ft at low pool to 159,390 ac ft at full pool, or a spring refill volume of 46,424 ac ft: HHD Phase I storage volume is 50,400 ac ft. The timing of Lake Washington reservoir refill is February 15 to the end of the first week in May, or about 88 days, with an average daily refill rate of 528 ac ft: Phase I refill follows the same general refill period beginning on February 15 and reaching full pool May 17 (32-year average), or about 97 days, with an average daily refill rate of 520 ac ft. Water residence time would be considerably longer in Lake Washington given that the total storage volume affected by the locks is 159,000 ac ft (15 ft to 22 ft elevation) and that a greater storage volume of the Lake lies below 15 ft elevation.

Residualism is a potential life-history pattern for coho, chinook and steelhead under natural and artificial rearing conditions and can be accelerated in frequency by a variety of natural and human-influenced factors including non-reservoir and reservoir related. Residualism has been observed in Lakes Washington and Sammamish. To our knowledge, primary factors explaining this residualism have not been provided. For example, Lake Sammamish has freshwater resident chinook salmon reaching sizes greater than 20 inches. In this instance, is residualism a function of the Issaquah Creek hatchery stock, excessive temperatures in the lake and Sammamish Slough, abundant food resources, or some other unidentified source? We can also speculate that residualism for some stocks may have occurred in Lake Washington because of low inflow and operations at the Locks. In recent decades there have been recurring years with long periods of time when no spill occurred during the normal smolt emigration window leaving only the locks, the fish ladder, or the saltwater drain as egress routes. It has been clearly communicated to the Corps that these routes are not "fish-friendly" and that the lack of spill may have delayed or entrapped emigrating smolts.

T04-8 Table 1 on page F1-169 (Appendix F1) illustrates the outmigration timing from naturally-reared salmon and steelhead fingerlings planted in the Upper Watershed. As stated on Page F1-168, Table 1 is shown for comparison to Figure 1, page F1-168. Figure 1 values were used in the predictive travel time model as *Variable 1: Juvenile Outmigration.* The proportional outmigration timing shown in Figure 1 was developed from a wide variety of Green River references (Lower and Upper Watershed), including

T04-8 Cont.

a much more extended migration period. This will significantly influence the stated benefits of the project and needs to be analyzed in the FEIS.

F1-Page 359. With regard to chinook and self-sustainability, the implications for management from the extent of straying are a serious matter. If straying is minimal, *e.g.* 10-20% on a consistent basis, then there is probably evidence that natural production is healthy. If so, there may be opposition to introduction of more strays from upper basin supplementation because evidence of straying from upper river releases of hatchery chinook have been found. For example, Icy Creek tags have been found throughout the basin and HHD chinook tags have been recovered in Newaukum Creek.

T04-9

If straying is mid-range, e.g. 20-40%, then there will be less chance of a healthy natural stock and more pressure to reduce straying and it is probable there will be resistance to upper basin supplementation for reasons stated above.

If straying is high, e.g. 40-80% then natural production is most likely entirely made up of second or third generation hatchery fish. Under this scenario, however, self sustainability is not a realistic goal.

Determining the degree of straying is of critical importance to the future of Green River Chinook management, with or without the project. While many attempts have been made, none are considered best science. Within the foreseeable future, however, all hatchery chinook production will be marked with an adipose clip for the purpose of selection during sport fisheries. An incidental benefit of this mark will be certainty in determining hatchery/natural composition in the terminal fishery and the rate of straying to the spawning grounds. Assuming several full cycles of supplementation in the upper basin it will be possible to determine with certainty how many chinook returning to the trap are of supplementation origin and how many are progeny of natural production. In the Tribes view this quality of information will be necessary to determine the feasibility of self sustaining stocks. Assuming it to be the case now is short sighted and irresponsible. Five cycles of chinook takes fifty years to complete.

T04-8 cont. data from Table 1. These references are discussed in Section-5.A of Appendix F1. These multiple references include emigration timing for wild and natural-reared hatchery plants and were used in the analysis of AWS Project impacts and benefits for both Section 2B-5 and Section 5 of Appendix F1. We believe that we were thorough in our review of known information on Green River juvenile salmonid emigration timing and that our impact analysis and benefits assessment is as accurate and complete as the available information.

T04-9 We agree that identifying the rate of straying of returning adult chinook is important to the management of Green River chinook salmon, and that the knowledge of chinook straying must be improved. We believe that providing the opportunity to establish a self-sustaining run of chinook salmon in the upper watershed is a reasonable and responsible goal. Whether the goal of establishing a self-sustaining run can be achieved won't be known till the project has been operating and monitored for several years. The analysis of the potential for self-sustainability used a deterministic life-cycle model that assumed values for each step in the salmon life cycle. Significant deviations from any of the steps will significantly affect the realization of self-sustainability.

For instance, we assumed that only 67 percent of juvenile chinook would survive migrating through the HHD reservoir. If observed survival is 75 percent, and assuming the other life cycle assumptions are accurate, there would be 266 more adult chinook returning to the upper Green River watershed[1]. An increased return of 266 adult chinook represents more than 10% of the escapement goal for the upper watershed. If all other life cycle assumptions are accurate, increasing reservoir survival increases the likelihood that self-sustainability can be achieved. If observations indicate that reservoir survival is less than expected, operations must be changed to increase survival, or other measures must be instituted to ensure higher survival. If NMFS finds it to be in the best interests of Green River chinook stocks, the Corps would not be against supplementing adult returns to enhance chinook recruitment. The goal of self-sustainability was not adopted to limit fish resource management alternatives, but to ensure the highest level of fisheries restoration benefits within the constraints of cost-effectiveness and public interest.

Specific Hunting/Wildlife Comments on USACE AWSP DFR DEIS

General comments:

T05-1 A detailed contour map showing the current pool level and proposed levels in Phase I and II is needed to address wildlife issues. An additional map of existing habitat showing current pool level and an outline of each Phase is also needed.

T05-2 Muckleshoot Indian Tribe wildlife biologists anticipate being be included in planning for, commenting on, and monitoring the elk forage habitat mitigation sites.

Specific comments

T05-3 pg. 9 *The proposed project modifications are consistent with the project purpose of low-flow augmentation, and provide a positive benefit to fish and wildlife resources.* Such a broad statement as a "positive benefit to wildlife" is too general. Not all wildlife will be benefited from the proposed project. The HEP analyses focused on a few general species of wildlife. While this may represent a mix of affected species, none of the proposed alternatives have no impact on some wildlife species. MIT recommends presenting a detailed species list for the inundation area showing those positively affected and those negatively affected.

T05-4 pg. 62 *Large woody debris would also be placed in terrestrial habitats to provide additional food and denning places for terrestrial mammals and birds.* This statement is rather vague. It does not identify which species may be enhanced or where LWD would be placed. Most importantly this statement assumes that there is currently not enough large woody debris for mammals and birds and that these populations might be enhanced with this material. General statements like these without specifics should be deleted from the EIS.

T05-5 pg. 63 *Plant types could include: ... bald cypress...* ONLY native plant species should be considered. There have been enough problems with non-native plants introduced into new areas.

T05-6 pg. 142 *Wildlife Habitat Mitigation* The elk forage pastures proposed for mitigation of the loss of MacDonald field have the ***potential*** to the produce suitable elk and deer pastures. There should be close coordination between MIT, TPU, Corps, and WDFW on forage species, disking, seeding, and fertilization schedule. The ongoing MIT adult cow elk study will yield data on elk distribution, movements, migrations, home range, and habitat use. These pre-AWS data should prove valuable in assessing the effectiveness of the mitigation plan, however, there should also be other mitigation alternatives available, and applied adaptively, should the proposed plan fail.

T05-7 pg. 142 *Such changes would not affect the attainment of full mitigation; rather they would affect the manner in which full mitigation is achieved.* The MIT Hunting Wildlife program acknowledges that wildlife habitat mitigation will be dynamic and that an exact plan description may be modified as work on specific sites begins. The key phrase in this

T05-1 A detailed contour map was not included as the Corps felt that few readers would benefit from such a map. However, the Corps can make one available to MIT in the near future if you desire one. A map showing the various reservoir elevations was included in Appendix F1 (Figure 2 of Section 2B-1 and Figure 1 of Section 3A). We agree that such maps would be helpful, but we did not overlay the reservoir levels onto the contour map, or on the habitat map, as the detail of such combined maps would make them unreadable. We feel that impact assessment is still easily accomplished without these aids. During PED, however, large scale contour maps of the individual wildlife mitigation sites will be produced to aid us in fine-tuning the locations of pastures and other mitigation features.

T05-2 The Corps agrees completely. We will again form an interagency team (including MIT) during our PED phase to solicit input for design of mitigation measures. The team will remain throughout the phase and into and through construction, and monitoring. We did not develop the initial plans without agency and tribal input, and we will not complete the project without agency and tribal input.

T05-3 The statement that the proposed project would result in a positive benefit to wildlife was not meant to mask that adverse impacts would occur (there would be impacts to some species), but rather to indicate our belief that the Section 1135 project would result in positive effects to wildlife overall. There are few—if any—projects that do not result in adverse impacts to some species. Enhancement of power line rights-of-way for elk grazing may seem to be positive benefit to all species that already utilize those areas. However, the rights-of-way include many shrubs and small trees, as well as herbaceous plants, that could be removed to create pastures. Thus, species that utilize shrubs, trees, and herbaceous plants would suffer an impact as a result of this effort. There are literally hundreds of plant and animal species found in the vicinity of Howard Hanson Dam. A table showing the effects of the Section 1135 project on each species is not within the scope of this document. However, we can offer, in our best professional judgment, that elk, mallard, green-winged teal, osprey, common loon, Canada goose, wood duck, and hooded merganser would all benefit from the project. All species that live in forested habitats such as Hutton's vireo, black-throated gray warbler, black-tailed deer, and many others are likely to be impacted by the project. We determined, through agency coordination, that the primary target species for the project include elk, common loon, cougar, red-backed vole, pileated woodpecker, and wood duck (and several others). We believe that the 1135 project would benefit wildlife on the basis that the habitats to be improved are scarce in the project area, while the habitats to be adversely impacted are abundant in the project area. Thus, while the forested species are affected,

T05-3 Cont. the loss they suffer is relatively small compared to the gain made by species that utilize pastures, islands, and wetlands.

T05-4 This statement is made in an introductory section of the DEIS; thus, details were not provided in that section. Page 148 of the DEIS, and p. 62 of Appendix F2 provide details of placing LWD in terrestrial habitats.

T05-5 Ultimately, approval to use a non-native plant will come through the WDFW permit process for introduction of native plants. Agencies, MIT, and the public will have the opportunity to comment through this process. Also see Comment O06-11.

T05-6 Agree. An interagency team (including MIT) will participate in the refinement of pasture design, including forage species, disking, seeding, and fertilization schedules, which we hope would utilize the data from the on-going cow and calf elk studies. Other alternatives will also be developed by the team.

T05-7 Mitigation measures proposed by the Corps in the recommended plan are intended to provide full mitigation for project impacts. Monitoring is designed to test whether the sites are performing per Corps expectations. If they are not, changes will be made to bring them up to expectations.

	Comments
T05-7 Cont.	sentence is that *full mitigation will be achieved.* Less than full wildlife habitat mitigation is unacceptable and does not comply with the Tribe's goals for wildlife.
T05-8	pg. 142 *Elk Forage Habitat pastures* For reference and clarity there should be a restatement of exactly how much of each habitat type is inundated for each Phase. . For example, it is unclear how large MacDonald Field is.
T05-9	pg. 142 *Elk Forage Habitat* Burning should also be considered as an additional pasture management tool.
T05-10	pg. 142 *Phase I Mitigation* Sites 1 and 2 may not be used by elk displaced from MacDonald field.
T05-11	pg. 142 *Phase I Mitigation* Elk currently use the powerline area which has been proposed for elk forage habitat mitigation (Sites 1,2,7,8). Thus, the loss of open pasture is not being actually replaced with open pasture but simply with potentially better forage (As stated in F2-18). A detailed forage analysis needs to be conducted on all sites proposed for forage habitat enhancement to verify that the proposed management activities will result in better and more forage than currently exists on those sites at all times of potential use. The amount of new forage (e.g., in DDM units) on the proposed mitigation sites ***must*** be equal to what presently exists on those sites ***plus*** an added amount to compensate for the loss of forage through inundation.
T05-12	pg. 142 *Phase I Mitigation* An additional consideration for ecosystem restoration that should be tied to this proposed project is elimination or reduction of scotch broom throughout the entire watershed, especially in potentially important elk foraging areas under powerline right-of-ways.
T05-13	pg. 145 *Phase II Mitigation* The Phase I elk pasture mitigation results must first be assessed on their effectiveness before Phase II is implemented. Phase II should be proposed under a separate EIS after the results of Phase I have been analyzed.
T05-14	pg. 157 *Staffing* Is all of the proposed wildlife mitigation practical? What added staff are needed to fully develop the wildlife mitigation sites and what is the certainty they will be hired to implement and monitor the mitigation proposals?
T05-15	pg. 196 *Cougar (Felis concolor) are also numerous.* Black bear (*Ursus americanus*) are also quite numerous.
T05-16	pg. 197 *WDFW estimates 590-650 elk within the watershed each year.* This comment needs to be cited or supported by information from studies conducted within the watershed. A more recent 1997 report available from WDFW indicates an elk population of only 200-300 animals.
T05-17	pg. 197 *A tribal subsistence hunt...* The elk hunt in the watershed was canceled in 1997 and again in 1998 and will be closed until the elk herd rebounds and productivity increases.
T05-18	pg. 197 *Black-tailed deer ... their numbers are estimated to be similar to black tailed deer populations in surrounding areas.* Numbers depend on size of area. What is probably meant here is *density* not numbers. The habitat potential may be similar to

T05-8 The total acreages of each habitat type, under existing conditions, and through each phase of the project, are listed in Table 3 of Annex 1 to Appendix F2. Acreages of specific areas, such as MacDonald field, were not given. The Corps estimates that approximately 18 acres of MacDonald field would be inundated.

T05-9 Concur; burning can be a useful tool in habitat management. This will be considered in PED.

T05-10 Maybe not; however, sites 1 and 2 are currently used by elk. The Corps anticipates that improving the forage at sites 1 and 2 should aid the population of elk that utilizes these areas (which will lose forage along the shoreline of the North Fork Green River in Phase I).

T05-11 Agree. Test pastures will be planted prior to implementation of Phase I to analyze the forage quality, and soil suitability for various pasture plants. The HEP analysis assumes that we will succeed with improved forage quality (i.e., greater than that existing today), and thus shows a net benefit to elk as a result of the mitigation.

T05-12 Control of Scot's broom in other areas of the watershed may be outside the scope of this project. Where it occurs on mitigation lands, every effort will be made to control this invasive plant. It is possible we may be able to enter into a cooperative agreement with BPA or Puget Sound Energy. However, the species is extremely difficult to control. Burning (twice) is accepted as the most viable method, and it is extremely doubtful that power companies would allow burning under their lines.

T05-13 Agree. The Corps intends on preparing a separate environmental document for Phase II, since few of the impacts of Phase II are truly quantifiable at this time, and need to be addressed in greater detail prior to implementation. Mitigation for Phase II would be re-evaluated at that time.

T03-14 During PED the Corps and TPU will be working with the MIT and the resource agencies to assure that the wildlife mitigation sites included in the final design are the most appropriate. The mitigation sites will be developed during construction and once developed will be maintained under Operations and Maintenance (O&M). Before construction, The Corps and TPU will enter into a cost sharing agreement and part of that agreement will address the requirement for TPU to be responsible for O&M on the AWS Project. This would include all mitigation sites.

T05-15 Comment noted.

T05-16 Agree. The Corps was not aware of the magnitude of the decline until after the DEIS was printed.

T05-17 Agree. The Corps was aware of this but failed to reflect it in the DEIS.

T05-18 Density is the correct term. The fact that the density may actually be less due to predation by cougars, coyotes, and black bears is new information. Comment noted.

T05-18 Cont. surrounding areas, but due to protection of bear, cougar, and coyotes, predation has likely resulted in lower density of deer than surrounding areas.

T05-19 pg. 198 *Cougar* The WDFW *was* involved in a cougar study which has ended. The stated estimated number of cougars is well beyond current estimates and what the available prey base can support.

T05-20 pg. 198 *...the large stable elk herd...* The elk herd has declined from 600+ to 200+ in 3 years, which can be hardly called stable. The Corps biologist recently attended a meeting on the status of the Green River elk herd. Cross-check comment with that on pg. 244.

T05-21 pg. 243 *Inundation of roughly 12 acres of grass meadows and up to 90 acres of emergent wetlands would result in loss of these forage areas. This loss represents approximately 56% of the foraging habitat for elk near the reservoir.* With a loss of 56% of the habitat in the area, will the mitigation meadows replace this habitat completely? Also, any evidence that elk will use these areas that are scheduled to be replanted and re-tilled each year should be presented.

T05-22 pg. 244 *Migration corridors often follow shorelines.* If this from a study that was conducted, it should be cited. We can not determine from the EIS that the created shorelines will be effective corridors for the elk. Again, the MIT elk study will shed light on migration patterns.

T05-23 pg. F2-6 *Existing Wildlife Resources.* It would help if these species were listed in a table and *a + or - or =* used to identify how each species might be affected by various alternatives with and without wildlife habitat mitigation.

T05-24 pg. F2-9 *Phase I 281 acres and Phase II 161 acres* The current MIT-TPU agreement provides for tribal ceremonial hunts. Watershed inspectors have interpreted this to mean ceremonial hunts shall occur on City of Tacoma lands and other open and unclaimed land. The loss of 442 acres of terrestrial land base during inundation only reduces the amount of area possible for conducting ceremonial hunts. TPU shall facilitate landowner agreements to provide access to other lands while conducting tribal ceremonial hunts.

T05-25 pg. F2-18 *...assumed elk meadows can be established which are more than twice as productive than existing right-of-way...* It would help if there were data to back up this statement. Will *twice as productive* be enough to offset losses from inundation? Although created pastures may be twice as productive as natural openings, how do they compare in forage quality? Data may be collected to assess elk nutrition and habitat use in the ongoing MIT elk study.

T05-26 pg. F2-18 *Several different mixes will be tested prior to the pool raise to determine which species are most preferred by elk.* True forage *preference* studies are hard to design and interpret. MIT wildlife biologists expect to be included in discussions of forage species considered and studies to assess which are "preferred".

T05-27 pg. F2-18 How might the elk pasture productivity and resultant availability to elk for winter forage be affected by increased rodent or insect populations associated with the pastures?

T05-19 Comment noted. An early estimate of cougars in the watershed was 25-35. This number was used in the DEIS without confirmation from the WDFW. We understand the number is much less than that, though population estimates have not been made.

T05-20 Concur. This information was available at the time of preparation of the DEIS, as reflected in the discussion of elk on p. 244. Unfortunately, not all of the discussion in the DEIS regarding elk populations was updated. We understand that the elk herd has been in serious decline for at least three years, likely due to a variety of causes.

T05-21 Phase I will inundate 12 acres of grassland, which will be replaced by 79 acres of managed pastures. Though none of the pastures will be adjacent to the reservoir, the HEP analysis indicates these will fully replace the loss of MacDonald field. Several studies from previous mitigation projects at Merwin Project (Lewis River) (Merker and Hale, 1982), BPA powerline study (West, 1987*), and Taber (1977, unpublished*), indicate that the productivity of the forage can be improved between 126% and 232% through the application of fertilizer. In two of these studies (West and Taber), elk use was found to increase. In Taber's study, however, the increase in elk use may have been so high that it caused lower productivity during the winter months. Thus, we are optimistic that creating productive forage will result in increase elk use.

Up to 90 acres of wetlands could be lost as a result of Phase I; these will not be fully replaced, but the replanted sedge meadows are expected to be at least as palatable and nutritious as those lost to the pool raise. The hope is that elk will find them more palatable than what is currently there, based upon evidence at other projects (see response to comment T05-28).

*West, S.D. 1988. Nitrogen fertilization and the suppression of tree establishment on Western Washington rights-of-way. In: Byrnes, W.R. and H.A. Holt. 1988. Proceedings, Fourth Symposium on Environmental Concerns in Rights-of-Way Management. October 25-28, 1987, Indianapolis, Indiana. Purdue University, West Lafayette. pp. 128-132.

*Taber, R.D. 1977. Power line rights-of-way and wildlife in forested mountains. Unpublished report, University of Washington, College of Forestry, 33 pp.

T05-22 No study was done; the comment was made based on personal observation, albeit, brief and over very short distances. Also, anecdotal evidence (i.e., discovery of

T05-22 Cont. hoof prints and grazing activity along shorelines) suggested to the author that elk very likely follow at least some of the Howard Hanson shoreline. We appreciate the fact that the MIT study will shed light on elk movements in the vicinity of the project and look forward to seeing this report.

T05-23 Concur. A Species list follows this letter. However, at this late date, the specifics of project alternative impacts on each species, with and without mitigation, are not possible to provide in the short time remaining prior to publication of the final report.

T05-24 We recognize the treaty rights of the Muckleshoot Tribe to hunt in the watershed, as well as the agreement between MIT and TPU for ceremonial hunts. The AWS project does not alter these treaties or agreements in any way. However, the loss of approximately 440 acres due to implementation of both phases of the project is an irretrievable loss of habitat for elk. The project proposes to mitigate for this loss by planting sedges in the areas of low topographic relief, and through various other measures to replace wetland, forested, and grassland habitats. The Corps' HEP analysis indicates the mitigation would replace lost habitat fully by increasing the yield and nutritional value of other grazing areas, and creating new grazing areas. Although the eventual success of the plan is not guaranteed, we look forward to working with MIT to refine the sites and development of the sites, and using the results of your elk cow and calf studies to further aid in refinement of the mitigation plan; we trust this cooperative effort will provide better assurance for the success of the mitigation plan. With regard to access, the loss of acres is seasonal: during the fall and winter, the reservoir will be drawn down to existing fall and winter levels, thereby resulting in no change of access (though vegetation cover will change) for the sanctioned hunting season (though we recognize the hunt was suspended in 1997 and 1998). We assume ceremonial hunts may occur at any season, and for these, the pool raise would result in a smaller effective hunting area. We also recognize that E.O. 13007, "Indian Sacred Sites", allows tribal access to Corps project lands (and other Federal lands) for ceremonial purposes.

T05-25 See response to comment #T05-21 above. Forage quality will be assessed during the test pasture study (see response to comment #T05-11).

T05-26 Thank you! Our plan is to involve resource agencies and MIT in development of detailed mitigation plans. This includes the testing of managed pastures and forage species of plants. Several studies could be conducted, including performance (growth) of various forage species on different soil types; performance with different fertilizers;

T05-26 Cont. palatability to elk; nutritional content; etc. The Corps is committed to making this mitigation plan a success; your assistance will be instrumental in reaching that goal.

T05-27 This is a good question for which we have no answers at this time. It is one more item that could be examined during the testing of pastures. Even if testing does not disclose problems, rodent or insect outbreaks could occur later, following implementation of the approved mitigation plan. Such outbreaks would be immediately obvious to watershed inspectors (who will visit most sites at least weekly) or to O&M personnel. Solutions will be quickly sought and implemented.

T05-28 pg. F2-20 *At each site, shallow marsh vegetation would be developed...* The proposed sedge plantings as mitigation for loss of elk forage habitat (sites 16, 22,23,24,25) without reference to forage value and palatability to elk is misleading. Is there documented use of these sedge species by elk? These plantings, however, may provide some benefits to other wildlife.

T05-29 pg. F2-23 *Phase 2 would .. inundate the 4 acres of sedge planted for Phase 1 emergent wetland mitigation.* It would be cost-effective to delete these 4 acres from being planted initially due to imminent inundation with Phase 2.

T05-30 pg. F2-35 *Tame Pastures receive tilling and seeding over 25% of pasture each year, and fertilizer each year.* This is not accounted for in the cost analysis within the Appendix. The costs accrued for tilling, seeding, and fertilizing each of these parcels for the next fifty years needs to be listed within the cost analysis. Is there an indication of the effects on elk that may be resident or transient within the fields that are being cultivated? What time of the year will this be occurring - cultivation of the fields may coincide with calving and, thus, disrupt the calving process. The MIT elk study will yield data on timing of migration and calving.

T05-31 pg. F2-43 *Pasture sites were selected on the following criteria...* Relative distance to roads, especially main roads within the watershed, is not mentioned. Was this considered as a disturbance factor?

T05-32 pg. F2-43 *site 1 will merely be screened from a road by trees on one side* The road being referenced needs to be stated. Also, will there be mitigation factors included for potential deaths due to a foraging site being placed next to a road?

T05-33 pg. F2-44 *Several mixes of pasture grasses will be tested on several plots of existing pasture two years prior to the pool raise. The best performing mix will be selected for mass seeding on the newly created pastures.* Are the mixes preferred going to be altered for each site depending on the surroundings and soil. It would seem logical to evaluate the site and then chose from a variety of preferred mixes. Also, will the preferred mix be chosen depending on the availability of nutrients in that area, and whether it is a summer or winter range? Preferably the winter range sites would be planted with species that are higher in available nutrients.

T05-34 pg. F2-44 *Existing roads adjacent to the created pastures will be screened with shrubs and low growing trees to provide elk with some privacy while grazing.* This sentence is repetitive, and vague as to explaining which species of trees and shrubs will be planted. Are the species to be planted considered as forage for elk?

T05-35 pg. F2-44 *some of the older mixed and coniferous forests will be managed to 'accelerate' the maturity of the forests to mimic conditions found in very mature forests.* How is this process conducted, i.e. tools, materials, length of time. What are the techniques used to promote this acceleration, and is this accounted for in the cost analysis section?

T05-36 pg. F2-45 *forage availability is considered to be a limiting factor within the vicinity of the reservoir* Cite reference to this statement.

T05-28 The only evidence of which we are aware that supports elk use of sedges is from two sources: Chester Morse Lake in the Cedar River Watershed, and Wynoochee Dam project on the Wynoochee River. Watershed managers in the Cedar River have noted elk use of inflated and beaked sedges (personal communication, Paige, 1996). At the Wynoochee Dam project, the Corps planted slough sedge in the upper part of the reservoir, only to find elk severely damaged plugs soon after planting the sedges. This is actually a concern at Howard Hanson Dam, that this large investment in plants may be an attractant to elk, and we will have difficulty establishing plants. The value of sedges to other wildlife (including waterfowl and loons), as well as fish and amphibians, is unquestioned, and is at least as compelling a reason to plant them as are the potential benefits to elk.

Paige, D. 1996, Personal communication, Cedar River Watershed, Seattle Water Department, Seattle, WA

Raedeke Associates, Inc.; Herrera Environmental Consultants, Inc.; Gaynor Landscape Architect Designers, Inc. 1995 "1993 Progress Report: Wetland Plant Community Monitoring Studies, Chester Morse Lake, King County, Washington" Seattle Water Department, Seattle, WA

T05-29 The sedge selected for the lowest elevations is Columbia sedge (*Carex aperta*), a native sedge that can tolerate inundation of up to 50 feet depths (Skeesick and Sheehan, 1993). The 4 acres that would be inundated by Phase II are not expected to die as a result of inundation, as the designed planting depth accounts for Phase II. Additionally, we do not consider implementation of Phase II "imminent". Rather, as you point out in earlier comments, implementation of Phase II is entirely dependent on approval of resource agencies and MIT.

T05-30 All but one of the pastures (#17) are passive pastures, which means they will not receive annual tilling and seeding. Only site 17 (in Phase II) will receive this treatment. This would be considered an O & M cost of the project. Concur that, should calving be occurring during the scheduled maintenance of sites, maintenance work could affect calf production. We hope your elk study will reveal timing and behavioral clues to calving that will assist us in timing of pasture maintenance so as to result in minimal impact to elk.

T05-31 Yes, distance to roads was one factor considered in choosing pasture locations. We appreciate the impact of roads to elk productivity, and attempted to locate most

T05-31 Cont. pastures away from roads. A few, especially #1, #3, and #4, are relatively close to well used logging roads. For these sites, screen trees will be planted to reduce the visual impact to elk to encourage them to use the sites. On the other hand, we recognize there will be an increased risk to vehicular collisions if these sites are heavily used; however, for this reason, as well as slopes, soils, and topographic relief, sites 3 and 4 were not selected for Phase I mitigation. Site 3 would be implemented in Phase II.

T05-32 This site is currently frequently used by elk (King, personal communication, 1996*). Since the site is nearly adjacent to the North Fork Green River, it was felt that the proximity to the road may not be as negative a factor as it could have been, since elk could access the site across the river, and not necessarily across the road (as is currently done); thus, mitigation for lost animals is not considered to be necessary. We would be happy to discuss this further with you, as it is also one of our concerns. It was also felt the site would receive more use if trees were planted to screen the busy road from the site. As stated in earlier comments, the detailed design of mitigation sites will involve the resource agencies and MIT—changes can and will be made based on your input.

*King, B. 1996. Personal communication. Green River Watershed manager, Tacoma Water Division, Tacoma, Washington.

T05-33 Yes, performance of plant growth relative to soils was one factor we planned to assess on the test plots. A variety of seed mixes will also be tested; however, we want to be careful not to make the testing so complex that key data is confused or obscured. Availability of nutrients is certainly a key factor in determining the forage mix. The choice of winter vs. summer forage is a key element that has not yet been determined. Summer use is less (fewer animals) and may not be as critical for the population as high quality winter forage; yet, cows and calves will require high quality summer forage to fatten up before the winter season. This is an excellent issue for further discussion.

T05-34 Do not agree that sentence is repetitive. The sentence simply states that pastures adjacent to roads will receive screen trees and shrubs. The suggested species are listed on page F2-19, and could include lodgepole pine, Western white pine, California bay laurel (non-native), and Pacific yew. Of these Pacific yew is known to be heavily browsed by elk, and Western white pine is also browsed. They are not planted as forage species, but as screen species. We selected evergreen (to provide screening during winter as well as summer) trees and shrubs that do not grow tall (to reduce maintenance underneath powerlines). Other suggestions are welcome.

T05-35 The process is described in Section 3.2.3 of Appendix F2 (pages F2-23—F2-27). The cost analysis reflects this activity. Briefly, the process involves removing small trees to decrease stem density and create openings in the canopy, thereby increasing light penetration and accelerating growth of grasses and shrubs. Snags would be created and woody debris would be placed to mimic characteristics of mature forests.

T05-36 This statement was made by Ken Raedeke, Raedeke Associates, Inc., Seattle, WA. His analysis of the landscape condition of elk habitat in the Green River watershed is found in "Mitigation Concepts for Terrestrial Wildlife, Howard Hanson Dam Additional Water Storage Project, King County, Washington", dated April 19, 1996, prepared for the Corps of Engineers and City of Tacoma.

T05-37

pg. F2-45 *The HSI's are relatively generic in the sense that they do not look closely at the species of grasses and other herbaceous plants available for forage, nor at the percent cover of these plants. Rather, the HSI's are based on factors such as whether the site is fertilized, seeded, and otherwise treated at frequent intervals.* An explanation of whether or not a HSI determination may be made with so few factors needs to be included. Also, cite other studies that have been conducted that used a small sample of HSI's. Pasture treatment is not a viable factor if the species of grass being treated is not known as plant species respond differently to treatments. The percent of cover may also determine the viability of species within the area.

T05-37 If plants aren't utilized, pasture management is not viable. Percent cover may contribute to viability of species. HEP is a dynamic tool. Modification of HSI models is a common technique to more appropriately match the model to the local conditions. In the case of Howard Hanson Project, the interagency team agreed that the elk model needed to focus on forage quality (unfortunately, MIT did not have a wildlife biologist on staff at the time). Though not representative of the whole range of forage characteristics that determine viable elk forage, the HSI's were intentionally simplified to capture what the team felt best represented the important forage factors for elk. We recognize the contribution of percent cover to forage viability, as well as the fact that if a habitat isn't used, the HSI score is meaningless. The basic tenet of HEP is that animals are present and habitats are assumed to be used.

Plant Species of Howard Hanson Reservoir by Habitat Type

Upland Habitat Types

1. Deciduous Forest

Trees:	*Acer macrophyllum*	Big-leaf Maple
	A. circinatum	Vine Maple
	Alnus rubra	Red Alder
	Populus trichocarpa	Black Cottonwood
	Pseudotsuga menziesii	Douglas Fir
	Thuja plicata	Western Red-Cedar
	Tsuga heterophylla	Western Hemlock
Shrubs:	*Rubus spectabilis*	Salmonberry
	R. ursinus	Trailing Blackberry
	R. parviflorus	Thimbleberry
	Oemleria cerasiformis	Indian Plum
	Vaccinium parvifolium	Red Huckleberry
	Oplopanax horridum	Devil's Club
	Sambucus racemosa	Red Elderberry
	Cornus stolonifera	Red-osier Dogwood
Forbs:	*Polystichum munitum*	Sword Fern
	Pterdium aquilinum	Bracken Fern
	Urtica dioica	Stinging Nettle
	Heracleum lanatum	Cow Parsnip
	Oenanthe sarmentosa	Pacific Water-parsley
	Prunella vulgaris	Self-heal
	Tolmiea menziesii	Pig-a-back
	Galium spp.	Bedstraw
	Rumex spp.	Docks
	Juncus spp.	Rushes
	Ranunculus repens	Creeping Buttercup
	Dicentra formosa	Bleeding Heart
	Poaceae	Grasses

1. Deciduous Forest - Alder

Trees:	*Alnus rubra*	Red Alder
	Thuja plicata	Western Red-Cedar
	Tsuga heterophylla	Western Hemlock
Shrubs:	*Rubus spectabilis*	Salmonberry
	R. discolor	Himalayan Blackberry
	R. parviflorus	Thimbleberry
	Ribes sanguineum	Red Flowering Current
Forbs:	*Polystichum munitum*	Sword Fern
	Athyrium filix-femina	Lady Fern
	Maianthemum dilatatum	False Lily-of-the-Valley
	Tiarella trifoliata	Foam Flower
	Poaceae	Grasses

3. Deciduous Forest - Cottonwood

Trees:	*Populus trichocarpa*	Black Cottonwood
	Alnus rubra	Red Alder
	Acer circinatum	Vine Maple
Shrubs:	*Rubus spectabilis*	Salmonberry
	R. parviflorus	Thimbleberry
	Oemleria cerasiformis	Indian Plum
	Sambucus racemosa	Red Elderberry
Forbs:	*Polystichum munitum*	Sword Fern
	Tolmiea menziesii	Pig-a-back
	Ranunculus repens	Creeping Buttercup

4. Deciduous Forest - Seedling/Sapling

Trees:	*Alnus rubra*	Red Alder
	Acer circinatum	Vine Maple
Shrubs:	*Rubus discolor*	Himalayan Blackberry
	R. ursinus	Trailing Blackberry
	R. spectabilis	Salmonberry
Forbs:	*Epilobium angustifolium*	Fireweed
	Poaceae	Grasses
	Polystichum munitum	Sword Fern
	Pteridium aquilinum	Bracken Fern
	Agrostis alba	Redtop Bentgrass

5. Coniferous Forest

Trees:	*Pseudotsuga menziesii*	Douglas Fir
	Thuja plicata	Western Red-Cedar
	Tsuga heterophylla	Western Hemlock
	Acer circinatum	Vine Maple
	Alnus rubra	Red Alder
Shrubs:	*Berberis aquifolium*	Tall Oregon Grape
	Rubus parviflorus	Thimbleberry
	R. ursinus	Trailing Blackberry
	R. spectabilis	Salmonberry
	Gaultheria shallon	Salal
	Sambucus racemosa	Red Elderberry
	Oplopanax horridum	Devil's Club
Forbs:	*Achlys triphylla*	Vanilla Leaf
	Galium aparine	Cleavers
	Poaceae	Grasses
	Maianthemum dilatatum	False Lily-of-the-Valley
	Montia sibirica	Western Spring Beauty
	Polystichum munitum	Sword Fern
	Pteridium aquilinum	Bracken Fern
	Smilacina racemosa	False Solomon's Seal
	Tolmiea menziesii	Pig-a-back
	Linnaea borealis	Twinflower

6. Coniferous Forest

Trees:	None	
Shrubs:	*Pseudotsuga menziesii*	Douglas Fir (sapling)
	Alnus rubra	Red Alder (sapling)
	Rubus ursinus	Trailing Blackberry
	R. spectabilis	Salmonberry
	R. discolor	Himalayan Blackberry
	R. parviflorus	Thimbleberry
Forbs:	*Epilobium angustifolium*	Fireweed
	Polystichum munitum	Sword Fern
	Agrostis alba	Redtop Bentgrass
	Pterdium aquilinum	Bracken Fern
	Poaceae	Grasses

7. Mixed Coniferous Forest

Trees:	*Acer macrophyllum*	Big-leaf Maple
	Alnus rubra	Red Alder
	Pseudotsuga menziesii	Douglas Fir
	Thuja plicata	Western Red-Cedar
	Tsuga heterophylla	Western Hemlock
Shrubs:	*Berberis aquifolium*	Tall Oregon Grape
	Rubus parviflorus	Thimbleberry
	R. ursinus	Trailing Blackberry
	R. spectabilis	Salmonberry
	Sambucus racemosa	Red Elderberry
Forbs:	*Galium aparine*	Cleavers
	Maianthemum dilatatum	False Lily-of-the-Valley
	Montia sibirica	Western Spring Beauty
	Polystichum munitum	Sword Fern
	Pteridium aquilinum	Bracken Fern
	Smilacina racemosa	False Solomon's Seal
	Tolmiea menziesii	Pig-a-back
	Achlys triphylla	Vanilla Leaf
	Blechnum spicant	Deer Fern
	Poaceae	Grasses

8. Shrubland

Trees:	*Acer circinatum*	Vine Maple
	Alnus rubra	Red Alder
	Pseudotsuga menziesii	Douglas Fir
	Tsuga heterophylla	Western Hemlock
Shrubs:	*Holodiscus discolor*	Creambush Oceanspray
	Rubus ursinus	Trailing Blackberry
	R. spectabilis	Salmonberry
	R. discolor	Himalayan Blackberry
	Sambucus racemosa	Red Elderberry
	Cytisus scoparius	Scot's Broom
Forbs:	*Anaphalis margaritacea*	Pearly Everlasting
	Epilobium angustifolium	Fireweed
	Polystichum munitum	Sword Fern
	Pteridium aquilinum	Bracken Fern
	Verbascum thapsus	Common Mullein
	Cirsium arvense	Canadian Thistle
	Tolmiea menziesii	Pig-a-back
	Equisetum arvense	Horsetail
	Ranunculus repens	Creeping Buttercup
	Rumex spp.	Docks
	Poaceae	Grasses

9. Grassland

Trees:	None	
Shrubs:	*Rubus ursinus*	Trailing Blackberry
	Agrostis alba	Redtop Bentgrass
	Cirsium arvense	Canadian Thistle
	Elymus glaucus	Western Rye Grass
	Holcus lanatus	Common Velvetgrass
	Phleum sp.	Timothy
	Poa pratensis	Kentucky Bluegrass
	Senecio spp.	Ragworts
	Trifolium spp.	Clovers
	Rumex spp.	Docks
	Taraxacum spp.	Dandelions

10. Talus Slope/Rock

Trees:	None	
Shrubs:	*Alnus rubra*	Red Alder (sapling
	Pseudotsuga menziesii	Douglas Fir (sapling)
	Tsuga heterophylla	Western Hemlock (sapling)
Forbs:	*Agrosta alba*	Redtop Bentgrass
	Anaphalis margaritacea	Pearly-everlasting
	Crucifer	unknown Mustard
	Poaceae	Grasses
	Hypericum perfoliatum	St. Johnswort
	Trifolium spp.	Clovers
	Verbascum thapsus	Common Mullein
	Epilobium angustifolium	Fireweed

11. Roadway/Railroad

Trees:	None	
Shrubs:	*Rubus discolor*	Himalayan Blackberry
	R. spectabilus	Salmonberry
Forbs:	*Cirsium arvense*	Canadian Thistle
	Achillea millefolium	Yarrow
	Epilobium angustifolium	Fireweed
	Anaphalis margaritacea	Pearly-everlasting
	Senecio spp.	Ragworts
	Verbascum thapsus	Common Mullein
	Poaceae	Grasses

Wetland Habitat Types

1. Forested Swamp

Trees:	*Alnus rubra*	Red Alder
	Fraxinus latifolia	Oregon Ash
	Populus balsamifera	Black Cottonwood
	Thuja plicata	Western Red-Cedar
	Tsuga heterophylla	Western Hemlock
	Picea sitchensis	Sitka Spruce
Shrubs:	*Rubus spectabilis*	Salmonberry
	Salix spp.	Willows
	Acer circinatum	Vine Maple
Forbs:	*Lysichitum americanum*	Skunk Cabbage
	Oenanthe sarmentosa	Pacific Water-parsley
	Scirpus spp.	Bulrush
	Epilobium watsonii	Watson's Willow-herb
	Juncus effusus	Soft Rush
	Petasites Frigiduc	Colts Foot
	Glyceria sp.	Mannagrass
	Heracleum Lanatum	Cow Parsnip

2. Shrub Swamp

Trees:	None	
Shrubs:	*Salix hookeriana*	Hooker's Willow
	Salix spp.	Willow
Forbs:	*Scirpus cyperinus*	Woolgrass
	Agrostis sp.	Bentgrass

3. Emergent Marsh

Trees:	None	
Shrubs:	None	
Forbs:	*Agrostis alba*	Redtop Bentgrass
	Carex spp.	Sedge
	Holcus lanatus	Common Velvetgrass
	Juncus effusus	Soft Rush
	Poa spp.	Bluegrass
	Ranunculus flammula	Creeping Buttercup
	Scirpus cyperinus	Woolgrass
	Eleocharis spp.	Spike-Rush
	Typhus latifolia	Common Cattail
	Equisetum spp.	Horsetail

4. Moss

Trees:	None	
Shrubs:	None	
Forbs:	*Agrostis alba*	Redtop Bentgrass
	Bryophyta	Mosses
	Chara sp.	Stonewort
	Ranunculus flammula	Creeping Buttercup
	Spirogyra sp.	Green Algae
	Zygnema sp.	Green Algae

5. Mudflat

Trees:	None	
Shrubs:	None	
Forbs:	*Bryophyta*	Mosses
	Chara sp.	Stonewort
	Spirogyra sp.	Green Algae
	Zygnema sp.	Green Algae

6. Riverbed

Trees:	None	
Shrubs:	None	
Forbs:	*Spirogyra sp.*	Green Algae
	Zygnema sp.	Green Algae

7. Open Water

Trees:	None	
Shrubs:	None	
Forbs:		phytoplankton
		floating algae

Bird Species of Howard Hanson Reservoir

Gavia immer	Common Loon
Aechmophorus occidentalis	Western Grebe
Ardea herodias	Great Blue Heron
Butorides virescens	Green Heron
Cathartes aura	Turkey Vulture
Branta canadensis	Canada Goose
Aix sponsa	Wood Duck
Anas crecca	Green-winged Teal
A. platyrhynchos	Mallard
A. strepera	Gadwall
A. americana	American Wigeon
Aythya collaris	Ring-necked Duck
Aythya affinis	Lesser Scaup
Histrionicus histrionicus	Harlequin Duck
Bucephala islandica	Barrow's Goldeneye
B. albeola	Bufflehead
Lophodytes cucullatus	Hooded Merganser
Mergus merganser	Common Merganser
Pandion haliaetus	Osprey
Haliaeetus leucocephalus	Bald Eagle
Circus cyaneus	Northern Harrier
Accipiter striatus	Sharp-shinned Hawk
A. cooperii	Cooper's Hawk
A. gentilis	Northern Goshawk
Buteo jamaicensis	Red-tailed Hawk
Falco sparverius	American Kestrel
F. columbarius	Merlin
Dendragapus obscurus	Blue Grouse
Bonasa umbellus	Ruffed Grouse
Charadrius vociferus	Killdeer
Tringa melanoleuca	Greater Yellowlegs
T. solitaria	Solitary Sandpiper
Actitis macularia	Spotted Sandpiper
Calidris mauri	Western Sandpiper
Gallinago gallinago	Common Snipe
Larus californicus	California Gull
Columba fasciata	Band-tailed Pigeon
Zenaida macroura	Mourning Dove
Bubo virginianus	Great Horned Owl
Glaucidium gnoma	Northern Pygmy-Owl
Strix occidentalis	Spotted Owl
S. varia	Barred Owl
Chordeiles minor	Common Nighthawk
Cypseloides niger	Black Swift
Chaetura vauxi	Vaux's Swift
Selasphorus rufus	Rufous Hummingbird
Ceryle alcyon	Belted Kingfisher
Sphyrapicus ruber	Red-breasted Sapsucker

Picoides pubescens	Downy Woodpecker
P. villosus	Hairy Woodpecker
Colaptes auratus	Northern Flicker
Dryocopus pileatus	Pileated Woodpecker
Contopus cooperi	Olive-sided Flycatcher
C. sordidulus	Western Wood-Pewee
Empidonax traillii	Willow Flycatcher
E. hammondii	Hammond's Flycatcher
E. difficilis	Pacific-slope Flycatcher
Lanius excubitor	Northern Shrike
Vireo cassinii	Cassin's Vireo
V. huttoni	Hutton's Vireo
V. gilvus	Warbling Vireo
V. olivaceus	Red-eyed Vireo
Perisoreus canadensis	Gray Jay
Cyanocitta stelleri	Steller's Jay
Corvus brachyrhynchos	American Crow
C. corax	Common Raven
Progne subis	Purple Martin
Tachycineta bicolor	Tree Swallow
T. thalassina	Violet-green Swallow
Stelgidopteryx serripennis	Northern Rough-winged Swallow
Riparia riparia	Bank Swallow
Hirundo pyrrhonota	Cliff Swallow
H. rustica	Barn Swallow
Poecile atricapillus	Black-capped Chickadee
P. rufescens	Chestnut-backed Chickadee
Psaltriparus minimus	Bushtit
Sitta canadensis	Red-breasted Nuthatch
Certhia americana	Brown Creeper
Thryomanes bewickii	Bewick's Wren
Troglodytes troglodytes	Winter Wren
Cistothorus palustris	Marsh Wren
Cinclus mexicanus	American Dipper
Regulus satrapa	Golden-crowned Kinglet
R. calendula	Ruby-crowned Kinglet
Myadestes townsendi	Townsend's Solitaire
Catharus ustulatus	Swainson's Thrush
C. guttatus	Hermit Thrush
Turdus migratorius	American Robin
Ixoreus naevius	Varied Thrush
Sturnus vulgaris	European Starling
Anthus rubescens	American Pipit
Bombycilla cedrorum	Cedar Waxwing
Vermivora celata	Orange-crowned Warbler
V. ruficapilla	Nashville Warbler
Dendroica petechia	Yellow Warbler
D. coronata	Yellow-rumped Warbler
D. nigrescens	Black-throated Gray Warbler

D. townsendi	Townsend's Warbler
D. occidentalis	Hermit Warbler
Oporornis tolmiei	MacGillivray's Warbler
Geothlypis trichas	Common Yellowthroat
Wilsonia pusilla	Wilson's Warbler
Piranga ludoviciana	Western Tanager
Pipilo maculatus	Spotted Towhee
Passerculus sandwichensis	Savannah Sparrow
Passerella iliaca	Fox Sparrow
Melospiza melodia	Song Sparrow
Zonotrichia leucophrys	White-crowned Sparrow
Z. atricapilla	Golden-crowned Sparrow
Junco hyemalis	Dark-eyed Junco
Pheucticus melanocephalus	Black-headed Grosbeak
Agelaius phoeniceus	Red-winged Blackbird
Sturnella neglecta	Western Meadowlark
Euphagus cyanocephalus	Brewer's Blackbird
Molothrus ater	Brown-headed Cowbird
Carpodacus purpureus	Purple Finch
C. mexicanus	House Finch
Loxia curvirostra	Red Crossbill
Carduelis pinus	Pine Siskin
C. tristis	American Goldfinch
Coccothraustes vespertinus	Evening Grosbeak
Passer domesticus	House Sparrow

Mammal Species of Howard Hanson Reservoir

Didelphidae:	*Didelphis virginiana*	Virginia Oppossum
Soricidae:	*Sorex vagrans*	Vagrant Shrew
	S. obscurus	Dusky Shrew
	S. palustris	Northern Water Shrew
	S. bendirii	Marsh Shrew
Talpidae:	*Neurotrichus gibbsi*	Shrew-mole
	Scapanus townsendii	Townsend Mole
	S. orarius	Coast Mole
Vespertilionidae:	*Myotis lucifugus*	Little Brown Bat
	M. yumanensis	Yuma Myotis
	M. keeni	Keen Myotis
	M. evotis	Long-eared Myotis
	M. volans	Long-legged Myotis
	M. californicus	California Myotis
	Lasionycteris noctivagans	Silver-haired Myotis
	Eptesicus fuscus	Big Brown Bat
	Lasiurus cinereus	Hoary Bat
	Plecotus townsendii	Townsend's Big-eared Bat
Leporidae:	*Ochotona princeps*	Pika
	Lepus americanus	Snowshoe Hare
Aplodontidae:	*Aplodontia rufa*	Mountain Beaver
Sciuridae:	*Eutamias townsendii*	Townsend's Chipmunk
	Tamiasciurus douglasii	Douglas Squirrel
	Glaucomys sabrinus	Northern Flying Squirrel
Castoridae:	*Castor canadensis*	Beaver
Cricetidae:	*Peromyscus maniculatus*	Deer Mouse
	Neotoma cinerea	Bushy-tailed Woodrat
	Phenacomys intermedius	Heather Vole
	Clethrionomys gapperi	Boreal Red-backed Vole
	Microtus townsendii	Townsend's Vole
	M. longicaudus	Longtail Vole
	M. oregoni	Oregon Vole
	Ondatra zibethica	Muskrat
Zapodidae:	*Zapus trinotatus*	Pacific Jumping Mouse
Erethizontidae:	*Erethizon dorsatum*	Porcupine
Ursidae:	*Ursus americanus*	Black Bear
Procyonidae:	*Procyon lotor*	Racoon

Mustelidae:	*Martes americana*	Marten
	Mustela erminea	Short-tailed Weasel
	M. frenata	Long-tailed Weasel
	M. vison	Mink
	Lutra canadensis	River Otter
	Spilogale putorius	Spotted Skunk
	Mephitis mephitis	Striped Skunk
Canidae:	*Canis latrans*	Coyote
	Vulpes fulva	Common Red Fox
Felidae:	*Felis concolor*	Mountain Lion
	Lynx rufus	Bobcat
Cervidae:	*Cervus canadensis*	Rocky Mountain Elk
	Odocoileus hemionus	Black-tailed Deer

Reptile Species of Howard Hanson Reservoir

Anguidae:	*Gerrhonotus coeruleus*	Northern Alligator Lizard
Colubridae:	*Thamnophis sirtalis*	Common Garter Snake
	T. elegans	Western Garter Snake
	T. ordinoides	Northwestern Garter Snake

Amphibian Species of Howard Hanson Reservoir

Ambystomidae:	*Ambystoma gracile*	Northwestern Salamander
	A. macrodactylum	Long-toed Salamander
Plethodonidae:	*Plethodon vehiculum*	W. Red-backed Salamander
	P. larselli	Larch Mountain Salamander
	Ensatina eschscholtzi	Escholtz's Salamander
Salmandridae:	*Taricha granulosa*	Rough-skinned newt
Leiopelmatidae:	*Ascaphus truei*	Tailed Frog
Bufonidae	*Bufo boreas*	Western Toad
Hylinidae:	*Hyla regilla*	Pacific Treefrog
Ranidae	*Rana aurora*	Red-legged Frog
	R. cascadae	Cascades Frog

UNITED STATES DEPARTMENT OF COMMERCE
Office of the Under Secretary for
Oceans and Atmosphere
Washington, D.C. 20230

May 6, 1998

Kris Loll
Civil Projects & Planning Branch
US Army Corps of Engineers, Seattle District
PO Box 3755
Seattle, WA 98124-3755

Dear Mr. Loll:

Enclosed are comments on the Draft Environmental Impact Statement for Additional Water Storage Project, Howard Handson Dam, Green River, Washington. We hope our comments will assist you. Thank you for giving us an opportunity to review this document.

Sincerely,

Susan B. Fruchter

Susan B. Fruchter
Acting NEPA Coordinator

Enclosure

Printed on Recycled Paper

MEMORANDUM FOR: Susan B. Fruchter
Acting NEPA Coordinator

FROM: Charles W. Challstrom
Acting Director, National Geodetic Survey

SUBJECT: DEIS-9804-14-Additional Water Storage Project, Howard Hanson Dam, Green River, Washington

The subject statement has been reviewed within the areas of the National Geodetic Survey's (NGS) responsibility and expertise and in terms of the impact of the proposed actions on NGS activities and projects.

All available geodetic control information about horizontal and vertical geodetic control monuments in the subject area is contained on the NGS home page at the following Internet World Wide Web address: http://www.ngs.noaa.gov. After entering the NGS home page, please access the topic "Products and Services" and then access the menu item "Data Sheet." This menu item will allow you to directly access geodetic control monument information from the NGS data base for the subject area project. This information should be reviewed for identifying the location and designation of any geodetic control monuments that may be affected by the proposed project.

F01-1 If there are any planned activities which will disturb or destroy these monuments, NGS requires not less than 90 days' notification in advance of such activities in order to plan for their relocation. NGS recommends that funding for this project includes the cost of any relocation(s) required.

For further information about these monuments, please contact Rick Yorczyk; SSMC3, NOAA, N/NGS; 1315 East West Highway; Silver Spring, Maryland 20910; telephone: 301-713-3230 x142; fax: 301-713-4175.

F01-1 Comment noted.

DEPARTMENT OF HEALTH & HUMAN SERVICES Public Health Service

Centers for Disease Control
and Prevention (CDC)
Atlanta GA 30341-3724

June 15, 1998

U.S. Army Corps of Engineers, Seattle District
Planning Branch (CENWS-PM-CP)
Attn: Ms. Kris Loll
P.O. Box 3755
Seattle, WA 98124-2255

Dear Ms. Loll:

We have completed our review of the Draft Environmental Impact Statement (DEIS) for the Additional Water Storage Project, Howard Hanson Dam, Green River, Washington. We are responding on behalf of the U.S. Public Health Service, Department of Health and Human Services.

F02-1 We believe this DEIS is well written, the need for this project has been well established, and we believe our potential concerns have generally been addressed. We noted that the proposed combined water supply and restoration project was subjected to an agency resolution process involving Washington State Departments of Ecology, Fish and Wildlife, US Fish and Wildlife Service, the Muckleshoot Indian Tribe, the City of Tacoma and the Corps of Engineers. We also noted that the preferred alternative, the phased adaptive management plan which provided early outputs of water supply and restoration benefits, would result in the least amount of habitat loss of the three build alternatives, and the least amount of cumulative impact.

Thank you for the opportunity to review and comment on this DEIS. Please send us a copy of the Final EIS, and any future environmental impact statements which may indicate potential public health impact and are developed under the National Environmental Policy Act (NEPA).

Sincerely,

Kenneth W. Holt

Kenneth W. Holt, MSEH
Special Programs Group (F16)
National Center for Environmental Health

F02-1 Will incorporate requirement for relocation of destroyed or disturbed NGS monuments, within the project area, in the plans and specifications for the project as required.

Postm 6/12/1

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
P.O. Box 47600 • Olympia, Washington 98504-7600
(360) 407-6000 • TDD Only (Hearing Impaired) (360) 407-6006

June 11, 1998

Kris Loll
US Army Corps of Engineers
PO Box 3755
Seattle WA 98124-3755

Dear Ms. Loll:

Thank you for the opportunity to comment on the environmental impact statement for the Howard Hanson Dam Additional Water Storage Project.

S01-1 Consistent with the Department of Ecology's responsibilities as Washington State's coordinator for the National Environmental Policy Act, we are forwarding the comments received from the State of Washington, Department of Fish and Wildlife. If you have any questions on the comments made by Washington Department of Fish and Wildlife, please call Mr. Gary Engman at (425) 775-1311.

Sincerely,

Barbara J. Ritchie
Environmental Coordination Section

BJR:ri
EIS #982404

Attachment

S01-1 Comment noted.

STATE OF WASHINGTON
DEPARTMENT OF FISH AND WILDLIFE
16018 Mill Creek Boulevard • Mill Creek, Washington 98012 • (206) 775-1311 FAX (206) 338-1066

June 9, 1998

Ms. Kris Loll, Project Manager
U. S. Army Corps of Engineers, Seattle District
Post Office Box 3755
Seattle. Washington 98124-3755

RE: U. S. Army Corps of Engineers Howard Hanson Dam Additional Water Storage Project, Green River, Draft Feasibility Report and EIS, April 1998.

Dear Ms. Loll:

We received the above referenced documents concerning the proposed Howard Hanson Dam Additional Water Storage Project (AWSP) and have the following comments.

S02-1 At the outset, we need to make it clear these comments refer to the main report only. Detailed review of the accompanying nine appendices, totaling over 1000 pages of material involving complex issues, was simply not possible within the constraints of the preset response deadline; our good faith request for an extension of the response deadline was denied. Our comments therefore reflect only those questions or issues we were able to discover; no conclusions should be reached as to issues not discussed herein.

General Comments

Washington Department of Fish and Wildlife (WDFW) Director Bern Shanks' November 17, 1997 letter to Mark Crisson, Director Tacoma Public Utilities, and Colonel James M. Rigsby, U. S. Army Corps of Engineers, stated that "....realization of the resource benefit potential of the AWSP is absolutely dependant on commitment to and effective implementation of the following principles:

S02-2
1) clear commitment that Howard Hanson Dam refill and storage management will be dedicated to and directed to fishery resource conservation and enhancement;

2) provide for continuous project operation during refill and storage management periods;

3) state-of-the-art enhancement of snow pack monitoring and runoff forecasting;

S02-1 The draft DFR/EIS is the result of a collaborative process involving federal, state and local resource agencies (see agency resolution letters in Appendix I), the Muckleshoot Indian Tribe, non-governmental organizations, and the public. The technical appendices describe a variety of studies conducted since 1989 and include evaluations of fish and wildlife resources of the Green River Basin. Some of these studies were previously provided to WDFW in draft form for review and comment. Some of the WDFW comments on the draft DFR/EIS were addressed in the appendices. Additional fish and wildlife studies will be conducted during the three year Preliminary Evaluation and Design (PED) phase of the project; during this period WDFW will have additional opportunity to comment on Green River fish and wildlife studies.

S02-2 Below are responses to each of the stated principles:

1 - In Section 1.5 Existing Howard A. Hanson Dam Project, the current operating strategy is accurately described as reflecting a variety of natural resource needs, recreational opportunities and local community requests. The proposed operating strategy is described in Section 4.2 Recommended Plan: Hydrologic Considerations. Under Phase I of the proposed project, refill timing and release rates will be based on target instream flows that will be adjusted yearly in response to weather conditions, snowpack, the amount of forecasted precipitation and biological input from fisheries resource managers. Proposed refill rules are designed to meet project objectives for protecting instream resources, meeting existing conservation storage requirements, and providing reliability for storing additional water for M&I and low flow augmentation. Rules to provide for recreational, community and other non-fishery resource needs were not included in the description of the proposed storage and release strategy.

The proposed operating strategy involves the use of a non-dedicated block of storage. The non-dedicated storage can be directed for release or dedicated storage provided reservoir refill rule curves are satisfied for the original 22,400 ac-ft of low flow augmentation and storage of water available to Tacoma under the P5 water right. Decisions on the use of the non-dedicated block of stored water will consider consultations with fish and wildlife resource agencies. Non-fishery resource needs are not a designated downstream delivery objective; however, where those non-fishery resource needs do not conflict with fishery objectives, every attempt will be made to satisfy multiple uses.

2 - Provisions for continuous project operation during the spring refill and summer storage management period have been included in the proposed operations plan. As

S02-2 Cont stated in Section 4.12 Recommended Plan, Operation and Maintenance:

"For 3½ months from 15 February to 1 June, the high activity rate at the fish passage facility will require up to 11 additional personnel to operate the gates, stoplogs, and fish discharge equipment. Coordinating the main gates and the fish passage gate is sufficiently time consuming to require additional staffing. The additional staff will work three shifts per day, generally three persons per shift. The rate of pool fill during this period and the rate of outmigration requires operation through the night. The design team will examine controlling the pool fill so as to eliminate the third shift by preventing the need for nighttime stop log installations. The pool raise staffing equates to 5 FTE.

During the summer and fall months, stoplog changes will not be so frequent, and pool elevation can be managed to allow stoplog operation during the day shift. Personnel will be needed to remove the stoplogs, but will not be needed full time. Assuming that the outflow does not exceed 1250 cfs, the fish passage gate will control the flow and the main gates will not be needed. Therefore flow control will not require staffing above current levels. However, three man crews will be required for the occasional stop log removal. Upland habitat maintenance will be scheduled for this time. The total staffing for these months equates to 3 FTE."

Opportunities for automating project operations to improve responsiveness, while reducing the level of project staffing described in the DFR/DEIS, will be explored during the PED phase of the project.

3 - During PED we will investigate whether additional snowpack monitoring and improved runoff forecasting will benefit the reliability and flexibility of spring water storage and release. If it determined to be beneficial, the Corps and Tacoma are committed to enhancing monitoring/forecasting and will develop details of an expanded monitoring/forecasting plan during the PED project phase.

4 - Effective procedures for risk-sharing between municipal water supply and fishery resource needs have been implemented throughout the HHD AWS project. In response to agency and tribal concerns regarding potential risks to fishery resources, an Agency Resolution Process (DFR/DEIS, Paragraph 3.1.2.3b) was convened. As a result of this process, the Corps and Tacoma agreed to phased implementation of the HHD AWS Project. This phased approach incorporates an adaptive management process that conditions Phase II of the project on the demonstration that environmental impacts can be sufficiently minimized and mitigated. This phased approach presents significant risk

S02-2 Cont. to municipal and industrial water supply project benefits, a risk that is conditioned on satisfying fishery resource concerns.

Shared risk between municipal water supply and fishery resources is also demonstrated under Phase I of the HHD AWS Project. Under Phase I, only the quantity of water available for municipal and industrial use (M&I) under Tacoma's existing water right will be held as dedicated storage behind HHD. Under Tacoma's existing water right, water is only available when instream flows exceed a minimum flow regime developed in an agreement between Tacoma and the MIT. The Tacoma/MIT flow agreement specifies a minimum flow regime that exceeds Washington State instream flow requirements. During drought years, the quantity of water available for municipal and industrial use will be reduced whenever instream flows drop below the Tacoma/MIT minimum flow regime. During drought conditions, the actual quantity of dedicated municipal water held behind HHD at the end of the spring storage period reflects the shared risk between municipal water supply and fishery resource needs.

Under the HHD AWSP, operating procedures have been proposed to limit potential conflicts between municipal water supply and fishery resource needs. Under Phase I of the proposed project, proposed refill rules are designed to meet project objectives for protecting instream resources and providing reliability for storing additional water for M&I and fishery resource needs. Refill timing, storage and release rates will be adjusted on a real-time basis in response to input from fisheries resource managers.

The proposed operating strategy involves the use of dedicated and non-dedicated blocks of storage. The quantity of water available to Tacoma under the P5 water right will be held on a daily basis as dedicated storage. The non-dedicated storage (Dampen dam) can be directed for release to meet immediate fishery resource needs or stored for later low flow augmentation to benefit fishery resources. Springtime operations, where they do not conflict with flood control responsibilities, will be responsive to fishery resource agency and tribal direction. This operating strategy was designed to minimize conflicts between municipal water supply and fishery resource needs by giving fishery resource managers much greater opportunity, and responsibility, for managing flows in the Green River.

5 - A monitoring and evaluation program is proposed for the first 15 years following project construction as described in Appendix F, Section 10: Proposed Adaptive Management Monitoring and Evaluation Program. The results of these surveys will assess the efficacy of proposed mitigation and enhancement measures and identify

4) effective procedures for risk sharing between municipal supply and fishery resource needs, including use of municipal storage to meet fish needs when storage flexibilities are not adequate;

S02-2 Cont.

5) fund and implement monitoring and use results to effectively modify project procedures and design; and

6) restore fish habitats where appropriate and where significant benefits can be demonstrated."

Our endorsement of the project also hinges on the effective implementation of these very important principles. In our reading of the draft Feasibility Report and Environmental Impact Statement (DFR/DEIS), commitment to these points was unclear. We request an explicit and detailed discussion as to how each of these principles will be addressed through AWSP design, construction and operation. These are essential to fulfillment of our stated goals in regard to fishery resource protection, restoration and enhancement.

S02-3 In the DFR/DEIS, the proposed fish passage facilities and reestablishment of anadromy to the upper watershed are characterized as keystones of the restoration project. We agree with the importance of these elements. However, also very important to the overall restoration of Green River fisheries resources is greater protection of downstream resources. In broad terms, the existing project, as defined and limited by its Congressional mandate has both harmed and benefitted Green River fisheries resources. At present, the existing project benefits fall salmon spawning at the expense of spring outmigration and steelhead incubation survival. These are the consequences of spring refill, constraints on the use of conservation storage, and project operations to serve purposes other than resource protection and restoration. Effectively doubling the amount of storage that is intended to be captured every spring, while correcting rather than exacerbating existing problems, will require greatly expanded attention and dedication to meeting fishery resource needs.

S02-4 Additionally, our endorsement of the AWSP, as outlined in our November 17, 1998 letter, was only for the Phase I portion of the proposed project. At various points in the DFR/DEIS it is implied that Phase II would proceed automatically. We wish to make it clear that our approval of Phase I was with the understanding that Phase II would not proceed without specific further approval by the resource agencies and Muckleshoot Tribe.

Specific Comments

S02-5 1.5.6., page 8. With regard to Howard Hanson Dam (HHD) discharge adjustments to accommodate purposes other than fishery resource needs, the inherent incompatibility of such potential actions must be clearly recognized. One event can nullify months or years of effort to protect and restore fisheries resources.

S02-2 Cont. whether the level of project impacts are as anticipated.

The adaptive management process provides for changes in operational strategies to minimize project impacts following construction. Changes in operating guidelines for refill and storage are assumed to address many of the potential project effects. Maintenance and necessary modifications will be made to the non-fish passage related mitigation and restoration measures. Detailed study plans on the field methods and data analysis procedures to be employed will be developed during the PED phase prior to project construction.

6 - A detailed description of proposed measures to restore fish habitats in the Green River Basin is included in Appendix F, Part 1: Fish Mitigation and Restoration and summarized in Section 8: Restoration and Mitigation Plan Summary.

S02-3 Comment noted. See Comment-Reply S02-2.

S02-4 We concur. As stated in Section 4.1.2 Recommended Plan Description: Phase II, "Implementation of Phase II would be contingent upon acceptance by the regulatory agencies and the MIT".

S02-5 See response to SO2-2-1

Ms. Kris Loll
June 9, 1998
Page 3

S02-6 Ibid. We disagree that water management conflicts result from a lack of knowledge of what flows the resources require. Far more often, conflicts have arisen from non-resource needs taking precedence, incompatible project mandates and uncertainties in runoff forecasting.

S02-7 Ibid. Steelhead incubation may require substantially more than 50 days, depending on water temperatures and when spawning occurs.

S02-8 1.5.7., page 9. The option to annually store the additional 5,000 ac-ft is necessary to reduce the annual, and in some years, substantial loss of steelhead eggs through spawning sites (redds) being left high and dry by insufficient stream flows. To some extent this occurs every year but greatest losses usually occur in years with above average spring runoff. We recognize the incremental effect that storage of this water may have on juvenile outmigration survival and this will be a consideration in storage decisions every spring. But failure to store this water will, in most years, guarantee significant wild steelhead losses.

S02-9 1.6.5., page 16. We strongly agree that the capacity of the watershed to produce salmon and steelhead has been greatly reduced. Flow management practices of the existing project should also be listed among the "specific factors" especially in regard to steelhead.

S02-10 Ibid. Regarding Tacoma Headworks trap catches of adult salmon and steelhead, these catches are a mixture of upper and lower watershed origin fish and are not necessarily directly proportional to upper watershed releases or production.

S02-11 Ibid. WDFW has developed a preliminary wild steelhead escapement goal of 650 for the upper watershed.

Ibid, page 18. WDFW has adopted a wild salmonid policy.

S02-12 Ibid. Puget Sound steelhead are no longer under consideration for listing under Endangered Species Act.

S02-13 3.2.1.2.b.(11), page 69. We would appreciate some definition as to how self-sustainability will be defined. What assumptions are made regarding harvest? Stocks that are self-sustaining only with very restricted harvest will not achieve restoration goals and will curtail harvest opportunities on other healthier stocks.

S02-14 3.2.4.10., page 78. Regarding the fall-back fish collector, Alternative 9B2, how and when would this option be implemented?

S02-15 3.3.2.4.a.(3)., page 102. Here, and in subsequent sections, reference is made to supporting steelhead incubation flows through the end of June. While steelhead emergence begins in June,

S02-6 As noted in the document, water management conflicts arise from a combination of differing fishery resource needs, project mandates, uncertainties in runoff forecasting and non-fishery resource needs. The proposed adaptive management strategy is predicated on the opportunity to modify storage and release practices to benefit fishery resources as we gain knowledge and experience.

S02-7 The rationale and limitations of the assumption that steelhead incubation extends over a 50-day period are described in Appendix F, Section 6, Green River Steelhead Spawning and Incubation. As noted in that document:
The assumption that embryonic development, from fertilization to emergence, lasts 50-days is a simplification. The time required for egg incubation and alevin development to the emergent fry stage is dependent upon the accumulation of Fahrenheit Temperature Units (FTUs), which in turn is a function of water temperature. Burton and Little (1997) found that winter steelhead fry emerge from the gravel in the Cedar River after accumulating between 1045 and 1284 mean Fahrenheit Temperature Units (FTUs), with mean emergence at about 1165 FTUs. Green River water temperatures during the incubation period range from about 45 degrees Fahrenheit in early March to about 62 degrees Fahrenheit in mid August. In the Green River, the number of days required to accumulate 1165 FTUs from March through June varies between 40 to 45 days for eggs fertilized near the end of June to 75 to 80 days for eggs fertilized in early March. For this analysis, 50 days was selected as the time between fertilization to emergence for modeling purposes. Based on the 50-day assumption, the steelhead spawning and incubation model developed for this analysis projected that fry would emerge from the gravel between April 20 (early March spawn) and August 19 (late June spawn) (Table 2). In reality, fifty days underestimates development time for eggs fertilized in March through the first two weeks in May, and overestimates development time for eggs fertilized during the last two weeks in June. Fifty days is a good estimate for eggs fertilized during the last two weeks in May through the first two weeks in June.

S02-8 For planning purposes, release of the 5,000 ac-ft stored under the Section 1135 process was assumed to maintain an instream flow in the Green River of 250 cfs at the USGS gage near Auburn during drought conditions. The Section 1135 Project incorporates an adaptive management process that allows changes to the frequency of storage, reservoir refill strategy and storage release schedule. Use of the Section 1135 storage volume to benefit steelhead incubation is one of several potential opportunities to augment flows to benefit fisheries resources.

S02-9 Comment noted.

S02-10 Comment noted. Adult salmon captured at the Tacoma Headworks are not currently released above Howard Hanson Dam.

S02-11 Comments noted. Based on production potential estimates of the upper watershed, an escapement of 1,300 adult steelhead was used in the analysis of project impacts and potential benefits. The production potential estimate was derived from data on potential accessibility of tributary streams based on surveys of the upper watershed conducted by USFWS, USFS, Plum Creek Timber Company, US Army Corps of Engineers, and City of Tacoma personnel.

S02-12 Comment noted.

S02-13 The analysis of the potential to restore self-sustaining anadromous fish runs above the project is described in Appendix F, Section 8:Restoration and Mitigation Plan Summary, Part E: Incremental Analysis of Restoration and Mitigation Project. A range of harvest rates were initially used for each salmonid species adult run size under different parameters of dam passage, instream and ocean survival. Harvest rates used in the final incremental analysis reflect the long-term average harvest rates of lower watershed salmon and steelhead from the late 1970's to the 1990's.

Harvest rates for salmon populations in the Green/Duwamish River system peaked in the 1980's: chinook salmon harvest for all Puget Sound rivers ranged from 69-83% (NMFS press release February 27, 1998); coho salmon harvest in the Green River was assumed to average 90% from 1986-1991 (WDFW draft Wild Salmonid Policy, 1995). In the 1990's with five years of El Nino ocean conditions (1992-1995, 1997), adult harvest has been drastically reduced with total closures in several years. For the final incremental analysis, the fish passage model preferred alternative (See Appendix B, Cost-Benefit, Tables 1-8), long-term harvest rates were assumed to be lower than the peak 1980 years, but higher than the 1990's: 70% for coho, 35% for steelhead, 55% for fall chinook.

Adult harvest rates are one of several mortality factors influencing the number of adults returning to spawn that are required to maintain existing runs or that could be necessary for recovery and restoration of runs to the upper watershed. The actual level of adult harvest is determined on an annual basis in a cooperative effort between WDFW and the tribes. The recent proposed listing of Puget Sound chinook as a threatened species under the Endangered Species Act (ESA) adds an additional complexity to salmon harvest management. Restoration of self-sustaining, naturally reproducing runs of adult salmon and steelhead is a major project objective; however, the Corps and the City of

S02-13 Cont. Tacoma do not govern harvest levels in the Green River. The final incremental analysis describes potential project benefits under various assumptions of reservoir and dam passage, instream and ocean survival and adult harvest. A 70% adult harvest level for coho, 35% for steelhead and 55% for fall chinook was assumed to be an inviolate component of the salmonid life cycle in the Green River.

S02-14 An upstream fish collector (Alternative 9B1 or 9B2) is considered a fall-back option should a fatal design or operational flaw be identified during the PED phase. If Alternative 9A8 is found to be unacceptable during the PED phase, the combination of 9A4 and 9B1 will be given consideration as the next best alternative. Once Alternative 9A8 is constructed, consideration of an upstream collector (Alternative 9B1) would require new Section 216 authorization.

Two versions of an upstream fish collector were initially evaluated, Alternative 9B1 which includes trucking as a downstream transport mechanism and 9B2 which includes an open channel flume for downstream transport. The upstream collector options were considered both as single facility alternatives and combined with downstream fish passage facilities located at the dam (9A1-7). In the initial incremental analysis, Alternative 9B1 when combined with Alternative 9A4 ("gulper" on existing tower) was incrementally justified as the least-cost alternative that met escapement goals under most scenarios. Following review of the initial incremental analysis, the Corps and Tacoma entered into an Agency Resolution Process. It was during this process that Alternative 9A8 was identified and developed (new intake tower, horn and fish lock and MIS screen of 1,250 cfs capacity). A final incremental analysis and evaluation were completed following development of Alternative 9A8. This analysis incorporated the comments of the FPTC and included Alternative 9A8. The final list of alternatives that were selected by the model included 9A4, 9A8, and the combination of 9A4/9B1, 9A8/9B1 and 9A8/9B2 (see Table B2-19, Appendix B).

The analysis showed that while Alternative 9A4 provided a relatively low dollar cost per unit output ($94), as a single facility it would not provide the passage success required to produce sufficient numbers of returning adult salmon to support self-sustaining runs. It was also rejected by the FPTC for not meeting design criteria. Fish passage measure Alternative 9A8 is the least-cost facility that supports the goal of self-sustaining runs. The analysis showed an obvious difference in incremental cost per incremental output between 9A8 and the combination of 9A4 and the upstream collector 9B1. The incremental cost per incremental output of Alternative 9A8 is $188 while the cost of the combined 9A4/9B1 is $538. The incremental cost per incremental output of Alternative

S02-14 Cont. 9A8 and the upstream collector 9B1 is even higher at $1,019.

Based on the incremental analysis, combined Alternative 9A4/9B1 has a high likelihood of supporting self-sustaining runs of salmon and steelhead, but was rejected by the FPTC and was much more expensive than Alternative 9A8. Based on technical feasibility and incremental evaluation, Alternative 9A8 was recommended as the facility being in the federal interest. The use of the upstream collector 9B1 in combination with Alternative 9A4 will be considered a fall-back option during the PED phase, but following construction of Alternative 9A8, an upstream collector would only be considered under a new Section 216 authorization.

S02-15 Depending on the amount of precipitation and reservoir refill operating rules, storage of water would occur between 15 February and 30 June. During this period, priorities for use of inflow are for reservoir refill and to satisfy downstream water demands including baseflows to protect steelhead incubation and other instream resources. Priorities for use of water that flows into Howard Hanson Reservoir during this time are described in Appendix F, Section 9 Modeling parameters for Baseline, Phase I and Phase II reservoir operations. Water can be stored after 30 June on an opportunistic basis under the adaptive management process, but for modeling purposes, it was assumed that following 30 June, the reservoir would switch from a refill condition to release of stored water for downstream flow augmentation. Flow augmentation during July and August will provide instream resource protection, including protection of steelhead egg incubation.

Ms. Kris Loll
June 9, 1998
Page 4

S02-15 Cont. emergence is not complete until late July to early August. Protection only through June perpetuates the existing problem for steelhead.

S02-16 4.1.2., page 118. "*Implementation of Phase II would be contingent upon acceptance by the* regulatory agencies and the MIT." Provided "regulatory agencies" is also intended to mean resource agencies (e.g., WDFW), this reflects our understanding.

S02-17 4.2.7., page 123. A listing of "primary refill rules" includes "....a stage decline of no more than 1 foot from 1 May to 30 June to protect incubating steelhead eggs...." The erroneous implication is that achievement of this objective will protect steelhead. Steelhead spawning begins in April and extends into June. Emergence is not complete until late July to early August. The option to annually store the supplemental *5,000 ac-ft is needed to help provide incubation flows through* emergence.

S02-18 Table 6-1, page 211. Chinook in the upper watershed are given a "....moderate chance...." of achieving self-sustaining returns. While we would welcome this prospect, based on apparent survival rates of lower Green River chinook, expected passage efficiency makes this unlikely. What additional or compensatory measures will be implemented if chinook are not sustainable?

S02-19 6.2.5.d., page 221-222. *Reference is made to improved recreational opportunities in the upper* watershed because of the "....large increase in the number of naturally spawning adult salmon and steelhead released in the Upper Watershed." All things considered, it is unlikely the upper watershed will be open for the taking of any anadromous fish.

S02-20 6.9.2., page 246. The stated goals of the AWSP include "....while maintaining **existing** anadromous salmonid populations...." (Emphasis added). Given the stressed condition of Green River fisheries resources, this would be a short-sighted goal. We believe that significant restoration and enhancement is possible.

S02-21 6.9.2.1.d., page 248. How will gravel nourishment at a rate that is only 50% of the estimated rate of loss (4.8.3., page 148) be able to "....maintain spawning habitat for salmon and steelhead."? If monitoring so indicates, will augmentation rate be increased?

S02-22 6.9.2.2.d., page 258. How will it be determined that the proposed riparian habitat mitigation, in combination with the enlarged reservoir surface area, will off-set production losses from habitat inundation losses for coho, chinook, and steelhead? If not, what additional measures will be employed to more fully achieve restoration goals?

S02-23 Ibid, page 261. Future prospects for lower watershed chinook are indeed unclear. Their future depends to a great degree on how well adaptive strategies for annual refill work out in actual practice. This underscores the need for flow management to be focused on fishery resource

S02-16 We concur. Regulatory agencies was intended to mean resource agencies.

S02-17 The reservoir refill rule guiding maximum stage declines was developed in cooperation with WDFW personnel and designed to protect incubating steelhead eggs. As noted in the response to SO2-15, after 30 June reservoir operations change from a refill mode of operation to release of stored water for downstream flow augmentation. Extending the refill rules past 30 June would provide little benefit since the reservoir will releasing water rather than storing water. The need for sustained baseflows to protect steelhead eggs remains through the July and early August period. Management measures to protect steelhead eggs during July and early August should focus on release of stored water rather than guidelines for reservoir refill.

S02-18 Should anticipated levels of reservoir and dam passage success not be achieved, or if other factors, such as ocean survival be identified as controlling influences, other reasonable and prudent alternatives may be considered under the adaptive management process. Under the adaptive management process, WDFW and the Muckleshoot Indian Tribe will determine management direction for the Green River salmon and steelhead stocks within the constraints of the NMFS listings under the ESA. Should self-sustaining runs be deemed infeasible, long-term supplementation of some stocks may be considered as one option to seed the upper watershed.

S02-19 We concur.

S02-20 We agree that fisheries resources in the lower watershed can be improved, and as stated on pg. 246, one of the goals of the AWSP is to restore selected aquatic habitat features of the lower watershed.

S02-21 As noted on Pg. 147, the proposed level of gravel nourishment is intended to maintain "an increment" of
existing spawning habitat in the Middle Green River. The objective of gravel nourishment is to slow or stop the downstream extension of streambed armoring and replenish certain areas presently deficient of spawning-sized sediments. The extent to which gravel nourishment successfully stops continued streambed armoring will be identified through monitoring and evaluation. A major concern of adding gravel-sized sediments to the Middle Green River is the potential effect on flood control measures in the lower river. As described in Appendix F, Section 4B Gravel Nourishment in the Middle and Upper Green River, a monitoring plan is proposed to track the travel distance, redistribution and deposition of the added gravel to minimize the risk of major

S02-21 Cont. downstream ramifications. Annual gravel placement would be reduced or halted if monitoring identifies problematic aggradation.

As a restoration measure, the maximum rate of gravel nourishment is capped by financial constraints.. If problematic gravel aggradation in the lower river is identified, the rate may be reduced. If monitoring identifies the value of an increased rate of gravel nourishment, funds for additional gravel must come from other sources.

S02-22 As described in Appendix F, Section 10: Proposed Adaptive Management Monitoring and Evaluation Program, Table 10-3, a monitoring and evaluation program is proposed for the first 15 years following project construction. The stability and biological effectiveness of instream habitat enhancement measures will be evaluated through physical and biological surveys. Juvenile salmonid distribution and growth in the reservoir will be monitored as will predator abundance in the reservoir and tributary confluences. The results of these surveys will help identify impacts of inundation on juvenile salmonid production and the efficacy of proposed mitigation measures. Maintenance and necessary modifications will be made to the non-fish passage related mitigation and restoration measures based on the results of the monitoring evaluations. Detailed study plans on the field methods and data analysis procedures to be employed will be developed during the PED phase prior to project construction.

S02-23 Comment noted.

needs.

S02-23 Cont. For steelhead, future status depends to a great degree on how well incubation losses can be controlled and reduced. Under present conditions, we believe these losses are the paramount limiting factor on lower river wild steelhead production.

S02-24 6.9.2.3.d., page 265. Regarding lower watershed chinook salmon, we agree that a determination cannot be made as to project effects. However, this conclusion appears to conflict with anticipations described at page 261.

S02-25 6.10.2.d., pages 271 and 272. Regarding flow adjustments and reservoir operations, controlling flow stage declines only during the period from May to June 30 will not protect wild winter steelhead eggs and alevins. See earlier discussions on this point.

S02-26 Ibid, page 273. It is stated that mitigation of existing project effects on steelhead was "....aimed to protect **existing** level of natural production in the Lower Watershed." (Emphasis added) and that this was the WDFW objective. The existing level of production is presently impaired by project operations, both accidental and intentional. It is our desire that these impairments be reduced to the fullest extent possible to restore these runs to their full potential which will be significantly greater than the **existing** level.

Thank you for the opportunity to provide comments.

Sincerely,

R. Gary Engman
Mitigation/Water Rights Division

cc: Muckleshoot Tribe
U. S. Fish and Wildlife Service
National Marine Fisheries Service
Department of Ecology

S02-24 We agree that biological project effects are uncertain, however, that does not obviate the need to describe anticipated effects under NEPA. Many of the operational strategies incorporate an adaptive management process to allow changes to be implemented as additional information is gathered through the monitoring and evaluation process. The adaptive management process was incorporated in response to the inherent inability to predict biological outcomes with certainty.

S02-25 See earlier response to SO2-15.

S02-26 Comment noted.

Tacoma Public Utilities

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17 JUN 1998
USACE
REGULATORY BRANCH

Mark Crisson
Director

3628 South 35th Street
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Divisions
Light
Water
Belt Line

June 15, 1998

Colonel James M. Rigsby
District Engineer
U.S. Army Corps of Engineers, Seattle District
P.O. Box 3755
Seattle, WA 98124-3755

Attn: Kris Loll, Civil Projects & Planning Branch

Re: Review of Howard Hanson Additional Water Storage Project (HHD AWSP)
Draft Feasibility Report/Draft Environmental Impact Statement (DFR/DEIS)

Dear Colonel Rigsby,

L01-1 As the local sponsor for the Howard Hanson Additional Water Storage Project, Tacoma Water has worked closely with the U.S. Army Corps of Engineers for several years. During this time, we have consistently tried to address the concerns expressed about the project by federal, state, and local resource agencies and the Muckleshoot Indian Tribe. We believe that the outcome of this multi-year dialogue and cooperative work effort has been the design of a municipal water storage project that works in concert with the needs of fish and wildlife resources. Now that the Feasibility phase of the project is coming to a close, we encourage the Corps of Engineers to move quickly into the Preliminary Engineering and Design phase so that the Howard Hanson Additional Water Storage Project can be implemented on schedule.

Our staff has reviewed the Howard Hanson Additional Water Storage Project Draft Feasibility Report/Draft Environmental Impact Statement, and would like to provide you with the following comments.

Draft Feasibility Report & EIS

L01-2 Project water availability seems to be based on the COE Scenario #7 analysis. This scenario has been superseded by the modeling done by CH2M and the subsequent negotiations with federal and state natural resource agencies and the Muckleshoot Tribe which focused on an adaptive management approach to instream flows. Less water is now available to Tacoma than there was under Scenario #7.

A reduction in water available to Tacoma and its partners from this project resulted from increasing Auburn instream flows in the spring from 400 to 575 cubic feet per second in the modeling effort. This change is of serious concern because it reduces the water

L01-1 The Corps is committed to completing the NEPA process in a timely fashion, in order to submit the document to Congress for authorization in the next Water Resources Development Act bill.

L01-2 The proposed operating strategy allows for storage of Tacoma's full second supply water right (SSWR) available between 15 February and 30 June as modified by the TPU/MIT agreement. On days when instream flow levels do no meet minimum flows established by the TPU/MIT agreement no water would be stored. The decision to dedicate stored water for M&I use would be made on a real-time basis, TPU can accumulate water in a dedicated block of storage at a rate established by the TPU/MIT agreement. See Common Issue Response - Priority of Springtime Water Storage and Release.

Colonel James M. Rigsby
June 15, 1998
Page 2

L01-2 Cont. available for municipal storage by about 4500 acre feet in 1992. Review of the hydrograph for that year reveals some opportunities to recover that lost storage. Tacoma will want to discuss this with resource agencies during the development of operating guidelines for the project.

L01-3 Water quality is always of paramount concern to Tacoma due to our water supply responsibilities. Therefore, we will expect that a water quality management plan will be developed to cover the construction of the additional storage project. This plan should be included as part of the Preliminary Engineering and Design (PED) phase.

The natural rate of reduction of pool turbidity in the spring following refill is of critical concern to Tacoma since we operate as an unfiltered surface water supply. Preliminary study by the COE has indicated that if the reservoir pool is highly turbid following refill, it will return to acceptable turbidity levels by May. Tacoma believes that this preliminary work must be confirmed during PED to assure that Tacoma's operations will remain in compliance with the Safe Drinking Water Act.

L01-4 The currently identified local sponsor share for this project is $38.6 million. This cost has increased significantly over the course of the study. It will be a goal of Tacoma to implement all cost reduction measures possible consistent with project objectives. This will be a central focus of our PED effort.

L01-5 *Page 62. 3.1.3.11 b (4) Alternative 11B4 Large Woody Debris Management for Fish and Wildlife Habitat.* The discussion in this section implies that the large woody debris (LWD) collected in Howard Hanson Reservoir is owned by the Corps of Engineers. As you know, the LWD and any merchantable timber that accumulates in the reservoir during flood events is owned by Tacoma Water. Tacoma Water uses this material in part, for habitat mitigation, enhancement, and restoration purposes. We consider the HHAWS Project to be a priority use of this material.

L01-6 *Page 63. 3.1.3.11 c (3) Alternative 11C3 Leave Inundated Trees in the Enlarged Storage Pool.* We fear potential water quality problems due to falling trees causing bank soil loosening as trees topple after their death due to submersion. In addition, many of these trees represent a source of revenue for Tacoma Water, to financially support the subject project. However, we acknowledge the resource agency viewpoint that these trees will provide valuable habitat if left standing. We will work with these agencies during PED to assure that their concerns for shoreline habitat are properly addressed.

L01-3 Water Supply
See Comment-Reply L04-5.

Water Quality Management Plan
We share the concern for water quality of the Green River during construction of the additional storage project. Development of a water quality management plan to cover the construction will be included as part of the Preliminary Engineering and Design (PED) phase.

Water Quality Study
We understand the concern expressed by Tacoma Public Utilities for pool turbidity following refill. Historically, the project has not had a problem with long-term high turbidity values. The turbidity analysis included in the FEIS was based on historic turbidity events and on conservative assumptions concerning the reduction of pool turbidity. As such, the analysis demonstrates that even under a worst-case scenario, the additional water storage project poses no threat to the quality of Tacoma's water supply. We plan to continue water quality monitoring efforts and to further expand our understanding of the causes and fate of turbidity in the reservoir.

L01-4 The COE is committed to meeting project objectives in a cost effective manner and will work with Tacoma in that regard.

L01-5 We concur that the HHD AWS project has priority in the use of large woody debris collected in the HHD reservoir.

L01-6 We agree that this issue can only be fully explored in PED. However, we disagree that trees falling into the water, and causing minor bank sloughing, will cause a significant water quality problem: bank sloughing will occur (and has occurred) with or without leaving trees around the reservoir. These events (individual trees falling into reservoir) will be localized and occur over a long period of time, with no significant impacts to water quality. We recognize the potential loss of revenue to you if trees are left standing, and also the loss of habitat if trees are removed.

L01-7 *Page 199. 5.9.1c. Ecosystem Description and Function, Terrestrial Resources, Wildlife - Grizzly Bear.* Tacoma's Watershed Inspectors have each spent the past 20 years in and around the upper Green River watershed and none of them has ever seen a grizzly bear. They have seen hundreds of black bears of many colors and sizes. Tacoma is exploring obtaining Endangered Species Act coverage for grizzly bears under its Green River Municipal Water Supply Habitat Conservation Plan.

Staffing Issues

L01-8 *Page 142. 4.7.3 c Wildlife Habitat Mitigation.* Tacoma Water is concerned about the efficiency of using full-time employees to maintain managed elk pastures. We believe the as-yet-undefined work would be more efficiently undertaken by contract employees using their own equipment, and inspected by Tacoma Water and Corps staff..

L01-9 *Page 157. 4.12.1 Operation and Maintenance, Considerations and Concerns.* Tacoma Water is concerned about the plan to adjust floating habitat with pool elevation changes. A less labor-intensive, yet equally effective method of adjusting the floating habitat should be available. Tacoma Water staff want to be involved in the design, operation and maintenance of the floating habitat.

L01-10 *Page 157. 4.12.2 Required Increase in Staffing.* Tacoma Water believes the stated number of additional staff is excessive and can be reduced if fish passage is handled in a practical, efficient manner, utilizing existing staff, part-time employees, contract employees, or possibly a contractor to operate the fish passage facility. The recommendation to have continuous full time coverage (24 hours per day / 7 days per week) during refill should be cafefully evaluated to assure that the benefit outweighs the cost of providing it. The capacity of the current onsite staff should be fully evaluated to help assess the need for the proposed high level of staffing.

If overnight adjustments to flow are justified, there still may not be sufficient justification for continuous full time coverage. This need might be easily met with the current staff being on call, by staggering work shifts or by other creative means.

Tacoma Water feels strongly that an investigation into automating all or part of the stop log function should be investigated to eliminate the need for manual stop-log placement and removal. Finding a practical solution to this problem will greatly reduce the number of FTE's required for ongoing fish passage operations.

L01-7 Comment noted. The USFWS included grizzly bear on its list of threatened and endangered species that potentially could occur in the project area. The biological assessment indicated that no grizzly bears had been observed in the project vicinity, but that tracks of a grizzly bear adult, cub, and unknown-aged bear had been identified roughly 25 miles from the project in 1993.

L01-8 Comment noted. Certainly any work contracted to others will need to have periodic inspections. Presumably the cost of contracting the work plus inspections will be less than doing the work in-house. This cost comparison will be conducted during PED.

L01-9 Comment noted. The design of the floating islands is preliminary. The Corps shares your concern regarding the operation and maintenance of the floating islands and will work with TPU to further refine the design to minimize these concerns.

L01-10 The FTE requirement is based on a Feasibility level design and will likely change as the level of design progresses. We will continue to refine the requirements and costs of Operation and Maintenance in PED.

Colonel James M. Rigsby
June 15, 1998
Page 4

L01-11 *Page 158. 4.12.3 Cost of Operation and Maintenance.* The hourly cost of $25.02 appears to us to be a low estimate. Nine FTE's appears excessive, and perhaps includes an inordinately large safety factor.

We thank you for this opportunity to comment on the Howard Hanson Additional Water Storage Project. If you have questions about our comments, please telephone me at (253) 502-8208.

Sincerely,

John Kirner

John Kirner
Deputy Superintendent
Tacoma Water

JK: sf

L01-11 We concur that the hourly rate may be low.

King County
Department of Natural Resources
Yesler Building
400 Yesler Way, Room 700
Seattle, WA 98104-2637
(206) 296-6500

June 15, 1998

Kris Loll
Civil Projects & Planning Branch
US Army Corps of Engineers, Seattle District
P.O. Box 3755
Seattle, WA 98124-3755

Dear Ms. Loll:

Thank you for the opportunity to comment on the Additional Water Storage Project, Draft Feasibility Report and Environmental Impact Statement for the Howard Hanson Dam on the Green River.

L02-1 King County supports the Additional Water Storage Project and Tacoma's associated Second Supply Project. We recognize the potential importance of this project as a new source of water supply for King County, and are impressed by the degree to which Tacoma and the Corps have included not only mitigation for impacts, but also aquatic restoration into the project purpose.

L02-2 The proposed listing of Chinook salmon as threatened by the National Marine Fisheries Service will have significant ramifications on all water resource agencies and projects in the Puget Sound. Endangered Species Act (ESA) response strategies adopted by Tacoma, the U.S. Army Corps of Engineers and others may need to consider the Additional Water Storage project, all associated diversions, and instream flow agreements for the Green River comprehensively to fully assess mitigation needs for fisheries habitat.

Under such an evaluation, there are several important areas of the proposal that may differ from emerging views of river, salmonid, and ecosystem restoration. In addition, the ESA may require a broader regional approach to determining where and how to mitigate for impacts of projects such as this one. Specific areas that may require further evaluation include:

- With the ESA listing on the horizon, we need to preserve options for water management for salmon in the Green while moving ahead to address critical water supply needs. We support the Additional Water Storage Project, but need to better understand how it fits into the ESA response strategy that we have been developing with Tacoma and other regional partners.

L02-1 Comment noted.

L02-2 Tacoma Public Utilities Habitat Conservation Plan includes the AWSP and provides a public forum for King County and other interested parties to comment on and better understand how the project could fit into an overall response strategy. In addition, we expect to have continuing communication with King County about development of the AWSP during the next three years of pre-construction engineering and design (PED phase).

L02-3

- We support the concept of adaptive management of instream flows and would prefer to see a flow strategy designed to replicate natural flow patterns. The adaptive management approach recommended in the EIS involving the Green River Fisheries Management Coordination Committee in decision-making on flows might be difficult to implement. Given the competing priorities of the many stakeholders in the Green River—hatchery managers, other fisheries agencies, the tribes, recreational user groups, and floodplain managers—consistent decision-making is uncertain. For such an approach to function, we recommend clearly defining the governance structure, including the membership, decision-making protocols, etc. A hierarchy of objectives to be used when competing interests are not mutually compatible would be helpful.

L02-4

- To prepare an ESA response, we should investigate further modifications in flow and storage management to mimic natural hydrologic conditions and would like work with Tacoma and the Corps on this investigation. The Additional Water Storage Project need not wait, but would like to work with you on flow and storage management based recommendations in the context of Tacoma's Habitat Conservation Plan for the Green River. The Habitat Conservation Plan must resolve the issues and house the ultimate agreements on adaptive management strategy and impacts on fish.

King County Department of Natural Resources staff is dedicated to working with you and the City of Tacoma in our efforts to mutually develop a response to the proposed ESA listing. We offer to immediately begin work with you to analyze alternative flow patterns on the Green River in an attempt to create a naturalistic and ecologically complex flow regime.

Attached is a list of additional technical comments on the Additional Water Storage EIS that we offer for your consideration. Please feel free to call Nancy Davidson, Regional Water Resources Manager at 296-3775 if you have any questions.

Sincerely,

Pam Bissonnette
Director

cc: Nancy Davidson, Regional Water Resources Manager
Nancy Hansen, Manager, Water and Lands Resources Division
John Kirner, Tacoma Public Utilities

L02-3 We agree that the competing priorities of river resource users make consistent decision making a continuing challenge. We will investigate development of a decision making structure for adaptively managing the refill and release of existing and additional storage during the PED phase of the AWSP. This phase begins in fall 1998 and will continue through 2001. Such a decision structure would include a hierarchy of objectives.

L02-4 The City of Tacoma's HCP will not address potential changes to the storage and release of water at HHD; but instead, will address their water withdrawal activities. Further modifications in water storage and release management at HHD will be addressed through the proposed AWS adaptive management plan.

Howard Hanson Dam is a federal project and the storage and release of water at Howard Hanson Dam is a federal activity. The Corps will be seeking coverage for water storage and release at HHD in conformance with Section 7 of the Endangered Species Act through an application for an Incidental Take Statement (ITS). Activities to be covered under the ITS will include:

- storage of water behind HHD;
- reservoir inundation;
- construction of mitigation measures associated with reservoir inundation;
- construction and operation of the downstream fish passage facility;
- alteration of reservoir levels;
- alteration of downstream flows;
- effects of water storage on sediment and gravel transport; and
- restoration activities.

The City of Tacoma is seeking coverage for municipal and industrial water withdrawal activities in conformance with Section 10(a)2(A) of the ESA through an application for an Incidental Take Permit (ITP). In support of their application for an ITP, the City is preparing an HCP that will describe how Tacoma proposes to operate its municipal and industrial water supply system in a manner that will minimize impacts to the covered species, and how these operations may affect other fish and wildlife resources in the HCP area. As local sponsor of the AWS, the City is also responsible for maintenance and monitoring of AWS mitigation and restoration measures. The City will be seeking coverage under an ITP for activities including:

- water withdrawal at Tacoma's Headworks (reduced flows and concomitant habitat effects downstream);
- operation of downstream fish bypass facility at Tacoma's Headworks;

L02-4 Cont. • water withdrawal from their North Fork wellfield;
- monitoring of downstream fish passage through the HHD reservoir and fish passage facility;
- monitoring and maintenance of the AWS fish habitat restoration projects and fish and wildlife mitigation projects; and
- Tacoma Water watershed forest management activities

Additional Water Storage Project EIS
Additional Technical Comments

L02-5

Flood Protection

The draft Feasibility Report and EIS (the EIS) should better state how each alternative meets the stated objective of not affecting the flood control function of Howard Hanson Dam. The recommended project will require reservoir refill to begin five weeks earlier than under the base case. This will necessarily result in a loss of available flood storage in the reservoir which in principle results in diminished downstream flood protection.

Given the acknowledged importance of Howard Hanson Dam in the regional economy as a flood control facility, the EIS should address the impact of project alternatives (especially early refill) on flood risk, including the following:

- A presentation of the expected marginal changes in flood frequencies and other relevant flood characteristics, and
- An assessment of these impacts in the appropriate economic analysis and mitigation portions of the report.

These analyses should test the flood control performance of alternatives through the full range of historical and appropriate synthetic events including events of probability as low as 1 in 500 years, which has been stated as the protection level provided by the facility under the base condition.

L02-6

Reliability of Stored Water

The EIS uses the term "reliability" expressed as a probability associated with different levels of flow that may be diverted under the TPU Second Supply Water Right (SSWR) for different project alternatives. Given the importance of "reliability" in terms of the economic value of water supply, the main body of the report should provide a description of how reliability is defined and by what method it is determined. This would require that information provided in Appendix D be brought forward to the main report and be supplemented for additional clarity. Appendix D describes reliability in terms of the percentage of "seasons" in which "demand" is satisfied during every 2-week period. However, "demand" never seems to be explicitly defined. Figure 4 of the appendix on page D1-Fig-2 is entitled "Target Diversion Flows from the Green River below Howard Hanson Dam". Are these "targets" supposed to represent "demand?" If so, additional explanation is required regarding how a seasonal demand pattern was derived which declines from 100 to 80 cfs during the summer. The report should explain reliability and demand as well as their relationship to the economic benefits of the proposed project.

L02-5 The recommended project includes reservoir refill in February which is earlier than refill under the base case. This is not considered a necessary loss of available flood storage for two reasons, it is not *required*, and the magnitude is small. The amount of refill storage is 5,000 acre-feet which is 5% of the 106,000 acre-feet of storage for flood control. Our discharge-frequency files show that the 500-year 1-day maximum discharge at Auburn for February is approximately 70% of the 500-year for January. Although the relationship for flow and storage is not necessarily linear, this does strongly suggest that the 101,000 acre-feet that is still available for February (95% of the total storage) is ample to cover floods expected in February.

The refill of 5,000 acre-feet of storage by the end of February is not a firm requirement. The EIS and water management procedures for Hanson Reservoir have recognized that the flood control function is a higher priority use over water supply. If the weather outlook was for flood conditions in February, the refill would not be initiated. If the refill was already underway or completed, the 5,000 acre-feet would be evacuated. This water could be evacuated in one day using a discharge of 2,500 cfs plus inflow, which should be well within the channel capacity of 12,000 cfs at Auburn. A presentation of expected changes in flood frequencies and impacts was not included in the EIS because they are expected to be zero.

L02-6 The water supply output of the proposed project as well as all of the structural water supply alternatives are based on 95 percent reliability. Basically, this means that 95 years out of 100, the amount of water claimed as an output can be provided. Since water supply benefits are based on avoided costs of not having to implement the most cost effective alternatives to the proposed project, it is important to evaluate the output/unit cost of those alternatives using the same reliability as that provided by the project. Water demand is compared to the without project supply to determine the project deficits and timing of those deficits. See paragraph 2.5.1, and Section 2.6 of Appendix B.

L02-6 Cont. In addition, the report describes the reliability of providing flow augmentation as 75%; this appears to be referring to the project's ability to meet State instream flow requirements, but this is not clear in the document. One of the principle stated benefits of this project, however, has been the ability to "adaptively manage" flows, based on additional stored water above and beyond that necessary for supply or to meet the state and the TPU/ Muckleshoot agreement minimum flows. While we welcome the opportunity created by such a surplus, we note that the EIS does not evaluate the reliability of this additional stored water, so it is impossible to determine how often and to what extent it would be available.

Water Rights and Flow Requirements

L02-7 The tables and text in Section 1.6.8 appear to require clarification. The rates, volumes, and priority of Tacoma's SSWR and its relationship to the DOE minimum flows at both Palmer and Auburn should be explained as should the relationship of the TPU/ Muckleshoot instream flow agreement. The text implies that the TPU/ Muckleshoot agreement would be more restrictive on TPU's withdrawal of water than state-mandated minimum instream flows in all cases. However, this appears to be contradicted by the last paragraph on page 23 referring to consultations that would address instream flows in the summer months. The EIS should clarify the applicability of the State minimum flows at Auburn and Palmer, Tacoma's diversions, and stream augmentation by the Additional Water Storage project.

Water Quality (Temperature)

L02-8 The preferred alternative in the EIS attempts to improve temperature conditions in the river by blending water from the existing deep outlet with water from the surface outlet used for fish passage. The proposal focuses on meeting state temperature standards and a target temperature curve based on specific salmonid life histories, rather than on replicating natural river conditions. The report states that, at flows under 400 cfs, the surface outlet must be used with no blending. This could result in warmer temperatures immediately below Howard Hanson Dam in the summertime and early fall than exist under the current management scenario. The EIS should clearly evaluate the effects of this. A comparison of temperatures under "natural" river conditions (assuming no dam or reservoir), current conditions, and the recommended alternative should be made. This comparison should include several representative downstream locations, so that reviewers can evaluate the downstream persistence of any temperature changes. The impacts of these changes to the downstream ecosystem should then be fully evaluated.

L02-9 Gravel and LWD

L02-7 All of the flow versus date tabulations in section 1.6.8 are compiled into one table near the end of the DFR/DEIS in Section 9, Pertinent Data. The inter-relationships of flows are easier to see in the table of Instream Flows for the Green River Below Hanson Dam on page 283 with footnotes on page 284. The relationship of flow versus operating features is simplified on the next page in a separate tabulation.

The statement in the last paragraph on page 23 says that consultations would address the need to drop the instream flow from 250 to 225 cfs. This is not something that would happen every summer. This represents a very rare condition when flows have been low for so long that there is no "additional storage" left and very little existing storage left in Hanson Reservoir.

L02-8 The use of a temperature target curve is the customary procedure for mimicking natural temperature variation for thermal budget modeling of a reservoir. Due to local hydrometeorological variation, it is not possible to operate a fish passage facility to match inflow temperatures that may vary as much as 10°F within a few days, however, we attempted to mimic the natural seasonal increase and decrease in daily average temperatures. In this proposed project, meeting fish passage criteria took precedence over meeting temperature criteria.

The lower limit of 400 cfs through the fish passage structure has been reviewed and revised by the Fish Passage Technical Committee (FPTC). The FPTC recently reviewed the screening velocity criteria for low velocity screens and determined that flows less than 400 cfs could be passed through the fish passage facility. This lower flow volume would allow blending of deep and surface water at lower flows, such that this is no longer a limitation of the project.

In 1992, The Muckleshoot Indian Tribe commissioned Caldwell and Associates to collect and analyze temperature data. The resulting report, as well as the Corps' water quality analysis in the DFR/DEIS, came to the same conclusion that (in 1992) water temperature 4 miles below the dam was independent of the dam outflow temperature. The proposed project would release cooler water in late summer and early fall. Accompanied by greater flow, this cooler water would persist further downstream and could improve salmon and steelhead rearing and spawning conditions in the mainstem just below the dam, however, the improved temperature is not expected to persist much farther downstream. Cooler dam outflows cannot overcome the lack of riparian shading. Page D3-14, Figure 7, of the DFR/DEIS illustrates the before and after project conditions of downstream temperature control. This figure shows that, 4 miles down-

Flow Vs. Operating Features

(See comment-reply L02-7)

Purpose	Min.Flow 110 cfs	Wa.Dept.Ecology Palmer	Wa.Dept.Ecology Auburn	MIT/TPU Agreement	Adaptive Management
Tacoma's 1st Diversion	A	A	A	B	C
Tacoma's 2nd Diversion	A	C	D	C	C
Hanson Existing Storage	C	A	A	E	E
Additional Storage Phase 1	F	C	D	C	G
Additional Storage Phase II	F	C	D	C	G

Explanations of the applicability of various instream flows versus water management purposes

A = Not applicable at all.

B= Applicable after "existing" storage is gone.

C = Directly applicable to regulating the quantity of instream flow after diversion.

D = Not applicable due to location, use the Palmer location.

E = Indirectly applicable due to 4 storage zones. The top of the zones are simplified below:
The top of the Wet Zone (1) is 24,200 ac.ft. on 1 August varying to zero on 8 December.
The top of the Wet-to-Avg. Zone (2) is 22,748 ac.ft. on 3 August varying to zero on 7 December.
The top of the Avg.-to-Dry Zone (3) is 22,748 ac.ft. on 20 July to 19,613 ac.ft. on 31 July then zero on 7 December.
The top of the Dry Zone (4) is 15,490 ac.ft. on 1 August varying to zero on 8 December.

F= Applicable after "additional" storage is gone.

G = Directly applicable as target flows (not minimums) in wet, average, and dry years according to conditions based on 4 reservoir zones (see E). Minimum flows are the MIT/TPU Agreement flows. The success in maintaining the target flows is proportional to the storage available, which is greater in Phase II than Phase 1.

L02-8 Cont. stream of the dam, the water temperature may be as much as 3°F cooler that under existing conditions. Additional comparisons farther downstream were not reported as solar heating becomes the dominant factor for water temperature.

Page D3-11, Table 1, of the DFR/DEIS demonstrates the benefits to outflow temperature of the proposed project over existing project conditions. The poor temperature control of the existing structure would be exacerbated by additional storage without the fish passage/selective withdrawal structure.

L02-9 We share your concerns about potential impacts to flood protection, private property and existing habitat. We do not believe our proposals are overly ambitious, in fact, they may be less than necessary to restore mainstem habitat to a meaningful degree. To avoid impacts to flood protection, the gravel nourishment project was limited to what is considered a minimum sediment transport rate (see Section 4b Appendix F1). We will be conducting additional analysis of sediment transport and channel conditions during the PED Phase. At project inception we will also closely monitor initial and continuing gravel placement. The truck and transport of large woody debris will be limited by the availability of suitable sized pieces of wood. We expect requests for large woody debris (collected from the reservoir) for use in habitat restoration projects will continue to escalate. Just as there are competing interests for instream flows, we are expecting similar competing interests for use for large woody debris.

The two projects, gravel nourishment and large wood transport, are highly controllable requiring the annual placement of material to maintain the benefits of each. If at anytime a problem is identified, the frequency and volume of placement can be reduced or halted. Additional opportunities for public input will occur prior to construction.

L02-9 Cont.

The EIS proposes fairly ambitious programs of reestablishing both gravel and large woody debris in the river below the dam. While we support the concept of reintroducing these attributes into the Green River environment, we believe such work should be done with extreme care. In particular, we're concerned that such projects not be implemented without sufficient analysis of flooding impacts, potential increases in channel migration hazard, and the like. In addition, given the visibility of these initiatives and the likely perception that adverse impacts to private property could occur, it's extremely important that local landowners along the Green River have an opportunity to review these programs in detail. A public involvement program that is limited to formal SEPA/ NEPA review may not be sufficient.

Artificial vs. natural freshets

L02-10

The EIS recommends an adaptively managed flow regime during the spring refill period that includes the potential for release of artificial and/or natural freshets, when there is sufficient available water. Without a detailed analysis of Green River flow conditions before the dams and diversions, we recommend caution in undertaking release of artificial freshets, as it may be difficult to optimize the timing, peak, duration, and rate of change of these flow event within an ecosystem context. Natural freshets—probably created by capturing a consistent target flow or flow percentage, and releasing the remainder—are far preferable.

Relationship to the Green River Ecosystem Restoration Study

L02-11

King County has been cooperating with the Corps, the Muckleshoot Tribe, and various valley cities in the development of a conservation and restoration strategy for the Green River system. The program includes many restoration and rehabilitation projects identified through an evaluation of factors affecting the riverine ecosystem's ability to support salmonids. Many of these projects have now been brought forward in the ADDITIONAL WATER STORAGE PROJECT EIS. The success of these projects are related to flows and a more naturalized interaction among flow, sediment and woody debris in the system.

L02-10 We have conducted a detailed study of late winter and spring flow conditions (post-dam) for 32 years of record, 1964-1995 (see Section 5 Appendix F1). Our priority in flow management is development of a refill and release regime that mimics the natural hydrology of the river. We expect if we can track natural flow patterns that we will rely on natural increase in river flows to achieve the objective of maintaining freshets. Even with mimicry of a natural flow regime, artificial freshets may be a necessary tool to assist in the recovery of depressed Green River salmon stocks. As part of our adaptive management program we have begun development of a database of off-channel habitat (1996) and habitat use (1998), including what influence natural and artificial freshets may have on juvenile salmonids. Beginning in 1999 we expect to build on this aquatic habitat database with additional monitoring of side channel habitat quality and use (for two years) and by monitoring the instream migration of juvenile salmon and steelhead (2 years). At project inception, 2004, we will continue this monitoring of Lower Watershed habitat for 5 more years.

L02-11 We agree that the success of any floodplain or mainstem restoration project developed under either the Green River Ecosystem Restoration or AWSP will be dependent on a more natural flow, sediment and wood transport regime. Ultimately, all floodplain and mainstem habitats (natural or restored) are effected by the permanent flood protection operations of HHD.

Pierce County
Public Works and Utilities
JOHN O.TRENT, Dir

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June 12, 1998
#9806019

Kris Loll
Civil Projects & Planning Branch
US Army Corps of Engineers, Seattle District
P.O. Box 3755
Seattle, WA 98124-3755

RE: Howard Hanson Dam, Additional Water Storage Project, Draft Feasibility Report & EIS

Dear Kris Loll:

Thank you for the opportunity to comment on the document: "Additional Water Storage Project, Draft Feasibility Report & EIS, Howard Hanson Dam, Green Water, Washington, April 1998" prepared by the Seattle District US Army Corps of Engineers. Comments from the Pierce County Public Works and Utilities Department, Environmental Services division are as follows:

GENERAL COMMENTS - Background Information - Chambers Creek Properties

L03-1 In 1992, Pierce County purchased an existing gravel mine from Lone Star Northwest for the purpose of expanding the County's regional wastewater treatment facilities. The site of the gravel mine surrounds the County's existing wastewater treatment plant site, and, together, are referred to as the Chambers Creek Properties. The acquisition of the gravel mine included all rights, permits and licenses, including ground and surface water rights and a water impoundment dam. Detailed analysis of the water rights shows there is a combined potential water right of about 15,000 gallons per minute (gpm) or approximately 22 million gallons per day (MGD) of instantaneous (peaking) production and about 15,800 acre-feet (AF) annually or about 14 MGD on an average day basis. This total includes groundwater rights of 12.9 MGD and surface water rights from Chambers Creek for 8.9 MGD. In 1994, Pierce County filed applications with the Washington State Department of Ecology for a change of use of the County's water rights from industrial to municipal. Pierce County is completing some additional studies requested by Ecology prior to approving the change of use applications. Currently, the Pierce County Department of Public Works and Utilities, Water Programs division is studying the activities needed to be accomplished, estimated time-frames, costs, options, strategies and impediments to development of the water resources at the Chambers Creek Properties. Pierce County is considering a variety of methods to distribute the water resources into the regional supply

L03-1 Due to the uncertainty surrounding the viability and actual availability of this site as an likely alternative to Howard Hanson Dam it was eliminated from further analysis during the plan formulation stage of this study.

network. The City of Tacoma system is only one of the possible methods. At this point in time, Pierce County has not reached any final decisions regarding the use of the Chambers Creek Properties' water rights.

SPECIFIC COMMENTS

Page 53, f. Alternative 3F. Please revise as follows:

L03-2 ~~Lone Star Sand and Gravel.~~ Chambers Creek Properties. This Pierce County owned property contains ~~the rights to develop an additional 9.3 mgd for used during the summer and 4-day peak periods~~ groundwater rights of 12.9 MGD, restricted to 5,778 acre-feet per year. ~~Construction would consist of installing a well, approximately 15,000 feet of transmission pipeline, and retrofitting a pump station to achieve an hydraulic gradient of 576 feet.~~ Developing the groundwater rights associated with the Chambers Creek Properties to be used in the Tacoma Water Division's 576 pressure zone would require approximately 15,000 feet of transmission pipeline to convey the water from the Chambers Creek Properties to the nearest Tacoma Water Division distribution system located at 40th and Bridgeport. A pump station would also be required to lift the groundwater to the hydraulic grade line of the distribution system at elevation 576.

Page 73, b. Alternative 3F. Please revise as follows:

L03-3 ~~Lone Star Sand and Gravel. Construction consists of installing a well and pump plus 15,000 feet of transmission pipeline, as well as retrofitting a pump station to achieve a hydraulic gradient of 576 feet.~~ Chambers Creek Properties. "Developing the groundwater rights associated with the Chambers Creek Properties to be used in the Tacoma Water Division's 576 pressure zone would require approximately 15,000 feet of transmission pipeline to convey the water from the Chambers Creek Properties to the nearest Tacoma Water Division distribution system located at 40th and Bridgeport. A pump station would also be required to lift the groundwater to the hydraulic grade line of the distribution system at elevation 576.

Thank you in advance for your consideration of the above comments. Please contact Susan Clark at (253) 798-6169 with any questions you may have.

Sincerely,

Tim Ramsaur

TIM RAMSAUR, P.E.
Water Programs Manager

cc: John O. Trent, P.E., Director, Pierce County Public Works & Utilities Department
Joseph Scorcio, Special Assistant, Pierce County Public Works & Utilities Department
Chambers Creek Properties Management Team
Susan Clark, Associate Planner, Water Programs

L03-2 By reference to this document the following text provided by Pierce County is incorporated in the FR/FEIS.

Page 53, f. Alternative 3F.
"Chamber Creek Properties. This Pierce County owned property contains ground water rights of 12.9 MGD, restricted to 5,778 acre-feet per year. Developing the groundwater rights associated with the Chambers Creek Properties to be used in the Tacoma Water Division's 576 pressure zone would require approximately 15,000 feet of transmission pipeline to convey the water from the Chambers Creek Properties to the nearest Tacoma Water Division distribution system located at 40th and Bridgeport. A pump station would also be required to lift the groundwater to the hydraulic grade line of the distribution system at elevation 576."

L03-3 By reference to this document the following text provided by Pierce County is incorporated in the FR/FEIS.

Page 73, b. Alternative 3F
"Chambers Creek Properties. Developing the groundwater rights associated with the Chambers Creek Properties to be used in the Tacoma Water Division's 576 pressure zone would require approximately 15,000 feet of transmission pipeline to convey the water from the Chambers Creek Properties to the nearest Tacoma Water Division distribution system located at 40th and Bridgeport. A pump station would also be required to lift the groundwater to the hydraulic grade line of the distribution system at elevation 576."

City of Seattle
Paul Schell, Mayor

Seattle Public Utilities
Diana Gale, Director

June 12, 1998

Ms. Kris Loll
U.S. Army Corps of Engineers
Seattle District, Planning Branch (CENWS-PM-CP)
P.O. Box 3755
Seattle, WA 98124-2255

Subject: Howard Hanson Dam Additional Water Storage Project
Draft Feasibility Report and Environmental Impact Statement Comments

Dear Ms. Loll:

We appreciate the opportunity to review the Howard Hanson Dam Additional Water Storage Project Draft Feasibility Report and Environmental Impact Statement, dated April 1998. Our comments are as follows:

L04-1

1. Section 1.7.3, Municipal and Industrial Water Supply on page 28 of the main report, states,

> *Seattle Water Department is currently in negotiations with Tacoma Water for Tacoma to provide Seattle with up to 25 million gallons of water per day (mgd) during the summer demand period, via a water supply intertie which is currently planned for construction prior to construction of the proposed HHD AWS Project.*

The Conceptual Agreement between Tacoma and Seattle allocates between Tacoma and Seattle M&I water to be stored under Phase I of the proposed Howard Hanson Dam Additional Water Storage Project as well as run-of-the-river water from Tacoma's Second Supply Water Right. No rate of delivery of water from storage

L04-1 Concur that Tacoma and Seattle are still in negotiation regarding the intertie, that no water delivery rate has been established, and that the intertie would be capable of carrying up to 40 mgd of water.

L04-1 Cont.

has been negotiated. The intertie would be capable of delivering water at a rate of up to 40 mgd.

2. Appendix B, Economic Evaluation, Section 2.3.1, Water Supply, Item (2), page B-7, states,

L04-2

Tacoma intends to supply Seattle up to 25 mgd of water with or without Howard Hanson Dam. [footnote: Supply without Howard Hanson Dam will require developing a currently undefined ground water or out of stream storage site.] As a result, construction of a water supply intertie between Tacoma and Seattle water systems with a peak capacity of 40 mgd would occur under the without-project condition. Based on a water supply contract with Seattle, Tacoma will provide Seattle with 20 mgd of water at 95% reliability during the summer.

a. ***up to 25 mgd***
The rate of delivery should be "up to 40 mgd;" see our comment to Section 1.7.3.

b. ***Supply without Howard Hanson Dam***
Construction of the Intertie is predicated upon Seattle having access to water from Tacoma during the peak water use season. To date, the mechanism for assuring water to Seattle in the peak season has been the proposed HHD Additional Water Storage Project. Without access to water in the peak water use season it is unlikely that the intertie will be built. Should the Additional Water Storage Project not be approved, then an acceptable substitute method of delivering water to Seattle during the peak water use season would have to be devised. This could be some other yet-to-be-proposed storage project or the identification of a water supply that is available to Seattle during the peak water use season. In either case, the costs, benefits and environmental impacts of these substitutes would have to be evaluated before Seattle could determine whether or not to proceed with the Intertie.

c. ***Based on a water supply contract with Seattle, Tacoma will provide Seattle with 20 mgd of water at 95% reliability during the summer.***
No rate of delivery of water from storage, overall yield, or reliability have been included in the Conceptual Agreement between Tacoma and Seattle. We suggest that this sentence be deleted.

L04-3

3. Appendix B, Economic Evaluation, Section 2.3.1 Water Supply, Item (2) on page B-8 provides information on the cost and benefit to Seattle for the Tacoma-Seattle Intertie and the North Fork Tolt Project. We recommend that this text be deleted from the Appendix because the information is not current. Also, similar information on the cost and benefits of water supply alternatives was not provided for South King County. The cost to Seattle for receiving water from Tacoma is under negotiation, and the firm yield of the supply is now under evaluation. Seattle Public Utilities is in the process of updating its evaluation of water supply

L04-2 It is recognized that the intertie has a capacity of 40 mgd and that water up to that amount can and most likely will be provided at that rate on occasion. The 20 MGD used in the evaluation of this project was based on Tacoma's Water Demand Forecast, dated June, 1995, page 1-6 which states "..Seattle's anticipated demand on the Tacoma system is expected to be 11,700 acre-feet delivered between June1 and October 31. If delivered at a constant rate, this equals 25 mgd for the 153-day period although the system will be operated to allow for varying rates of delivery depending on Tacoma's demands." We took a more conservative approach and reduced the 25 mgd to 20. See section 2.3.1(2) of Appendix B. It is recognized that without Howard Hanson Dam another source of water would need to be developed to supply Seattle with their peak season needs. Given the alternative sources of water available to Tacoma and their respective costs, it is not unreasonable that Tacoma could and would still provide Seattle with part of their summer time water needs via the intertie.

L04-3 While we recognize that the cost and yield of alternative sources of supply change over time and that new sources of supply are being evaluated, the cost and yield of the North Fork Tolt was not used to compute project benefits but only used for comparison purposes.

L04-3 Cont.

alternatives. A Programmatic EIS is being prepared to analyze the potential environmental impacts of a variety of different water supply sources including the project with Tacoma and the North Fork Tolt Project. Information on the potential yield and cost of alternative sources of supply for Seattle will soon be updated.

L04-4

4. Appendix B, Economic Evaluation, Section 2.6.3, Demand Forecast Scenarios, High Forecast, page B-18, and Table B2-3, indicate that the Seattle Water Department has a demand for water from Tacoma of 20 mgd starting in 2003. Seattle needs access to a new supply of water for existing customers (and their projected growth) in the year 2013. Should Seattle take on new wholesale customers, then the need for a new supply would emerge somewhat earlier than 2013, depending on the needs of the wholesale customers added. Alternatively, if the Interim Water Group forms the Cascade Water Alliance and purchases Seattle's interest in the Tacoma project, then they may have a need for the supply earlier as a basis for adding new wholesale customers. However, if the Tacoma-Seattle Intertie is on-line prior to 2013 Seattle may take delivery before then according to the terms of the Conceptual Agreement with Tacoma.

L04-5

5. Our review of the DEIS and supporting documentation indicates that less water supply to Seattle would be available from Phase I than what is reflected in our conceptual agreement with Tacoma Public Utilities. The information provided in the DEIS indicates that the storage for water supply fills to only 13,083 acre-feet in 1992 under the current project constraints as compared to 17,533 acre-feet under previous analyses (see Appendix D, Hydrology & Hydraulics, Part D1, Section 16, Summary of Phase I Operations and the March 4, 1997, CH2M Hill report on the Howard Hanson Additional Water Storage Project Modeling Results for Baseline, Phase I, and Phase II Reservoir Operations). We understand that the difference is attributed to the 575 cfs minimum flow at Auburn for dry springs (March 1 to May 1) agreed to by the Corps, Tacoma Public Utilities and the National Marine Fisheries Service. This difference in stored water available to municipal water supply severely limits the yield and reliability of this project to Seattle and reduces the economic benefits attributed to this project.

L04-6

The City of Seattle is fully supportive of the Howard Hanson Additional Water Storage Project. We believe the project is an example of using water creatively to meet the needs of both fish and people. The project promotes the conjunctive use of water supply in a manner that truly benefits the region. We look forward to being of assistance to the Corps and the city of Tacoma wherever possible.

Again, thank you for the opportunity to comment on the Draft Feasibility Study and DEIS. If you have any questions or would like to discuss our comments, please contact Ben Milgrom at (206) 684-5904 or Ray Hoffman at (206) 233-5008.

Sincerely,

Diana Gale

DIANA GALE
Director

L04-4 The economic evaluation of this project assumes that the intertie between Seattle and Tacoma is in place by project year one (year 2003) and that water is supplied to Seattle beginning in that year. The year water is expected to be supplied to South King County and Seattle is based on Tacoma's latest Integrated Resource Plan.

L04-5 It is unclear how the numbers 13,083 and 17,533 ac.ft were derived. Perhaps these are numbers derived from subtraction using the full pool. Year 1992 was a dry year and a full pool was not obtained under any of the scenarios (Baseline, Phase I, & Phase II). This is not a typical year and should not alone be used to quantify the yield and reliability to Seattle nor the economic benefit attributed to this project. Comparing maximum storage quantities from different scenarios doesn't necessarily relate to what is dynamically happening in the river. In Phase II, there are more demands on the water operation. A maximum achieved storage amount in Phase II may be less than Phase I because of timing and because there is more water actually being delivered from the storage to the intended purpose. A difference in static stored water amounts alone should not be used to determine yield and benefits. One should examine the delivered water for specific time periods. A complete copy of CH2M Hill's report on water operations is available for inspection here in our Reservoir Control Center. It includes a detailed flow and storage accounting of year 1992 that is available for anyone's inspection.

Phase I of the proposed project will provide 20,000 acre feet of M&I storage or 42 MGD of water at 95 % reliability over a 153 day summer/fall period. The benefits of this project associated with water supplied to Seattle are based on 20 MGD being supplied over the 153 day period.

L04-6 Comment noted.

Ms. Judith L. NELSON
MR. MRS. MS. MISS FIRST NAME INITIAL LAST NAME

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ADDRESS

KENT, WA. 98042
CITY STATE ZIP CODE

PHONE NO. (OPTIONAL)

Covington WATER District
FIRM, ORGANIZATION OR AGENCY REPRESENTED

☒ I WISH TO SPEAK AT THIS MEETING
☐ I HAVE WRITTEN MATERIAL TO SUBMIT
☐ I AM INTERESTED IN OBTAINING A TRANSCRIPT OF THIS MEETING (At Cost of Reproduction)

L05-1 REMARKS: This is A good project with benefits for fish AND people. WE HAVE BEEN waiting A long time, let's get on with it.

NPD FORM 111 June 1980 (Rev.) NORTH PACIFIC DIVISION, U.S. ARMY CORPS OF ENGINE

L05-1 Comment noted.

BNSF

J. M. (Mike) Cowles
Manager Public Projects
(States of WA., ID, MT, & British Columbia)

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Kris Loll
Corps of Engineers, Seattle District
P.O. Box 3755
Seattle, WA. 98124-3755

May 27, 1998

Dear Ms. Loll:

Concerning the Draft feasibility Report and EIS for the Additional Water Storage Project along the Green River and behind the Howard Hanson Dam.

001-1 The railroad's only comment to the report addresses section 1.6.10, 2nd paragraph on page 25 of the report. In 1985 the Burlington Northern Railroad, predecessor railroad to the Burlington Northern and Santa Fe Railway, sold the operational rights to the Washington Central Railroad from Kennewick to Cle Elum, WA. The branchline from Cle Elum to Auburn, WA. was never, abandoned, but remained inactive from 1983 to 1986.

It is difficult to anticipate when the BNSF will make additional improvements to the existing tunnel to allow for double stack trains. Our best guess for future improvements is in the next 10 years.

Sincerely,

J. M. (Mike) Cowles
Mgr Public Projects

JMC

file: Lester, WA. - General

O01-1 Noted that the branchline from Cle Elum to Auburn was never abandoned but remained inactive from 1983-1986.

Author: GrathwohlH@aol.com at Internet
Date: 6/16/98 1:16 AM
Priority: Normal
TO: Kristin M Loll at NPS-EN
Subject: HHD AWSP DFR/DEIS
---------- Message Contents ----------
US Army Corps of Engineers, Seattle District
P.O. Box 3755
Seattle, Washington 98124-3755

Attn: Kris Loll, Civil Projects & Planning Branch
e-mail: kristin.m.loll@usace.army.mil

Subject: Review of Howard Hanson Dam Additional Water Storage Project (HHD AWSP) Draft Feasibility Report/Draft Environmental Impact Statement (DFR/DEIS)

O02-1 The Cascade Chapter of the Sierra Club has a membership of approximately 20,000 who abide in western and central Washington. The Waters and Salmon Committee of the chapter often works with other organizations which are concerned with environmental issues In this particular case we have examined the HHP AWSP DFR/DEIS, and have consulted with the Washington Recreational River Runners regarding the same. We find that we are in complete concord with the WRRR concerning the DFR/DEIS. Rather than writing our own letter, reiterating the same concerns, we herewith express our support of the WRRR letter and the weaknesses of the DFR/DEIS it points out.

O02-2 The Sierra Club is very concerned about the survival of the wild salmonids, and the threat of ESA listing which could have a sever effect on the economics and life style of Washington state. The DFR/DEIS does not exhibit adequate awareness of the problems posed by ESA listing. We believe the Corps has a

O02-3 conflict of interest in making the proposal and then evaluating it. Several alternative in the scoping document were not given sufficient attention in the DFR/DEIS.

O02-4 Water conservation would seem to be the obvious first consideration and lowest cost alternative.

O02-5 Trucking fish is a failed policy, and while fish ladders are not good, they are better than trucks if you canÆt get rid of the dams. The river should be run as much as possible like a river, with instream flows maintained at levels necessary for salmonid protection.

O02-6 We are opposed to hatchery solutions to depleted salmonid runs. Improved

O02-1 See responses to WRRR letter designated O06 in this document.

O02-2 The Corps and Tacoma Public Utilities share your concern over the survival of wild salmon and steelhead in the Green River Basin. Our extensive investment in fish passage and habitat restoration activities is a reflection of this concern.

As a Federal Agency, the Corps of Engineers is required under the Endangered Species Act to consult or conference with the U.S. Fish and Wildlife (FWS) and/or National Marine Fisheries Service (NMFS) if the effects of a Corps project may impact a proposed or listed species. The form of this communication is a Biological Assessment (BA), a document that describes the proposed action and the Corps' determination as to potential effects on proposed or listed species known to occur within the project area. Upon receipt of the BA, FWS and/or NMFS agrees or disagrees with the Corps' determination in the form of a Biological Opinion. As noted in Section 2 and Section 5 of the DFR/DEIS we had already prepared a BA for Bald Eagle, Bull Trout, and other species under the jurisdiction of FWS, that was reviewed and accepted by the FWS: the BA and BO can be found in Appendix I. The proposal for listing of the Puget Sound Chinook Salmon occurred concurrently to our writing the DFR/DEIS. While there is no absolute requirement to prepare a BA if no listed species appears on the list provided by NMFS, the Corps submitted a BA to NMFS in late May for their review and concurrence. However, their concurrence is not required, and they have indicated their BO will not be completed prior to printing of the FEIS. In addition to the BA's prepared by the Corps, our project sponsor, Tacoma Public Utilities, is completing a Habitat Conservation Plan (with FWS and NMFS) for proposed and listed species (and species of concern) that may be affected by operation of Tacoma's waterworks or in their managed forest lands. Lastly, the FWS and NMFS have been active study participants with the Corps and Tacoma for 7 years and they will continue to be actively involved with the project through design, construction and implementation.

O02-3 The Corps of Engineers can only become involved with a project when approached by a local sponsor for a specific purpose - in this instance Municipal and Industrial water supply and Ecosystem Restoration. Our function is to look at a potential problem, propose possible alternative solutions, and determine which of those solutions are feasible and whether the Federal government has an interest in the project. We believe we have done this to the degree required in a feasibility study. We do not see that we have a conflict of interest in this project.

O02-4 See comment-reply O05-2.

O02-5 Trucking of Fish

Upstream fish passage is the responsibility of the Tacoma Public Utilities, our local sponsor. As described on page 59 of the DFR/DEIS trucking of adult salmon and steelhead is a common method of providing fish passage. The Seattle District Corps has built and operated trap and haul facilities at two Western Washington dams, Wynoochee and Mud Mountain. Mud Mountain dam has provided upstream fish passage for almost 40 years. At no time have either of these facilities been considered "failures" by the Corps or by state of federal fish management agencies. Trapping and trucking fish around large dams is not the preferred means of providing fish passage but is often the only feasible or cost-effective way of moving fish upstream.

River as Natural to Protect Salmon

As described throughout the DFR/DEIS, the AWS Project will be managed to mimic the natural flow conditions in the Green River Basin. To do this, the Corps and Tacoma Public Utilities will be developing a reservoir refill and release schedule that will mimic the natural highs (freshets) and lows (baseflows) in river flows during late winter and spring. This refill and release schedule will be adaptive, being tied to the needs of the fish resources found above and below HHD. We will be identifying the specific fish needs within the Green River Basin through a long-term monitoring and evaluation program.

O02-6 Comment noted.

002-6 Cont. habitat and access thereto provide superior and lower cost long run solutions to salmonid survival.

002-7 Additional storage at HHD will create more problems for migrating fish by increasing water temperature, slowing steam flow, increasing threats from predators, damaging or destroying wetlands, and causing all the other negative impacts of dams.

002-8 Please re-evaluate the DFR/DEIS in the light of the analysis provided by the WRRR letter.

Sincerely yours,

Harrison Grathwohl, Ph.D.
Waters and Salmon Committee
Cascade Chapter
Sierra Club
5507 258th Ave. N/E.
Redmond, WA 98053

O02-7 It is unclear from the comment what part of the watershed is referred to. During Phase I in the Lower Watershed, below HHD, conditions will be improved or unchanged including – 1) water temperatures would be reduced from use of the selective withdrawal facility, 2) baseflows are higher and average stream flows would be unchanged from the Baseline condition (Second Supply Project already on-line), 3) predator threats would be unchanged, and 4) mainstem spawning habitat and wetlands would be restored. As part of Phase I, to provide additional water for flow augmentation (yearly storage of 5,000 ac ft, Section 1135) and for water supply the existing reservoir will have to be enlarged. Since the reservoir would be larger water flowing through it would be slowed and wetlands within the new inundation zone would be degraded.

We have developed a variety of flow management techniques (maximum refill rates, freshets) and stream habitat improvements to provide additional protection for juvenile salmon and steelhead that migrate through the reservoir. A range of wetland and stream improvement projects will be built to compensate for the full areal extent of the degraded wetlands. We have not come to a consensus with other resource agencies and the MIT on whether more juvenile salmon migrating through the reservoir will be eaten by predators. As a preventative measure, we will be studying the abundance of predators above and below HHD prior to project construction, and at regular intervals following construction. As required, resource agency or MIT biologists may elect to selectively remove predators to maximize the survival of juvenile salmon and steelhead migrating through the project area.

The changes to habitat (from the enlarged reservoir) during Phase II (additional water stored) will be contingent upon evaluation of Phase I benefits and consensus of all resource agencies and MIT.

O02-8 Responses to the WRRR letter (O06) appear later in this document.

Author: patsump@juno.com at Internet
Date: 6/16/98 7:01 AM
Priority: Normal
TO: Kristin M Loll at NPS-EN
Subject: Review of Howard Hanson Additional Water Storage Project
---------- Message Contents ----------
June 15, 1998

US Army Corps of Engineers, Seattle District
P.O. Box 3755
Seattle, WA 98124-3755

ATTN: Kris Loll, Civil Projects & Planning Branch

RE: Review of Howard Hanson Dam Additional Water Storage Project (HHD AWSP) Draft Feasibility Report/ Draft Environmental Impact Statement (DFR/DEIS)June 15, 1998

Dear Ms. Loll:

Frieds of the Green River appreciates this opportunity for commenting on the DFR/DEIS FOR THE HHD AWSP. Friends of the Green River is a non-profit organization founded in 1988 and dedicated to protecting the Green River and its watershed from environmental and recreational degradation.

003-1 Friends of the Green River continues to have concerns about this project. We are concerned about the role of the Corps of Engineers as both a proponent of the project and the evaluator of the project. We are also concerned about the Corps' relationship with Tacoma.

003-2 The Corps and Tacoma have worked together for a long time. The Corps seems willing to go along too easily with what Tacoma suggests. The Corps seems to have completely given in to Tacoma's wishes regarding exclusion of a Water Conservation and Reuse Alternative. Given the Corps' role in water supply because of the authorized project purpose of HHD for Municipal & Industrial Water Supply, the Corps ought to be trying to learn as much as possible about State and regional water supply options. The Corps should be collecting data regarding water supply from multiple sources and should have required a full study of the potential for water conservation and reuse instead of listening to Tacoma's protestations that they were inconsequential in providing sufficient water. The DFR/DEIS says "Water conservation and non-structural measures have been instituted, to include: required use of low-flush toilets and low-flow

O03-1 The Corps of Engineers can only become involved with a project when approached by a local sponsor for a specific purpose - in this instance Municipal and Industrial water supply and Ecosystem Restoration. Our function is to look at a potential problem, propose possible alternative solutions, and determine which of those solutions are feasible and whether the Federal government has an interest in the project. We function in partnership with our local sponsor.

O03-2 See comment-reply O05-2.

showerheads...; conservation pricing - seasonal water rate increases for residential and wholesale customers." The DFR/DEIS then concludes, referring to Conservation and other non-structural measures, "The above measures will not provide adequate water to supply Tacoma's demands beyond the next 30 years" (page 97). The implications are that there are only a very few things that could be done, that Tacoma is already doing them, that they don't provide much water, and that any benefits provided won't last very long.

On the contrary, there are hundreds, perhaps thousands of things that can be done in the name of water conservation. Tacoma has made positive steps with the measures it has started, but has only begun to scratch the surface of the potential of water conservation. It is also erroneous to assume that conservation and reuse couldn't save much water. Seattle Public Utilities just completed their "Water Conservation Potential Assessment" and estimate that their cost-effective savings from a new package of water conservation measures, given today's technology, would equal 30 million gallons a day by 2020. Tacoma apparently claims that the water saved from a package of water conservation measures would only save between 1.3 and 1.8 mgd (page 74). If Seattle didn't believe it could yield substantial savings from conservation, it would not be pursuing conservation and reuse as equally viable with bringing on a new "structural" source of water. The lack of data in the DFR/DEIS to support the claims of Tacoma that savings from conservation would be *insubstantial makes the claims suspect. Either the data is erroneous or* Tacoma is looking at the wrong packet of conservation measures. It is also not correct to assume that the savings in water would not assist Tacoma in its role as water purveyor for long enough to be worthwhile. Clearly Seattle and others recognize the long term effectiveness of water conservation & reuse.

O03-2 Cont.

The Corps seems to have given up some of its autonomy to Tacoma in that it is not giving Environmental (Ecosystem) Restoration the primary position as an objective for the DFR/DEIS. Since the federal government has indicated that environmental restoration should have a high priority in what the Corps does, it would seem that the Corps would place that objective above one of meeting water supply needs of Puget Sound residents.

Yet the DFR/DEIS contemplates restoration efforts discussed as if they were merely mitigation for the impacts caused by the real reason for the study: Water Supply. At the same time that the Corps is working on a number of restoration projects in the watershed, some apparently as mitigation for past errors of the Corps and others, the Corps yields to Tacoma by failing to see that the restoration efforts in the DFR/DEIS must be done just as the other non DFR/DEIS restoration projects that are

O03-3

O03-3 This is a dual purpose project water supply and ecosystem restoration. Tacoma is the local sponsor for both purposes and the project must meet both objectives. The project began a single purpose water supply project at a time when the Corps authority did not include ecosystem restoration. In 1994 federal law changed and ecosystem restoration was added as a Corps authority. The Corps, however, cannot bring forth a project on its own and is required, by law, to have a non-federal sponsor to share the costs. Tacoma recognized that ecosystem restoration was a worthwhile goal and agreed to sponsor, and cost-share that part of the project along with the water supply. While Tacoma is willing to sponsor a single purpose water supply project and a dual purpose water supply/ecosystem restoration project there is no local sponsor who has expressed willingness to sponsor a single purpose ecosystem restoration project. Therefore, both objectives of this project need to be met.

003-3 Cont. being contemplated, regardless of whether or not any project to "meet water supply needs" is undertaken. Since the restoration must be done for the sake of the salmon regardless of anything else, those projects should not be used to make the water supply "need" more palatable. Taking water and storing it for water supply is making the system less natural. Restoration makes the system more natural. Restoration is the primary objective. The water supply objective should not be able to take away from the natural environment and then offer up certain restoration projects to make up for the damage.

003-4 The proponents of this project seem to have cast out the good alternatives without analysis, without logic, and with arbitrariness. As the long list of preliminary alternatives that came up during or before the scoping process was pared down, Alternatives 4a - Water Conservation and Reuse and 4b - Industrial Reuse were eliminated without analysis and without a clearly stated reason. Alternative 3e - Tide Flat wells, Alternative 3f - Lone Star Sand and Gravel wells, and Alternative 3g - South Tacoma Aquifer, which in combination at least could definitely provide a comparable amount of water, were eliminated without analysis and without a well defined reason.

003-5 The Preferred Alternative and Recommended Plan did not well fulfill the Proponents' stated objective of "environmental (ecosystem) restoration" since it created additional negative impacts for fish, wildlife, and native plants. The Preferred Alternative and Recommended Plan does not meet its own Planning Criteria.

003-6 The additional water storage in the Recommended Plan makes the flow regimes of the Green River less natural. Salmonids don't thrive in the less natural environment humans make. The evolved in a free flowing river. The Recommended Plan does not provide fish passage which is the most natural achievable. The dams should be removed; barring that, fish do not survive well when they are trucked from one dam to the other. They do not thrive when trying to migrate through an ever larger reservoir. The Recommended Plan does not provide for ecosystem restoration as it is required to under its own objective. The Plan does not include reforestation and restoration of wetlands throughout the watershed, which would create natural water storage and better instream flows in summer and fall. The Plan destroys habitat for wildlife such as the elk who forage in areas along the banks of the reservoir.

003-7 The Recommended Plan does not analyze impacts to recreational boating in the Green River gorge and below it. It claims that there could be improvements for recreational whitewater boating but produced no studies, no data to support that claim.

O03-4 The evaluation of all identified potential water supply alternatives was presented in the plan formulation and in section 3.1.3.1 of this report. Alternatives must be able to provide water during the same time of year as the proposed project and must be considered viable options to the proposed project. Several alternatives were carried forward for further evaluation and were used in the evaluation of water supply benefits. These alternatives are discussed in section 2.6.6 of appendix B.

O03-5 We disagree with your comment. As described in Comment-Reply O03 -3, the AWS Project is a dual purpose project. By definition all ecosystem restoration features go beyond what is required to mitigate for impacts from storing additional water. As described in the DFR/DEIS we address several key limiting factors that affect salmon and steelhead in the Green River basin. The factors we address include 1) reconnecting the Upper Watershed to the Lower Watershed with a downstream fish passage facility (in combination with the Tacoma Public Utilities adult truck and haul); 2) improvement of water quality (temperature) with use of the selective withdrawal system and flow augmentation; 3) improvement of instream flows by mimicking natural flow fluctuations in refill and release and with summer low flow with flow augmentation; 4) improvement of spawning habitat with gravel nourishment; 5) increased off-channel habitat with restoration of Signani Slough; and 6) addition of large woody debris with truck and haul of wood collected in the reservoir.

The storage of water for flow augmentation (an environmental or ecosystem restoration features) and water supply does create negative impacts to areas below and above the dam. We avoid or minimize the downstream impacts with the phased-implementation of the project: Phase II impacts will be reduced or conditioned by resource agency consultation. If we store additional water for either ecosystem restoration or water supply we cannot avoid impacts from inundating terrestrial and wetland habitats: the areal loss of habitat around the reservoir will be fully mitigated.

O03-6 Flow regimes are less natural.
We agree that the natural productive capacity of the Green River Basin has been greatly reduced by anthropomorphic changes throughout the Basin. Construction and operation of HHD for fall and winter flood protection has permanently modified the natural flow regime of the river. As described in the DFR/DEIS, future reservoir operations and flow releases during spring and summer will mimic the natural flow regimes of the river. An extensive monitoring and evaluation program has been programmed to provide specific information on the habitat needs of salmon and steelhead during spring refill so we may more closely mimic the habitat needs for these fish.

O03-6 Cont. Plan does not provide fish passage which is most natural and remove dams.

Upstream fish passage by trucking adult salmon and steelhead is discussed above in Comment-Reply O02 - 5. Removal of the Tacoma Diversion Dam and Howard Hanson Dam is impractical and infeasible without 1) losing a current and future regional water supply source; and 2) placing much of the urban Green River valley at risk from flooding (including billions of dollars in property value).

Few studies have been conducted on the migration of juvenile salmon and steelhead through small reservoir impoundments (such as HH Reservoir). Of the studies that have been performed, results have indicated that the size of HH Reservoir should not significantly impact the survival of juvenile salmon and steelhead migrating through it. As part of an adaptive management program, we will monitor and evaluate reservoir survival. We expect that we will identify a variety of tools (flow management, habitat improvements, fish management) that can be used to help young salmon survive and possibly thrive during their residence and migration through the reservoir .

Plan does not provide ecosystem restoration as it is required.

See Comment-Reply O03-5. Also, the plan does not include restoration of forests and wetlands throughout the watershed because the plan is specific to Howard Hanson Dam Additional Water Storage Project. Mitigation planning for the AWS Project was designed to occur on site to the greatest extent possible. Restoration efforts were intentionally restricted to areas near Howard Hanson Dam, to restore habitats that may have been initially affected by construction of the dam. Planning criteria in Section 3 of the DFR/DEIS includes a limited ecosystem restoration area. Restoration under the Additional Water Supply Project was also developed in part because of the parallel Green/Duwamish Basin Restoration Study. That study was not limited in project area and will be considering wetland restoration projects throughout the watershed. We recognize that important elk habitat is lost as a result of implementation of the Recommended Plan. An extensive mitigation plan has been developed that is intended to offset the losses of elk habitat.

O03-7 Although recreation is not an authorized project purpose and we have not been approached by any agency expressing interest in becoming a local sponsor in pursuing that authority through Congress, the Corps will take into account the needs and desires of recreational boaters, to the extent possible, in its regulation of water through Howard Hanson Dam. See Comment-Reply O03-6.

003-8 The proponents must make Conservation and Reuse, probably in conjunction with Alternatives 3e, 3f, and 3g, part of the preferred Alternative. The Preferred Alternative must give anadromous fish a fish ladder for real passage. The Preferred Alternative must do real ecological restoration throughout the basin.

Sincerely,
Patricia Sumption, president
Friends of the Green River
10510-11th Ave. NE
Seattle WA 98125

O03-8 The proponents must make Conservation and Reuse, probably in conjunction with Alternatives 3e, 3f, and 3g, part of the Preferred Alternative.
The economic evaluation of water supply (See Appendix B) compares the separable cost of the proposed water supply project (i.e. those costs identified as only associated with water supply) to the cost of implementing water supply alternatives 3e, 3f, and 4a&b (conservation and reuse). Alternative 3g was included as part of the without project supply of M&I water (See paragraph 3.2.2.2 of main report and paragraph 2.6.4 of Appendix B) and therefore, is assumed to be implemented and part of the without supply of water. Since the separable water supply costs of the proposed project are lower than the costs of implementing the water supply alternatives above, the preferred alternative is the proposed project.

The Preferred Alternative must give anadromous fish a fish ladder for real passage.
Upstream fish passage at both dams (Tacoma Diversion Dam and Howard Hanson Dam) is the responsibility of the Tacoma Public Utilities, our local sponsor. And see Comment Reply O02 -5.

The Preferred Alternative must do real ecological restoration throughout the basin.
See Comment Reply O03 - 5. Addition habitat restoration within the Upper and Lower Watershed is also being studied by the Corps and King County under the Green-Duwamish Ecosystem Restoration General Investigation Feasibility Study.

(B -A ~Washington Kayak Club
c/o Dara Mueller
39612 - 226th Avenue SE
Enumclaw, Washington, 98022-8924
Tel: (360) 802-6275, E-mail: dmueller@ibm.net

June 15, 1998

US Army Corps of Engineers, Seattle District
P.O. Box 3755
Seattle, Washington 98124-3755
Attn: Kris Loll, Civil Projects & Planning Branch
e-mail: kristin.m.loll@usace.army.mil
Subject: Review of Howard Hanson Dam Additional Water Storage Project
(HHD AWSP) Draft Feasibility Report/Draft Environmental Impact Statement (DFR/DEIS)

Dear Project Proponents:
The Washington Kayak Club (WKC) is pleased to offer for filing with the Seattle District Corps of Engineers, our written comments for the Draft Feasibility Report/Draft Environmental Impact Statement (DFR/DEIS) for the above named project

004-1 WKC was founded in 1948. WKC has a membership of over 1,200, with more than half of its members being whitewater boaters. One of WKC's mission is "to encourage, aid, and give direction to conservation of water resources and adjacent lands for recreational purposes." Many of our members boat various stretches of the Green River. The Green River is a classic and premier Washington whitewater run!! WKC members boat the Green River extensively, from primarily Kanaskat-Palmer to Flaming Geyser State Parks (the Green River Gorge). Stretches directly above and below this run, include the "Headworks" and "YoYo", respectively and are excellent beginner runs, both used for teaching purposes. We need a minimum of approximately 1,200 CFS or more to run from Kanaskat-Palmer to the Franklin Bridge (the Upper Gorge) and 800 CFS or more to run from the Franklin Bridge to Fleming Geyser (the Lower Gorge). The unique steep canyon walls, luxuriant with mosses and vegetation, seeping with water, containing excellent pool-drop rapids and remote nature, have made "the Green River Gorge" a favorite whitewater run for decades.
WKC has reviewed the HHD AWSP DFR/DEIS comments of the Washington Recreational River Runners (WRRR) and hereby adopts them as our own.

004-2 While we understand your pending funding deadline; we are deeply concerned that the publics' comments will not be adequately addressed in only one

O04-1 See responses to WRRR letter designated O06 in this document.

O04-2 The DFR/DEIS had an official 45 day review period from May 1 through June 15, 1998, the minimum allowed by the Council on Environmental Quality rules (40CFR 1506.104). Typically, during processing of draft EIS, the Corps receives requests for review extensions and these are routinely granted in most instances. In the case of HHD AWS, however, the District decided to adhere to the rigid schedule for completion and reporting of this seven year plus study. Real benefits associated with meeting the schedule include potential consideration in the current session of Congress and dollar savings in the next fiscal year. Accordingly, all possible time savings were incorporated into our schedule; among them enforcing the 45 day minimum DEIS review period. To mitigate this fairly severe policy, every effort was made to assure timely and direct distribution of the DFR/DEIS. A further consideration was that public awareness and agency and tribal involvement has been internal throughout the conduct of this admittedly complex study; from initial scoping through participation in technical studies and committees to attendance at public meetings and workshops. Most DFR/DEIS recipients were able to respond within the 45 day period. Those comments received late, while not directly responded to in this Appendix, were considered in final formulation and decision-making. There will be further opportunity to comment during the 30 day review of the FFR/FEIS and public involvement will continue into the PED phase.

004-2 Cont. month's time. The public will be short changed and the review process will become nothing but rhetoric.

004-3 There needs to be a regional water supply Environmental Impact Statement produced to determine whether or not the AWSP is the best option to accommodate the Cities that Tacoma would sell water to resulting from the proposed AWSP.

Please provide us with any additional information relevant to this project, throughout the remainder of the schedule for this study.
Sincerely,

Dara Mueller
WKC Conservation Chair/Board of Directors

O04-3 Concur that an integrated planning approach to water supply needs would be ideal. Any comprehensive strategy for effectively dealing with the challenge of providing long term regional or sub-regional water supply would need to consider and include the use of a variety of measures - including conservation/public education, re-use, zoning, new resources and others. These options are, however, not mutually exclusive - to some degree all may be requisite - nor of equal value (but maximizing the efficacy of existing developed water projects would reasonably be among the most important and first implemented). At present the institutional structure does not exist to evaluate, authorize, fund and effect these in a totally organized and integrated manner. The Corps of Engineers has examined alternatives available under this study's authority and has chosen a preferable choice within that constraint. The proposed action is within the Corps' purview; is cost-effective; is "doable"; contributes to resolution of long term water resource problems; enhances the productivity of an existing project; includes an environmental restoration feature and does not preclude or foreclose actions of others to further address the problem.

Author: celp@gonzo.wolfenet.com at Internet
Date: 6/16/98 1:23 AM
Priority: Normal
TO: Kristin M Loll at NPS-EN
Subject: Howard Hanson Dam DEIS
---------- Message Contents ----------
15 June 1998

U.S. Army Corps of Engineers
Seattle District
P.O. Box 3755
Seattle, WA 98124-3755

Attn: Kris Loll, Civil Projects & Planning Branch

Dear Ms. Loll:

Please accept these comments on the Draft Feasibility Report and Draft Environmental Impact Statement issued by your agency for the Howard Hanson Dam Additional Water Storage Project proposal.

005-1 We have attached and incorporate by reference comments we filed with the City of Seattle regarding its Environmental Impact Statement scoping process for the Seattle-Tacoma Pipeline Five Intertie. (These comments have been attached as Word file. Please let me know if there is a problem with transmission.)

As we note in that letter, the Intertie project is inextricably related to the Howard Hanson Dam project. Nonetheless, no single environmental document has evaluated the overall impacts of these projects on regional water resources.

The failure of lead agencies to connect and evaluate on paper the various projects associated with Pipeline Five have impermissibly fragmented the environmental analyses associated with that proposal.

Moreover, the alternatives analysis in the HHD environmental impact statement should consider the fact that, according to its own demand forecasts, Tacoma Public Utilities will not utilize Pipeline Five water in the near to mid-term future. Instead, the purpose of the Pipeline Five project is now to provide water to King County municipalities via the Seattle-Tacoma Intertie.

Given that fact, the EIS should consider the multiple proposals and projects now extant to provide future water supply to the King County

O05-1 Concur that HHD AWS proposed project is related to the Intertie and other proposals and alternatives for regional and sub-regional water supply. As noted in our document the "without project" condition contains the second supply pipeline, therefore, it is considered not dependent on the HHD AWS project. The HHD AWS project is dependent on the second supply pipeline(pipeline 5) for the development of water supply feasibility. Accordingly, environmental documentation supporting each project was written with this relationship as a basis. Any comprehensive strategy for effectively dealing with the challenge of providing long term regional water supply would need to consider and include the use of a variety of measures - including conservation/public education re-use, zoning, new resources, interties and others. These options are, however, not mutually exclusive - to some degree all may be requisite - nor of equal value (but maximizing the efficacy of existing developed water projects would reasonably be among the most important and first implemented). At present the institutional structure does not exist to evaluate, authorize, fund and effect these in a totally organized and integrated manner. The Corps of Engineers has examined alternatives available under this study's authority and has chosen a preferable choice within that constraint. The proposed action is within the Corps' purview; is cost-effective; is "doable"; contributes to resolution of long term water resource problems; enhances the productivity of an existing project; includes an environmental restoration feature and does not preclude or foreclose actions of others to further address the problem.

005-1 Cont.

region as substitute or potentially in conjunction with the Pipeline Five project. For example, the Snoqualmie Aquifer project (East King County Regional Water Association), the former Weyerhaeuser water right from the mouth of the Snohomish River (Snohomish River Regional Water Authority), the Oasis Project (Lakehaven Utility District), and numerous applications for municipal wells in the Green, Cedar and Snoqualmie basins all represent supply alternatives that may impact the demand for Pipeline Five water.

If the objective of the HHD project is to meet water supply needs of Puget Sound residents, it is axiomatic that the EIS must analyze other reasonable alternatives to expansion of the Howard Hanson dam. That the DEIS does not do.

005-2

Further, given (1) the March 1998 proposal by the National Marine Fisheries Service to list Puget Sound chinook as threatened, (2) the critical link between salmonid species health and instream flows in rivers, and (3) the recognition of the physical relationship between ground and surface waters, it is abundantly apparent that water conservation is going to become an increasingly crucial component of future water supply strategies.

For example, the Washington Governor's Office in March released its draft Lower Columbia Steelhead Conservation Initiative, intended to function as a form of recovery plan for the steelhead species listed as threatened in southwestern Washington. In discussing the fact that salmon need adequate water flows, and that this need conflicts with human demand on water resources, the LCSCI stresses water conservation as a habitat strategy. It proposes development of performance oriented goals and standards, noting that these goals and standards should be increased in areas where ESA listings have occurred or likely will occur and lack of or inadequate instream flows are identified as a limiting factor.

There is every reason to believe that a similar goals will be established in the Puget Sound region and the Green River basin. Notwithstanding this probability, the DEIS has elected not to analyze water conservation as a credible alternative to expansion of the Howard Hanson dam.

005-3

As illustrated by the Conservation Potential Assessment, a rigorous economic analysis conducted by Seattle Public Utilities, tens of millions of gallons per day of water may be saved utilizing economically feasible conservation strategies at a cost less than that which will be required to construct the HHD expansion project.

005-4

We propose that it is time for the Corps of Engineers to get its econometric house in order and accord the conservation alternative the attention it deserves. Failure to fully consider such an alternative is a

O05-2 Water conservation (Demand management and industrial reuse) is considered a crucial component of water strategies and is discussed in the Additional Water Supply Storage Project and DEIS in section 3; Appendix H, Plan Formulation in sections 2.3.4, 3.2.3 and in Appendix B, sections 2.6.1 and 2.6.6. Tacoma has already implemented several conservation measures to include a major plumbing retrofit project to include low flow toilets and showerheads in all new and remodeled residential construction projects (See Section 2.6e) In addition they have implemented conservation pricing of water where the summer water rates are higher for residential and wholesale customers (See Section 2.6e). This component is reflected in their demand forecast for water. In fact, as part of the benefit evaluation of this project, the most cost effective remaining conservation measures were used as a part of the alternatives analysis to Howard Hanson Dam and thereby were included in the computation of water supply benefit. A list of the conservation measures considered is shown in Appendix H, Section 3.2.3 as well as Appendix B, Section 2.6.6b. Also, see table B2-10 and section 2.6.7 of Appendix B.

O05-3 See response to comment 005, #2 above.

O05-4 See response to comment 005, #2 above.

005-4
Cont. serious defect of the DEIS.

Thank you for the opportunity to comment on this proposal. Please feel free to call if you have any questions.

Yours very truly,

Rachael Paschal

CENTER FOR ENVIRONMENTAL LAW & POLICY
1165 Eastlake Ave. East, Suite 400
Seattle, WA 98109
206-223-8454
celp@wolfenet.com

February 24, 1998

Ray Hoffman
Seattle Public Utilities
Dexter Horton Building, 10th Floor
710 Second Avenue
Seattle, WA 98104

RE: Scope of Programmatic Environmental Impact Statement for the Seattle-Tacoma Intertie

Dear Ray,

Thank you for soliciting the Center's comments on the scope of the Programmatic EIS regarding the Seattle-Tacoma Intertie. Following are our concerns regarding the impacts of the proposal that we feel need to be addressed in the EIS. Our concerns include impacts to existing rights in the Cedar and Green River watersheds, as well as instream flows and related habitat, and the need for aggressive conservation and use of reclaimed water to mitigate impacts. We look forward to remaining informed of the progress of the programmatic evaluation as well as the separate project-specific evaluations related to construction of the pipeline.

Impacts to existing water rights, fisheries and instream flows in the Cedar River Basin

005-5 Interties are defined as exchanges of water between systems. The EIS should evaluate whether and to what extent the Seattle-Tacoma Intertie will provide exchanges of water from the Cedar River as well as from the Green River systems. If water will be transferred from the Cedar River System to Tacoma or other users via the proposed intertie, the EIS must evaluate potential impacts of that transfer on existing rights and uses in the Cedar River Basin. The EIS should discuss how the project will provide adequate

O05-5 Comment pertains to the Seattle-Tacoma Intertie Project - not the HHD AWS project.

005-5 Cont. protection of the remnant natural flow regime in the Cedar River/Lake Washington system.

Impacts to Green River instream flows and instream values

005-6 The Seattle-Tacoma Intertie is inextricably related to the Howard Hanson Dam Additional Water Storage Project. These projects are mutually interdependent and deserve thorough cumulative impact analysis under NEPA-SEPA. To date there has never been a full program review of Pipe 5, the Howard Hanson project and the Seattle-Tacoma Intertie. Part or all of the water supplied to SPU from the Tacoma system will come from the proposed Howard Hanson project. As a result, the impacts of this project on the Green River and anadromous species should be addressed in the Seattle-Tacoma Intertie programmatic EIS. Because Puget Sound Chinook may be listed under the Endangered Species Act, the EIS should specifically address the ESA implications of the project.

Alternatives to Meet Regional Water Supply and Demand

005-7 The Seattle-Tacoma Intertie will facilitate increased use of water resources throughout the Puget Sound region. The project should therefore fully evaluate regional water use from existing sources. This evaluation should comprehensively report past and present rates of use, as well as reliable estimates of future demand for water by all entities and persons that perceive benefit from the Seattle-Tacoma Intertie. Recorded and projected *peak-day and average* water use statistics should be included for SPU direct customers and SPU purveyors and potential purveyors with their present rates and rate structures.

In assessing regional water demand, the programmatic EIS must discuss how that demand could be met or reduced through development of alternative sources of supply, conservation, system efficiencies, reduction of waste, and use of reclaimed water.

Included in evaluation of regional water demand and supplies, the EIS must address the current level of impairment to instream flows and habitat needs throughout the Cedar River water supply system. The EIS should evaluate each alternative's impacts to regional water supplies, aquatic and water-dependent habitat, existing water rights, and public interests.

We would expect that evaluation of regional supply and demand needs be more comprehensive than the reports we have seen developed to date. For example, conservation should be meaningfully discussed as both an

O05-6 Comment pertains to the Seattle-Tacoma Intertie Project - not the HHD AWS project.

O05-7 Comment pertains to the Seattle-Tacoma Intertie Project - not the HHD AWS project.

alternative and as means to mitigate environmental impacts of the Seattle-Tacoma Pipeline 5 project. This discussion should include the use of regional water rate reform (mandatory metering and rates based on use which increase in summer and penalize excessive use). The EIS should evaluate how rate structures will achieve strong price incentives for reducing residential, commercial, and industrial water use.

005-7 Cont.

The EIS must recognize and discuss the cost-effectiveness of demand reduction alternatives, both in terms of avoided costs of new supply development and costs of environmental despoilation.

Compliance with Existing Law

The Seattle-Tacoma Intertie must comply with existing laws governing transfer and interties.

The EIS should evaluate Seattle Public Utilities' authority to exchange water from Seattle's system outside the place of use designated in its water right. If water from the Cedar River system would be exchanged via the proposed intertie, what applications for change of water rights need to be filed with the Department of Ecology? Does existing law authorize indefinite length of time for development of a water right claim held by a city? Would the Department of Ecology approve the change of place of use for Seattle's water rights? Will any exchange of water via the intertie impair existing rights, including instream flows and public interests? These questions should be addressed in the EIS.

005-8

Thank you for the opportunity to provide these comments. We hope our comments will encourage preparation of a programmatic EIS which comprehensively addresses many complex issues.

Sincerely,

Michele Osborne

O05-8 Comment pertains to the Seattle-Tacoma Intertie Project - not the HHD AWS project.

US Army Corps of Engineers, Seattle District
P.O. Box 3755
Seattle, Washington 98124-3755

Attn: Kris Loll, Civil Projects & Planning Branch

Subject: Review of Howard Hanson Dam Additional Water Storage Project (HHD AWSP) Draft Feasibility Report/Draft Environmental Impact Statement (DFR/DEIS)

Dear Project Proponents:

Washington Recreational River Runners (WRRR) is a whitewater boaters' club which provides member services which include conservation, protection, and restoration of the rivers of Washington State and beyond. Because they enjoy living in the beautiful Pacific Northwest and recreating in the natural environment, WRRR members seek to protect and restore rivers for environmental and aesthetic reasons as well as to protect them as recreational resources. WRRR works with other boating clubs, recreation organizations, and environmental organizations in their efforts to protect rivers. The members of WRRR are out on the State's rivers whenever possible. A favorite run is the Green River Gorge because of the beauty of the Gorge, the challenge of the whitewater, and, for those who live in the Puget Sound area, the proximity to their homes.

O06-1 WRRR members and other boaters are concerned about the instream flows on the Green River and about the effect on flows of the operations of Howard Hanson dam by the Corps of Engineers. WRRR is concerned about the impacts on whitewater boating and on depleted runs of Green River salmonids from the Corps of Engineers' Howard Hanson dam and the Tacoma diversion dam and their operations. Current operations already have negative impacts on salmonids and on recreational boating. The proposed project does not begin to cure these impacts, but adds more and should not go forward as proposed.

See 3 Below The Corps, at Tacoma's request, has been working on this Study (DFR/DEIS) since 1989, with an objective of "meeting water supply needs of Puget Sound residents." While the Corps indicates on page 1 of the DFR/DEIS that it added the objective of "environmental (ecosystem) restoration" in 1994 as a result of changes in federal policy which gave such restoration a high priority, the Corps seems not to have been able to give this second objective the importance it deserves. Restoration was tacked on and used to justify "meeting water supply needs," which remained as the true objective. The Corps has failed to recognize when these two objectives are at odds with each other and has chosen to work toward the water supply objective when such conflicts have arisen.

O06-2 Washington Recreational River Runners finds that the Corps has a conflict of interest in being a proponent of this project and also serving as the lead agency doing the evaluation of the proposal.

O06-3 In 1998, given the depleted salmonid runs in the Puget Sound region, including the Green River, and the probability of listings of salmonids as threatened or endangered under the

O06-1 We share your concerns regarding the health of salmon in the Green River and the ability of recreational boaters to have an enjoyable whitewater experience. We believe operational changes during Phase I to benefit salmon and steelhead habitat will also improve flow conditions for whitewater boating.

O06-2 See response to comment O03-3 above.

O06-3 See Comment-Reply O03 -3 and O03-5. All restoration work occurs during Phase I of the project with protection of instream habitat as the primary objective of the spring refill and summer conservation season.

Endangered Species Act, the primary objective of the DFR/DEIS and the proposed project must be Restoration. The water supply objective must not interfere with Restoration.

O06-3 Cont.

WATER SUPPLY ALTERNATIVES

The DFR/DEIS indicates that a number of alternatives were considered under preliminary scoping. Seventeen alternatives related to Municipal/Industrial water supply were looked at during the scoping process and mentioned briefly in the DFR/DEIS. For the DFR/DEIS, only three structural M & I water supply alternatives were formulated because Tacoma "considered these (others) non-viable at the time of the reconnaissance report." At Tacoma's request, then, in addition to what Tacoma wanted to be the preferred alternative, Additional Storage at Howard Hanson dam, the only two alternatives studied in depth were building a large dam on Smay Creek in the Green River basin or constructing a new dam on the Skagit River with a water supply pipeline more than 85 miles long from the Skagit River to the Green River basin and then to Tacoma. Apparently, Tacoma chose the two most expensive alternatives from the 17 so that the HHD AWSP would be the least-cost of the three chosen alternatives.

O06-4 One of the Alternatives studied should have been the Alternative 4 of the Scoping process, Conservation/Demand Management and Industrial Reuse. From the scant information given on that Alternative on page 54, Tacoma is not thinking beyond basic items such as installation of flow restrictors in showers and sinks, etc. The Corps and Tacoma should have worked with Seattle Public Utilities studying conservation and reuse. Seattle has been studying conservation since 1996 and recently released its "Water Conservation Potential Assessment, Final Project Report, May 1998," a copy of which is attached. Seattle, recognizing the environmental impacts of major structural projects, looked to conservation and reuse as crucial to their future plans.

The Preferred Alternative for the DFR/DEIS must be Alternative 4 of the Scoping process, Conservation/Demand Management and Industrial Reuse. The Corps must not allow Tacoma to create further negative impacts on the Green River without having done all conservation and reuse measures that would be comparable in cost to the Recommended Plan chosen by the Corps and Tacoma. Since additional conservation and reuse measures could be added to the list of items which are cost-effective as technology advances over the years, these measures have great potential over time. Tacoma wants more water during summer/fall when the instream flows are lower than at other times of year. Water use is considerably higher during this season and since much of this additional water use is for watering lawns, Tacoma could start with a campaign to have its customers cut back on such use and plant drought-tolerant plants in place of lawns.

To get to Tacoma's goal for a specific amount of additional water, an appropriate Preferred Alternative might be to do the maximum possible of Conservation and Reuse (Alternative 4) and add to that from the list of Preliminary Alternatives, Alternative 3e - Tide Flat wells, Alternative 3f - Lone Star Sand and Gravel wells, and Alternative 3g -

O06-4 *It should be noted that water supply benefits are based on the costs avoided by* constructing HHD. The above referenced alternatives were evaluated and in fact are part of the alternatives that were used to compute avoided cost water supply benefits. See Appendix B, Sections 2.6.6 and 2.6.7. The economic analysis presented in Appendix B compares the water supply benefits to the separable costs (i.e. costs incurred directly as a result of adding that project purpose) of water supply to determine economic feasibility. The benefit-cost ratio of water supply is 1.1 to 1. Based on this analysis, it is more cost effective to construct a water supply project at HHD than implement the alternatives referenced in your comment. See Comment-Reply O05-2.

South Tacoma Aquifer. Such a combination would have far fewer negative environmental impacts and yet costs would be kept low.

O06-4 Cont

The Corps and Tacoma have got their priorities backwards. On page 74, the DFR/DEIS states about Alternatives 3e, 3f, 3g, and 4, that "with HHD, these measures would not need to be implemented" ... and ... "the cost of these measures would be avoided." The Corps, as an agent which is supposed to effect the federal priority of "environmental (ecosystem) restoration" should be deferring the HHD AWSP so that its costs can be avoided, choosing instead to implement Alternatives 3e, 3f, 3g, and 4 with their much less negative environmental impacts.

Since the DFR/DEIS failed to properly evaluate these Alternatives which were listed under preliminary scoping, and also failed to choose Alternative 4 or a combination of Alternative 4 with Alternatives 3e, 3f, and 3g, the DFR/DEIS is fatally flawed because it permits continuing degradation of the river system to the detriment of natural flows of a free flowing river and to the salmonids of the Green River. None of these Alternatives conflict with the Criteria Common to Water Supply and Restoration Measures, Water Supply Criteria, or Restoration Criteria (pages 46 and 47).

INSTREAM FLOW ALTERNATIVES

O06-5

The Recommended Plan in the DFR/DEIS includes additional water storage of 22,400 acre-feet for M & I water supply added to the 26,000 acre-feet already stored for that purpose. In addition, currently an additional 5,000 acre-feet of water for low flow augmentation is authorized. The Recommended Plan adds 9,600 acre-feet of water for low flow augmentation. Altogether, there is a huge impact on the Green River from current storage, let alone the effects of the Proposed Project. The Corps and Tacoma purport to help salmonids (and resident fish) by providing additional water during summer/fall low flow season. In order to do this, they would keep the river from running as high as it normally would in the Spring. The incremental change includes not only the portion stored specifically for low flow augmentation, but also the 22,400 and the 26,000 stored for water supply. These changes, current and proposed, prevent the river from flowing naturally. The anadromous fish runs on the river evolved and thrived in the natural conditions that included high flows in the Spring. Those fish runs are severely depleted currently because of the many impacts to their environment by the manipulations of humans. Causing the river to deviate even further from its natural rhythms is not appropriate. Just because we have caused changes in the past does not mean we should continue to deviate even more. Continued manipulations can only result in further degradation of the fish and the river system. Any projects of the Corps should be toward restoring the ecological system to its original natural state, especially given the potential ESA listings of salmonids.

O06-6

Washington Recreational River Runners is concerned in particular about geological aspects of the Recommended Plan's additional storage, including seepage through the North Fork channel and the dam's right abutment pervious material.

O06-5 Existing storage of 25,400 ac ft (26,000) in HH Reservoir is dedicated to instream flows (low flow augmentation) not M&I water supply as described in your letter. In addition, the project is phased, so that Phase I does not increase water withdrawal from the river over that already stored for instream flows or diverted for Tacoma's water supply needs. Phase II would increase water withdrawals (in reservoir storage) from the river, but, this additional withdrawal will be conditioned by agency and tribal acceptance on our ability to avoid or minimize impacts to aquatic resources.

As described throughout the DFR/DEIS, the AWS Project will be managed to mimic the natural flow conditions in the Green River Basin. To do this, the Corps and Tacoma Public Utilities will be developing a reservoir refill and release schedule that will mimic the natural highs (freshets) and lows (baseflows) in river flows during late winter and spring. This refill and release schedule will be adaptive, being tied to the needs of the fish resources found above and below HHD. We will be identifying the specific fish needs within the Green River Basin through a long-term monitoring and evaluation program. See also Comment Replies L02-10, L02-11, O02-5, O03-5, O03-6.

O06-6 In Section 4.5 of the DFR/DEIS and Section 3.5 of Appendix E we describe possible corrective actions to control seepage. Injection grouting is planned for the right abutment and we will be conducting a test pool raise to determine the amount of seepage prior to construction of the fish passage facility. This issue will be addressed more thoroughly in the PED.

WATER QUALITY ALTERNATIVES

O06-7 Washington Recreational River Runners agrees with the intent of the Corps and Tacoma to improve water quality below HHD. We also advocate such improvements throughout the watershed on main stem and tributaries. Increasing the water storage behind HHD does not improve water quality in the reservoir. Additional storage will change the temperature, making it less like natural temperatures.

FISH PASSAGE ALTERNATIVES

O06-8 The Preferred Alternative chosen for the proposed project must be one that provides the most natural anadromous fish passage. The DFR/DEIS Recommended Plan for fish passage is not acceptable, given the depleted salmonid runs. The Recommended Plan, if it does not call for removal of the two dams, should provide for a fish ladder from below the Tacoma diversion dam to a point above Howard Hanson dam. Trucking fish upstream is not biologically supportable. What works best for these fish is what is most like the historical, natural regime for the Green River system. Since Alternative 9F - Remove existing Dam, which would "provide near natural riverine conditions and total restoration of fish passage (both downstream and upstream)" (page 59), was eliminated because it "would violate existing project purposes for flood control and water conservation (meeting minimum instream flows)" (page 59), the fish ladder would be the next best solution.

FISH CULTURE ALTERNATIVES

O06-9 Hatchery fish cause problems for wild fish. Existing hatcheries should be phased out. The only way hatcheries of any owner should be used would be as in Alternative 10C - Temporary Supplementation Programs. This type program must be scientifically monitored and terminated if it creates problems for wild fish. It should be ended as soon as possible. Such a program should naturalize the rearing of juvenile hatchery fish in methods such as those in Alternative 10B - Permanent Supplementation Programs.

HABITAT MITIGATION AND RESTORATION ALTERNATIVES

O06-10 The objective for the Corps of Engineers must be "environmental (ecosystem) restoration"
for the Green-Duwamish Watershed. The Corps is committed to doing restoration in the watershed, some of which might seem to be outside the scope of this project. However, the above objective, derived from federal policy, could also seem to be outside the scope of this project. It is the position of WRRR that the geographic scope of the Study and the EIS should be the whole Green-Duwamish Watershed. Nothing less will do because the objective of "environmental (ecosystem) restoration" and he federal policy it reflects require looking at the whole watershed. The bottom line is that all agencies whose jurisdictions include/impact the Green- Duwamish Watershed must look at the big

O06-7 The AWS Project does, in fact, include features that improve water quality throughout the Lower Watershed -- a selective withdrawal structure and increased instream flows. These are considered important benefits to the river from the proposed project. The selective withdrawal structure allows for better management of the thermal budget within the reservoir. Currently at HHD, water exits the reservoir through an outlet at the bottom of the dam. This results in release water that is colder than the natural river would be in the early summer. By mid-summer, the cold water at the bottom of the reservoir is gone, and the release water is much warmer than the natural river would be. As described in the DFR/DEIS, release water temperature would mimic natural conditions all year round.

In addition to improved water temperatures, instream flows during critical salmon and steelhead spawning and rearing periods would be improved. This is a water quality benefit as well because the resulting faster flowing, deeper river would be cooler than the slower, shallower existing river.

O06-8 Upstream fish passage is the responsibility of the Tacoma Public Utilities, our local sponsor. See Comment-Replies O02- 5 and O06 -3. To bypass both dams and the reservoir would require construction of a fish ladder over 7 miles in length.

O06-9 Comment noted.

O06-10 Restoration goals of the Corps of Engineers for the Howard Hanson Dam Additional Storage Project are necessarily restricted to those areas originally affected by Howard Hanson Dam construction and operation. The Corps is also the major action agency in the parallel Green-Duwamish River Basin Restoration study, with sponsorship from King County. These two studies are separate, and authorized by separate Federal statutes, with funding targeting specific actions. Though there is some overlap between the two actions the Corps has tried to minimize the overlap. The geographic scope of the AWS Project DFR/DEIS, while focusing on the Howard Hanson Dam and reservoir area, as well as functional aspects of the Green River below the dam, addresses the Green River Watershed above the reservoir in the cumulative impact section, and in various other sections where reference is made to other landowners and agencies that are conducting studies or completing work in the watershed. The Corps is committed to restoring habitats in the watershed, but is limited in what it can do by Congressional authority, agency missions, and sponsor objectives. In addition, the Corps owns very little land in the watershed, and is unable to participate in a land exchange with other entities. Our land holdings are directly related to the dam and areas immediately

O06-10 Cont. surrounding the dam. Congress had not authorized purchase of lands by the Corps, except as required to complete construction projects. Thus, the Corps is unable to purchase lands for restoration. This is a major restriction when it comes to protecting wetland, riparian, and other floodplain resources. However, we can and do provide engineering, geotechnical, fish and wildlife biology, and other forms of expertise in the watershed restoration study.

The Corps is studying additional restoration work in the Green River watershed, as well as other areas, but we are limited by the authorities bestowed by Congress. Under the Green/Duwamish Basin study, the Corps is investigating projects that meet many of the restoration efforts identified by the WRRR including 1) protecting and restoring wetland habitats throughout the watershed; 2) creating and restoring estuarine habitat; 3) restoring parts of the natural Lower and Middle Green River floodplain; and 4) protecting and restoring riparian habitats. The HHD AWS study mitigation and restoration projects address several of the WRRR restoration objectives (in areas near HHD) including 1) wetland protection and restoration (above the new inundation zone); 2) restoring floodplain habitat; 3) protecting riparian habitats; and 4) improving water quality in the upper and lower watershed. The ability to restrict development is outside the authority of the Corps in either of the above studies. However, the Corps is the federal permitting agency in reviewing development activities that include dredge or fill of wetlands. The Clean Water Act does not restrict development, but merely reviews the impacts of development on water borne habitats, in particular wetlands.

O06-10 Cont.

picture. The restoration projects for the whole watershed contemplated be all the government agencies, Muckleshoot Indian Tribe, and others will cost a lot of money, and the players seem dedicated to spend it, provided they can get that money from whatever sources. To benefit wild fish, wildlife, and native plants to the maximum, commitments need to be to the following:

-Protecting and restoring forests in the upper watershed and, to the extent possible in the middle and lower watershed to provide natural water storage and increase instream flows. The Corps and other players should be involved in negotiations re land exchanges in the upper watershed, advocating for retaining as much land as possible in the upper watershed in federal ownership, for reforesting that federal land, and for buying and trading lands within the watershed to increase federal control of old growth trees and roadless areas, and to provide better wildlife corridors.

-Protecting and restoring wetlands throughout the watershed to provide natural water storage and increase instream flows.

-Restoring estuarine habitat to the fullest extent possible.

-Restoring as much as possible of the river's historic, natural flood plains.

-Reducing the impacts of development in the watershed throughout the watershed

-Protection and restoration of riparian habitat for fish and wildlife.

-Improve water quality throughout the watershed through the above measures and through working with other players to eliminate sources of pollution throughout the watershed.

ENVIRONMENTAL/SOCIOECONOMIC CONSEQUENCES

O06-11

Most of Washington Recreational River Runners' environmental objections to the HHD AWSP are noted above. In addition, WRRR objects to the negative impacts to the vegetation that will be inundated by enlarging the reservoir, and to the introduction of non-native water-tolerant species to the areas that would be under water part of the year. The wetlands along the banks of the reservoir would be destroyed taking away the positive functions of wetlands including wildlife habit for elk and other species. WRRR is concerned about the impacts to threatened and endangered species in the watershed. Studies of wildlife are inadequate. Studies of fish indicate major problems with additional storage.

IMPACTS TO WHITEWATER BOATING RECREATION

O06-12

Washington Recreational River Runners believes the data is insufficient to support the Corps' position that the Preferred Alternative and the Immediate Full Development of Water Supply with Environmental Restoration Alternative "could" bring improvements in frequency and timing of outflows sufficient for additional whitewater boating. The Corps tends to give such recreation short shrift because recreation is not one of the authorized project purposes. Whitewater Boating Recreation is an economic boon to the surrounding community and is likely to be seriously impacted by additional storage. The Corps and Tacoma must do studies of the possible impacts and means of mitigation for them. Speculation is not sufficient. The DFR/DEIS is inadequate for lack of the necessary studies and specificity.

O06-11 Agree that the Recommended Plan would result in negative impacts to fish, wildlife, threatened and endangered species, and their habitats. The extensive mitigation plans for fish and wildlife are intended to offset these impacts. The loss of wetlands is a concern; we propose the introduction of several species of native plants of the genus *Carex* to replace those plants that would be inundated by the reservoir. These replacement species are more tolerant of longer periods and greater depths of inundation than the species currently present in the reservoir. One non-native tree (bald cypress, *Taxodium distichum*) has been proposed to be planted in the reservoir, as it is capable of withstanding great depths and long periods of inundation. Bald cypress has been previously planted in several places in the Pacific Northwest (including several Corps reservoirs), and, to date, has not been known to regenerate itself. Several commenters have expressed concern over planting a non-native plant in the region, with good reason. Additional discussion with resource agencies will occur before any decision is made to plant bald cypress. Should agencies agree with our planting plan, a state Department of Fish and Wildlife permit will be required. The state may decide to not issue the permit. Should the state issue the permit, the growth of this species will be monitored, and the river downstream from the dam will also be monitored to make sure seedlings of this species do not become established outside the reservoir limits.

Biological assessments were prepared addressing the potential effects on threatened and endangered species found in the project vicinity. The USFWS concurred with the Corps' conclusion that the project is not likely to adversely affect bald eagles, marbled murrelets, spotted owls, gray wolves, and grizzly bears. Spotted frogs (candidate species), and bull trout (proposed species) were also addressed, and the Corps also determined a "not likely to adversely affect" conclusion for these species; the USFWS concurred. A biological assessment was prepared for Puget Sound chinook salmon (proposed species), and for Puget Sound coho (candidate species), following the recent announcement in the Federal Register (in March, 1998). The Corps determined the project is not likely to jeopardize the continued existence of the chinook, and is not likely to adversely affect the coho. We expect concurrence from NMFS on our determinations by the end of July, 1998.

O06-12 See response to comment O03-7 above.

In conclusion, Washington Recreational River Runners finds that the DFR/DEIS is inadequate. Additional studies need to be made regarding Whitewater Boating Recreation. The Corps of Engineers should not be in the dual role of project proponent and evaluator of the project. This duality creates a clear conflict of interest. The proponents did not provide the best alternatives and a Preferred Alternative which meet their own Planning Criteria and stated Objective of "environmental (ecosystem) restoration." The Corps and Tacoma have failed to include a Water Conservation and ReUse Alternative. The proponents failed to include a Fish Passage Alternative consisting of a fish ladder for natural upstream and downstream migration of anadromous fish. The Study Area was limited when it should have included the whole watershed which fits with the "environmental (ecosystem) restoration" objective and federal policy. The proposals for fish passage are more tinkering and attempts to build out of the problems created by previous "building" of the two dams on the river. With potential endangered species listings imminent, solutions must be more natural not less so. The DFR/DEIS and the Recommended Plan are not acceptable and must be reworked.

Sincerely, Mark Burns

Mark Burns, President
Washington Recreational River Runners
P.O. Box 25048
Seattle, Washington 98125-1948

Letter O07

Comments

MR. MRS. MS. MISS | FIRST NAME: DARA | INITIAL: KESSLER | LAST NAME: MUELLER

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FIRM, ORGANIZATION OR AGENCY REPRESENTED: WASHINGTON KAYAK CLUB

- ☐ I WISH TO SPEAK AT THIS MEETING
- ☐ I HAVE WRITTEN MATERIAL TO SUBMIT
- ☐ I AM INTERESTED IN OBTAINING A TRANSCRIPT OF THIS MEETING (At Cost of Reproduction)

007-1 REMARKS: I will submit written comments.

NPD FORM 111 June 1980 (Rev.) NORTH PACIFIC DIVISION, U.S. ARMY CORPS OF ENGINEERS

Replies

O07-1 See comment letter O04.

US Army Corps of Engineers, Seattle District
P.O. Box 3755
Seattle, Washington 98124-3755
ATTN: Kris Loll, Civil Projects & Planning Branch

Dear Project Proponents:

Subject: Review of Howard Hanson Dam Additional Water Storage Project (HHD AWSP) Draft Feasibility Report/Draft Environmental Impact Statement (DFR/DEIS)

As a resident of the Puget Sound region who chooses to live here because of the beauty and proximity of the natural world, I expect the government agencies who represent me to protect and restore environmental, recreational, and aesthetic values that make life here special. At this critical time, with several potential listings under the Endangered Species Act (ESA) looming, every government agency should have its primary objective be to restore and protect as fully as possible those threatened and endangered species. Instead, your project makes storage for municipal water supply the primary objective and gives lip service to environmental restoration while continuing to destroy natural conditions.

I01-1

Your proposed project negatively impacts river recreation on the Green River. The Green River Gorge is a premier whitewater run, renowned throughout Washington State, the nation, and abroad. The river below the Gorge is also much loved and heavily boated, thanks to its beauty and its proximity to a metropolitan area. Additional water storage and changes in the reservoir refill timing will have negative impacts on boating. Refill schedules will make the Green River Gorge unavailable to boating except in winter, but no mitigation for such negative impacts is provided. Recreation is scarcely mentioned in the DFR/DEIS. No studies were done; no data is provided to indicate what the negative impacts will be. The DFR/DEIS must be specific in relating impacts and mitigation.

The Selected Alternative for this project on the Green River should include:
Making the river's flows more natural --as natural as possible
Reforesting the Green-Duwamish Watershed as much as possible for natural water storage
Restoring and enhancing wetlands to the fullest extent throughout the watershed
Dam removal or keeping the reservoir's water storage as small as possible to enhance salmonid migration; providing a fish ladder from Tacoma's dam to H Hanson dam.
Eliminating dikes and channeling in the lower river to the fullest extent possible
Restoring the estuary wherever possible
Water conservation by Tacoma Public Utilities and all its customers equal to the costs of this and other Water supply projects which make the river less natural
Enhanced whitewater and casual boating on the Green River -- in particular of the Green River Gorge -- with no negative impacts, through natural flows

Sincerely,

Ned Kahler
IVED Sickels
Woodinville

I01-165 Comments noted.

2.6 MAILING ADDRESS FOR DRAFT FEASIBILITY REPORT AND DEIS

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	American Legion #19	1308 Beacon Way, S.	Renton, WA 98055
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Renton Local 1797	Brotherhood Carpenters & Joiners	231 Burnett N.	Renton, WA 98055
Trent Hudak	Burlington Northern & Santa Fe Railroad	2454 Occidental Ave S. Ste 1A	Seattle, WA 98134-1451
	Burlington Northern Railroad	999 Third Avenue	Seattle, WA 98101
	Burlington Northern RR	Honeywell Ctr, #290, 373 Inverness Dr. S	Englewood, CO 80112-5831
Jean Shabro	c/o Nancy Oertel	6018 SW Cupola Drive	Newport, OR 97366-9625
Corrine Brown	c/o Wayfarer Nursery	21414 Ricci Road	Monroe WA 98272
	Caesar Tasca	221 N Williams Street	Renton, WA 98055
	Carol Dobson	P.o. Box 59	Renton, WA 98057
Rich Starr	CENAB-PL	P.O. Box 1715	Baltimore, MD 21203
Larry Buss	CENWO-PD, Omaha District Corps of Engineers	215 North 17th Street	Omaha, NE 68102-4978.
	Chamber of Commerce	950 Pacific Ave	Tacoma WA 98402
	Charlie Kiefer	10926 SE 274th Street	Kent, WA 98031
	Cherry Knight-Larson	6827 34th Avenue, NW	Seattle, WA 98117
	Cheryl Miller	3303 N 36th St	Tacoma WA 98407
Mr. John Lind	Citifor Inc	1425 N Washington	Olympia WA 98501
	Citizens for a Healthy Bay	771 Broadway	Tacoma WA 98402-3700
Public Works Director	City of Auburn	25 W Main St	Auburn WA 98001-4998
Public Works Director	City of Federal Way	33530 1st Way S	Federal Way WA 98003
ATTN: Howard Schesser	City of Fife	5213 Pacific Hoghway E.	Fife, WA 98424
Don Wickstrom, Director	City of Kent	220 4th Ave S	Kent WA 98032
Gary Sund	City of Kirkland	123 5th Avenue	Kirkland, WA 98033-6189
Glenn Boettcher	City of Mercer Island	9611 SE 36th Street	Mercer Island, WA 98040
ATTN: Public Works Director	City of North Bend	P.O. Box 896	North Bend, WA 98052
Tikva Breuer	City of Olympia Public Works	P.O. Box 1967	Olympia WA 98507-1967

ATTN: Traci Disher	City of Redmond	15670 NE 85th St	Redmond, WA 98052
Housing Authority	City of Renton	200 Mill Avenue, S., City Hall	Renton, WA 98055
W.E. Bennett	City of Renton	200 Mill Avenue, S.	Renton, WA 98055
	City of Renton	200 Mill Ave So.	Renton WA 98055
Ron Straka	City of Renton, Surface Water Utility	200 Mill Avenue, S.	Renton, WA 98055
ATTN: City Hall City Planner	City of Snohomish		Snohomish, WA 98290
	City of Tacoma	747 Municipal Building	Tacoma, WA 98402-3793
ATTN: Mayor	City of Tukwila	6200 Southcenter Blvd.	Tukwila, WA 98188
ATTN: Director, Pub. Works Dept	City of Tukwila	6300 Southcenter Blvd.	Tukwila, WA 98188
Phil Fraser, Senior Engineer	City of Tukwila Dept. of Public Works	6300 Southcenter Blvd., Suite 100	Tukwila, WA 98188
	Clover Creek Council	1602 129th St E	Tacoma WA 98445
Scott Winn	Community Coalition for Environment	205 17th Ave, Suite A	Seattle, WA 98122
	Conrad Hermsted	201 union SE #186	Renton, WA 98059
P.C. Planning & Land Services	County Public Services Building	2401 S 35th St	Tacoma WA 98409
Don Sutherland, P.C. Executive	County-City Building	930 Tacoma Ave S	Tacoma WA 98402
Pierce County Commissioners	County-City Building	930 Tacoma Ave S	Tacoma WA 98402
Judy Nelson	Covington Water District	18631 SE 300th Pl	Kent WA 98042
	Craig & Margaret Simpson	111 Wells Avenue, N.	Renton, WA 98055
	Crescent Family Partnership	7510 Eastside Drive, NE	Tacoma, WA 98422
	Dale Mesecher	913 N 2nd Street	Renton, WA 98055
	Danilo & Gloria Delmundo	16546 SE 19th St	Bellevue, WA 98008
	David Mason	231 Williams Avenue, N.	Renton, WA 98055
	David Swanson	4616 S 124th	Seattle, WA 98178
	Dean Bitney	2727 Mt. View Avenue, N.	Renton, WA 98056
	Debra Johns	E 3690 Hwy 106	Union, WA 98592
	Dennis Moore	34900 212th Ave SE	Auburn, WA 98092
Bonnie Bunning, Region Manager	Dept. of Natural Resources	P.O. Box 68	Enumclaw WA 98022-0068
Jennifer M. Belcher	Dept. of Natural Resources	P.O. Box 47000	Olympia WA 98504-7000
Pat Clark, Federal Highway Admin.	Dept. of Transportation	222 SW Columbia Street Suite 600	Portland, OR 97201
Terry Ebersole, Urban Mass Trans. Admin.	Dept. of Transportation	915 Second Ave, Suite 3142	Seattle, WA 98174-1002
Stu Blocker	Dept of Natural Resources	P.O. Box 68	Enumclaw WA 98022
	Dino Patas	1815 Rolling Hills Avenue, SE	Renton, WA 98055
Kara Whitstock	Document Dept. Library	Colorado State University	Fort Collins, CO 80523-1019
Fred C. Schmidt	Document Dept. The Libraries	Colorado State University	Fort Collins, CO 80523-1019
	DOE - NW Regional Office	3190 160th Ave SE	Bellevue WA 98008-5452
	DOE - Water Quality Program	P.O. Box 47600	Olympia WA 98504-7600
Keith Phillips	DOE - Water Resources Program	P.O. Box 47600	Olympia WA 98504-7600
Greg Grunenfelder	DOH - Division of Drinking WaterAirdustrial Center Building #3	P.O. Box 47822	Olympia WA 98504-7822
	Don Morrison	14601 SE 173rd	Renton, WA 98055
	Donald & Margaret Schumsky	2019 Jones Avenue, NE	Renton, WA 98055
	Douglas & Claudia Buck	904 N Riverside Drive	Renton, WA 98055
Holly Kean	East King County RWA	1309 114th Ave SE, Suite 300	Bellevue WA 98004
	Edward S. Syrjala	P.O. Box 149	Centerville, MA 02632
Howard Johnson	Enumclaw Plateau	30304 SE 392nd	Enumclaw, WA 98022

Chuck Keenan	Environmental & Economic Balance Council	777 - 108th Avenue NE, Suite 1601	Bellevue, WA 98004
	EPA - Regional Administrator	1200 Sixth Ave	Seattle WA 98101
	Esell Corporation	126 Wells Avenue, S.	Renton, WA 98055
	Eugene A & Christine Frasier	778 Ashley Court	Buckley, WA 98321
Dennis Ossenkop	FAA, Airport Division	1601 Lind Avenue, SW	Renton, WA 98055-4056
	Fairwood Library	17009 - 140th SE	Renton, WA 98058
Ray Williams	Federal Emergency Management Agency	130 - 228th Street	Bothell, WA 98021-9796
Bob Frietag	Federal Emergency Mgmt Agency	140 228th SW	Bothell, WA 98021-9796
	Federal Way Regional Library	34200 First Way S	Federal Way, WA 98003
Steve Wieneke, Dir. of Engineering	Federal Way Water & Sewer District	P. O. Box 4249	Federal Way, WA 98063
Pete Soverel	Federation of Fly Fishermen	16430 72nd Avenue, W.	Edmonds, WA 98026-4908
	First Federal Savings & Loan	P.O. Box 358	Renton, WA 98055
Milo Bell	Fish Passage Technical Committee	P.O. Box 23	Muklteo, WA 98275
Ed Donahue	Fish Pro, Inc.	3780 SE State Hwy 160	Port Orchard, WA 98366
	Friends of the Earth	4512 University Way NE	Seattle WA 98105
Pat Sumption, Pres.	Friends of the Green	10510 11th Ave NE	Seattle, WA 98125
Pete Sikora	Giustina Resources	P.O. Box 529	Eugene WA 97440
	Glenn Reynolds	55 Logan Avenue	Renton, WA 98055
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Tim Thompson	Gordon, Thomas, Honeywell	P.O. Box 1157	Tacoma WA 98401
	Grace Storwick & John Giuliani	P.O. Box 78327	Seattle, WA 98178
	Green/Duwamish Watershed Alliance	742 S. Southern St	Seattle, WA 98108
	Greg & Deborah Devereaux	909 North 1st Street	Renton, WA 98055
	Hadi Fakharzadeh	11226 Auburn Avenue, S.	Seattle, WA 98178
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	Howard & Doreen Johnson	30304 SE 392nd	Enumclaw WA 98022
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	James Kirkman	1002 North 35th	Renton, WA 98055
	Janet Thompson	3190 160th Ave SE	Bellevue, WA 98008-5452
	Jeffery Eustis, P.S.	505 Madison #209	Seattle, WA 98104
	John A. & Carol M. Veness	36 Logan Avenue, S.	Renton, WA 98055
	John Burkhalter	803 North 1st Street	Renton, WA 98055
	John Gould	806 N 2nd Street	Renton, WA 98055
	John Hargrove	105 Wells Avenue, N.	Renton, WA 98055
	John Sparrow	908 N Riverside Drive	Renton, WA 98055
	Joseph Marchetti	801 North 2nd Street	Renton, WA 98055
	Josephine Morrison	112 Wells Avenue, N.	Renton, WA 98055
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	June Evans	817 North 1st Street	Renton, WA 98055
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Bob Fuerstenberg	KC DNR - Water & Land Res. Div.	700 Fifth Ave., Suite 2200	Seattle WA 98104

	Kenneth King	350 Sunset Blvd., N	Renton, WA 98055
	Kenneth Shellan	591 N Patencio Road	Palm Springs, CA 92262
	Kent Regional Library	201 Second Avenue N	Kent, WA 98032
	Kevin & Eugenia Beckstrom	206 Wells Avenue, N.	Renton, WA 98055
	Kevin & Kathy Bruce	921 North 1st Street	Renton, WA 98055
	King Cnty Dept. of Dev. & Env. Serv	3600 -136th Place SE	Bellevue, WA 98006
ATTN: Barbara Wright	King Cnty Parks, Plng & Res. Dept	506 2nd Ave, MS 7-ST	Seattle, WA 98104
ATTN: Dave Clark	King Cnty Sur. Water Div.	700 5th Ave, Suite 2200	Seattle, WA 98104
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	King County Council	516 3rd Ave, Room 402	Seattle WA 98104
Ron Sims	King County Executive	516 3rd Ave, Room 400	Seattle WA 98104-3271
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Helen Weagraff	King County Land - Water Stewards	4508 - 47th Avenue S.	Seattle, Wa 98118
Documents Dept.	King County Library System	1111 110th Ave NE	Bellevue, WA 98004
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Tim Goon	King County METRO	821 Second Avenue, MS-120	Seattle, WA 98104
Richard Tucker	King County Resource Planning	506 Second Ave, Ste 708	Seattle, WA 98104
Advisory Council on Historic Preservation	King County Surface Water Management	700 Fifth Ave, Suite 2200	Seattle, WA 98104
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Dave Clark, Manager	King County Surface Water Management	700 Fifth Ave, Suite 2200	Seattle, WA 98104
Gino Lucchetti	King County Surface Water Management	700 5th Avenue, Suite 2200	Seattle, WA 98104
Heather Stout	King County Surface Water Management	700 Fifth Ave, Suite 2200	Seattle, WA 98104
John Lombard	King County Surface Water Management	700 5th Avenue, Suite 2200	Seattle, WA 98104
Roz Glasser	King County Surface Water Management	700 Fifth Ave, Suite 2200	Seattle, WA 98104
Stephanie Lucash	King County Surface Water Management	700 Fifth Ave, Suite 2200	Seattle, WA 98104
Terry Butler	King County Surface Water Management	700 Fifth Ave, Suite 2200	Seattle, WA 98104
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Melinda Garcia	Lakehaven Utility District	P.O. Box 4249	Federal Way WA 98063
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	Larry Pape	16541 Redmond Way #C350	Redmond, WA 98052
	Lavina Kessler	310 Pelly Avenue, N.	Renton, WA 98055
	Lee York	2200 Aberdeen Avenue, NE	Renton, WA 98055
	Leonard Leathley, Jr.	809 N 2nd Street	Renton, WA 98055
	Louis Peretti	1102 Bronson Way	Renton, WA 98055
	Marion Lauck	904 North 1st Street	Renton, WA 98055
	Marjorie Bellando	P.O. Box 70217	Bellevue, WA 98007
	Martha Parker	18028 187th Avenue, SE	Renton, WA 98058
	Mary Ann Leggitt	375 Union Avenue, SE, #115	Renton, WA 98059
	Mary Patricia Ryan	P.O. Box 336	Renton, WA 98057
Steve Whitcher	Master Gardener Program Coordinator	3049 S 36th St., #300	Tacoma WA 98409-5739
Honorable Paul Schell	Mayor of Seattle	1200 Municipal Bldg., 600 Fourth Avenue	Seattle, WA 98104
	McLendon Hardware, Inc.	710 2nd Avenue	Renton, WA 98055
ATTN: Katherine McKee	METRO	821 Second Ave	Seattle, WA 98104-1598

	Milton Memorial Library	1000 Laurel Street	Milton, WA 98354
Eric Warner	Muckleshoot Fisheries Dept.	40405 Auburn-Enumclaw Road	Auburn, WA 98002
Karen Walter	Muckleshoot Fisheries Dept.	39015 SE 172nd Avenue	Auburn, WA 98002
Chantal Stevens	Muckleshoot Indian Tribe	39015 172nd Avenue S.E.	Auburn, WA 98092
Don Finney	Muckleshoot Indian Tribe	39015 172nd Avenue S.E.	Auburn, WA 98092
Fish Committee	Muckleshoot Indian Tribe	39015 172nd Ave SE	Auburn WA 98002
Fisheries Dept.	Muckleshoot Indian Tribe	39015 172nd Ave SE	Auburn WA 98002
Hunting Committee	Muckleshoot Indian Tribe	39015 172nd Ave SE	Auburn WA 98002
Paul Hage	Muckleshoot Indian Tribe	39015 172nd Avenue S.E.	Auburn, WA 98092
Pete Jerry, Wildlife Commission	Muckleshoot Indian Tribe	39015 172nd Avenue S.E.	Auburn, WA 98092
Tribal Council	Muckleshoot Indian Tribe	39015 172nd Ave SE	Auburn WA 98002
Walter Pacheco, Cultural Res Coordinator	Muckleshoot Indian Tribe	39015 172nd Avenue S.E.	Auburn, WA 98092
	Nancy Davidson	400 Yesler Way, Room 700	Seattle WA 98104-1637
Ben Meyer	National Marine Fisheries Service	525 NE Oregon Street, Suite 500	Portland, OR 97232-2737
Mike Grady	National Marine Fisheries Service	510 Desmond Drive SE, Suite 103	Lacey WA 98501
Robert Turner, WA Area Director	National Marine Fisheries Service	510 Desmond Drive SE, Suite 103	Lacey WA 98501
Steve Fransen	National Marine Fisheries Service	510 Desmond Drive SE, Suite 103	Lacey WA 98501
William Stelle, Jr., Regional Administrator	National Marine Fisheries Service	7600 Sand Point Way NE	Seattle WA 98115
	Nature Center at Snake Lake	1919 S Tyler	Tacoma WA 98405
	Neal Jensen	P.O. Box 353	Renton, WA 98057
Donna Weiting	NOAA	14th & Constitution Ave NE, HCHB, Room 6222	Washington DC 20230
	Norman & Marian Schultz	7634 Sunnycrest Road	Seattle, WA 98178
	North American Refractories	500 Halle Bldg, 1228 Euclid Avenue	Cleveland, OH 44115
Karen Bergeron	North Bend Ranger District, Mt. Baker-Snoq NF	42404 SE North Bend Way	North Bend, WA 98045
Sarah Humphries	Northwest Rivers Council	1731 Westlake Avenue, N, Suite 202	Seattle, WA 98109-3043
H. Paul Friesema	Northwestern Univ., Center for Urban Affairs	2040 Sheridan Road	Evanston, IL 60208-4100
Executive Director	NW Indian Fisheries Commission	6730 Martin Way	Olympia, WA 98506-5540
Mr. Dick Sanderson	Off of Fed. Activities(A-104), EPA Rm 2119-1	401 M St SW	Washington D. C. 20460
Ikuno Masterson	Office of Budget & Stratigic Planning	516 3rd Ave, Room 42	Seattle, WA 98104
John Bellinger, U.S. Dept. of the Army	Office of Environmental Policy, CECW-PO	120 Massachusetts Avenue NW	Washington, DC 20314-1000
Carol Borgstrom, U.S. Dept. of Energy	Office of NEPA Oversight Room #E-080	1000 Independence Avenue SW	Washington DC 20585
Advisory Council on Historic Preservation	Office of Program Review & Education	1100 Pennsylvania Ave., NW, #803	Washington, DC 20004
Ronald Anzolone	Office of Program Review & Education	1100 Pennsylvania Ave., NW, #803	Washington, DC 20004
Curt Smitch	Office of the Governor	Legislative Building, AS-13	Olympia WA 98504
Honorable Gary Locke	Office of the Governor	Legislative Building, AS-13	Olympia WA 98504
	Olimpia Audubon Society	P.O. Box 2524	Olympia, WA 98507
Cary Feldmann	P.S. Power & Light Co	411 108th Ave NE	Bellevue WA 98004-5515
Lee Moyer	Pacific Water Sports	16055 Pacific Hwy., S.	Seattle, WA 98188
David Mainer	Paddle Trails Canoe Club	P.O. Box 24932	Seattle, WA 98124
Gerald Eller	Paddle Trails Canoe Club	502 13th Ave., W.	Kirkland, WA 98033
John Rundberg	Paddle Trails Canoe Club	6219 41st Avenue N.E.	Seattle, WA 98115

Jeff Osborne	Parametrics	5808 Lake Washington Blvd. Suite 200	Kirkland, WA 98033
Sabine Renn	Parametrix	5808 Lake Washington Blvd NE	Kirkland, WA 98033
	Paul Szewczykowski	26226 187th Place, SE	Kent, WA 98042
Glenda Daniel	People For Puget Sound	1326 Fifth Ave Suite 450	Seattle, WA 98101
	People for Puget Sound	1402 3rd Ave, Suite 450	Seattle WA 98101
	Peter & Nancy Forras	2030 Rolling Hills Avenue, SE	Renton, WA 98055
	Peter Allan	25 Hickory Place, H-22	Chatham, NJ 07928-3014
Parkland Spanaway Branch	Pierce County Public Library	13718 Pacific Avenue S	Tacoma, WA 98444
	Pierce County Surface Water	2401 S. 34th	Tacoma, WA 98409-7487
Juli Wilkerson, Director	Planning & Development Services	747 Market St	Tacoma WA 98402
Gary Johnson	Plum Creek Timber Co	P.O. Box 248	Enumclaw WA 98022
Cindy Dietz	Portland Water Bureau	1120 SW 5th Ave	Portland OR 97204-1926
Puget Sound Power & Light Co.	Property Tax Dept.	P.O. Box 90868	Bellevue, WA 98009
	Proteam Marketing	514 Auburn Way, N.	Auburn, WA 98002
	Puget Sound Regional Council	1011 Western Ave #500	Seattle, WA 98104-1040
	Puget Sound Regional Council	1011 Western Ave, Suite 500	Seattle WA 98104-1035
ATTN: John Dohrmann	Puget Sound Water Quality Authority	P.O. Box 40900	Olympia, WA 98504-0900
Kathy Minsch	Puget Sound Water Quality Authority	P.O. Box 40900, MS PV-15	Olympia, WA 98504-0900
	Puyallup Public Library	324 S Meridian	Puyallup, WA 98371
ATTN: Wilson V. Binger	R. W. Beck	1001 Fourth Avenue, Suite 2500	Seattle, WA 98154-1004
Dudley Reiser	R2 Resource Consultants Inc.	15250 NE 95th St	Redmond WA 98052-2518
Phil J. Hilgert	R2 Resource Consultants Inc.	15250 NE 95th St	Redmond WA 98052-2518
Bruce Harpham	Rainier Audubon Society	P.O. Box 778	Auburn WA 98071
	Ralph Storey	1012 N Riverside Drive	Renton, WA 98055
	Randall Reeves	7050 150th Avenue, NE	Redmond, WA 98052
	Randy Aliment	14511 SE Fairwood Blvd	Renton, WA 98058-8533
	Randy Rogers	2273 Dorre Don Court, SE	Maple Valley, WA 98038
	Raymond Barry	1625 Jones Drive, SE	Renton, WA 98055
Bob Everitt,	Regional DirectorWDFW	16018 Mill Creek Blvd	Mill Creek WA 98012-1296
	Ren Four, Inc.	P.O. Box 59	Renton, WA 98055
	Rena McMillan	121 Wells Avenue, N.	Renton, WA 98055
	Renato & Paz Santos	1815 Lake Youngs Way, SE	Renton, WA 98058
	Renton Public Library	200 Mill Avenue S	Renton WA 98055
	Renton School District 403	435 Main Avenue, S.	Renton, WA 98055
Honorable Adam Smith	Representative in Congress	3600 Port of Tacoma Rd, Suite 204	Tacoma WA 98424
Honorable Jack Metcalf	Representative in Congress	3273 Saratoga Rd	Langley, WA 98260
Honorable Linda Smith	Representative in Congress	10009 Ridgecrest Avenue NW	Vancouver, WA 98685
Honorable Norm Dicks	Representative in Congress	1717 Pacific Ave	Tacoma WA 98402-4411
Honorable Jim McDermott	Representative in Congress ATTN: Mr. Steve Johnson	1809 Seventh Ave, Suite 1212	Seattle WA 98101-1399
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Joy Huber, Executive Director	Rivers Council of Washington	1731 Westlake Ave N, #202	Seattle WA 98109-3043
	Robert & Geraldine Hyler	127 Pelly Avenue, N.	Renton, WA 98055
	Roger Davis	P.O. Box 452	Renton, WA 98055
	Roger Lowe	12708 NE 144th, #B-202	Kirkland, WA 98034
	Ronald & Colleen Nelson	17221 163rd Place, SE	Renton, WA 98058

	Ronald & Jacqueline Forte	P.O. Box 816	Renton, WA 98057
	Ruby Heitman	50 Logan Avenue, S.	Renton, WA 98055
	Rudolph & Beverly Starkovich	810 N Riverside Drive	Renton, WA 98055
	Russell E. Storwick	106 Burnett Ave S.	Renton, WA 98055-2110
	Sally Fisher	854 Redmond Avenue, NE	Renton, WA 98056
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Shelley Lawson	Seattle Public Utilities	710 Second Ave	Seattle WA 98104
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Diana Gale, Superintendent	Seattle Water Dept.	710 Second Ave	Seattle WA 98104
George Schneider	Seattle Water Dept.	710 Second Avenue, MS 15101	Seattle, WA 98104
Rand Little	Seattle Water Dept.	710 Second Avenue	Seattle, WA 98104
Ray Hoffman	Seattle Water Dept.	710 Second Ave	Seattle WA 98104
Alonzo Plough, Director	Seattle-King County Dept of Public Health	999 3rd Ave, Suite 1200	Seattle WA 98104-4039
	Sierra Club NW Office	180 Nickerson St, Ste 103	Seattle, WA 98109-1631
	Simon & Hanna Young	6531 83rd Place, SE	Mercer Island, WA 98040
Dennis Holder	SKCRWA	18631 SE 300th Pl	Kent WA 98042
Barry Gall	Skykomish Ranger District, Mt. Baker-Snoq NF	P.O. Box 305	Skykomish, WA 98288
	Slapshot, Inc.	999 Third Avenue, Suite 3600	Seattle, WA 98104
	Snohomish Cnty Planning Dept	Courthouse	Everett WA 98201
	Snohomish County Executive	County Exec. Off. MS 407, 3000–Rockefeller Ave	Everett, WA 98201
Guillemette Regan	Snohomish PUD #1	P.O. Box 1107	Everett WA 98206
	Soren & Karen Sorenson	706 North 1st Street	Renton, WA 98055
Don Wright	South King Co. Regional Water Assn	27224 144th Ave SE	Kent, WA 98042
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	State Senator Jim Horn	407 Legislative Office Bldg.	Olympia, WA 98504-0460
	State Senator Margarita Prentice	419 John Cherberg Office Bldg.	Olympia, WA 98504-0482
	State Senator Stephen Johnson	401C Legislative Office Bldg.	Olympia, WA 98504-0460
Director	Student Conservation Association	605 13th Ave	Seattle, WA 98122
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Tribal Council	Suquamish Indian Tribe	P.O. Box 498	Suquamish, WA 98392
Dr. Derek Poon	Sustainable Fisheries Division NMFS	7600 Sand Point Way NE	Seattle WA 98115
Cleve Steward	Sustainable Fisheries Foundation	P.O. Box 206	Bothell, WA 98041-0206
Glen Aurdahl	Sverdrup Civil	600 108th Ave NE, Suite 700	Bellevue, WA 98004
Judith Lorbier	Tacoma Environmental Commission	747 Market St., Room 900	Tacoma WA 98402
Ken Heany	Tacoma Metro Parks	4702 S 19th St	Tacoma WA 98405-1175
	Tacoma Public Library	1102 Tacoma Avenue S	Tacoma, WA 98402
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Brian King, Watershed Inspector	Tacoma Public Utilities, Water Dept.	P. O. Box 11007	Tacoma, WA 98411
Dennis Ellison, Watershed Manager	Tacoma Public Utilities, Water Dept.	P. O. Box 11007	Tacoma, WA 98411
Jane Evancho, Natural Resources Manager	Tacoma Public Utilities, Water Dept.	P. O. Box 11007	Tacoma, WA 98411
John Kirner, Deputy Superintendent	Tacoma Public Utilities, Water Dept.	P. O. Box 11007	Tacoma, WA 98411
Ken Merry, Superintendent	Tacoma Public Utilities, Water Dept.	P. O. Box 11007	Tacoma, WA 98411

Paul Hickey, Fish Biologist	Tacoma Public Utilities, Water Dept.	P. O. Box 11007	Tacoma, WA 98411
Steve Marek	Tacoma-Pierce County Health Dept	3629 South 'D' St	Tacoma WA 98408
	Tahoma Audubon Society	2601 70th Ave W #E	University Place, WA 98466-5430
	Tennessee Group	710 S. Second Street	Renton, WA 98055
	Tennessee Group	11316 85th Avenue, S.	Seattle, WA 98178
	Terrence Callahan	210 Burnett Avenue, N.	Renton, WA 98055
	The Boeing Company	P.O Box 3707, MS LF-09	Seattle, WA 98124
Elizabeth Morrow	The Ferguson Group	1130 Connecticut NW, Suite 300	Washington, DC 90036
Brooke Drury	The Mountaineers	300 3rd Avenue West	Seattle, WA 98119-4100
	The Mountaineers	2302 N 30th St	Tacoma WA 98403
ATTN: Elliot Marks	The Nature Conservancy	217 Pine St., Suite 1100	Seattle, WA 98108
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