



BAKER RIVER PROJECT RELICENSE

Economics/Operations Working Group

June 11, 2003

9:00 AM – 2:00 PM

PSE Office

Mt. Vernon, WA

FINAL MEETING NOTES

The Economics Working Group Mission Statement:

“To ensure that alternative project proposals, operations and emergency plans for the Baker River Project and its components provide for: (1) Public health and safety; and (2) Thorough analysis and evaluation of the economic costs and benefits (including non-market and economic impacts.)”

Team Leader: Lloyd Pernela (PSE), 425-462-3507; lloyd.pernela@pse.com

Note: Please let the team leader know if you are unable to attend a meeting. If something comes up at the last minute, please call Lyn prior to the meeting. Lyn's cell phone is 425-890-3613.

PRESENT

Lloyd Pernela, Cary Feldman, Joel Molander (PSE), Linda Lehman and Keith Brooks (FERC) by phone, Bob Helton (interested citizen), Jerry Louthain (EES for City of Anacortes, Skagit County PUD, and Town Concrete) by phone, Stan Walsh (Skagit Systems Cooperative), Dave Brookings (Skagit County Public Works Department), Steve Babcock, Michael Deering, Ted Perkins (Corps) by phone, Gary Sprague (WA Dept. Fish & Wildlife), Jon Vanderheyden (USFS), Mark Killgore (Louis-Berger Group), Mary Jean Bullock, note-taker, and Lyn Wiltse, facilitator (PDSA Consulting Inc.)

DATES OF FUTURE MEETINGS

*****NOTE: THE JULY 9TH MEETING WAS CANCELLED.*****

August 13, September 10, October 8, November 12, December 10, 2003 at PSE Office, 1700 East College Way, Mt. Vernon.

Note: Starting June 16, 2003, the PSE Energy Production and Storage Department will move across the street and a block east to 10885 NE 4th Street, Bellevue, WA 98004, Mail Stop PSE-09S. All phone numbers remain the same.

Note: All PSE e-mail addresses must now conform to the new format first-name.last-name@PSE.com. An example is lloyd.pernela@pse.com. Make sure an e-mail address buried in a group list conforms.

AGENDA

June 11, 2003 at PSE Office, Mt. Vernon, WA

9:00 to 2:00 PM

- 9:00 - 9:05 Introductions
- 9:05 – 9:10 Review/revise minutes and agenda
- 9:10 – 9:15 Review Action Items
- 9:15 – 9:35 HYDROPS and TST Update
- 9:35 – 9:50 Debrief of May 14th Cross Resource Workshop: Next steps
- 9:50 – 10:15 Role of this Working Group
- 10:15 – 10:30 PDEA Update
- 10:30 – 11:00 Status of PMEs
 - Status of 5.01: CZMA, 5.02: Instream Flows and Water Rights, 5.03: Submerged Lands, 5.07 Drought conditions
- 11:00 – 11:15 Break
- 11:15 – 11:45 PME 5.06: Flood control (COE proposal and current License article 32)
 - Update on Corps/Skagit County flood coordination and possible integration into this process
 - Status of Skagit County Flood Control Study Request
- 11:45 – 12:15 Review Study Requests:
 - R-01 –Low Flow Augmentation from Baker Project – Continuing monitoring developments.
 - R-03 –Examination of Spawning and Incubation Flows in the Skagit River below the Baker Confluence during Brood year 2000
- 12:15 – 12:30 Lunch
- 12:30 – 12:45 Status of ER03: Spawning and Incubation Flows Study Request
- 12:45 – 12:50 Set July 9, 2003 agenda (at PSE Office in Mt. Vernon or at the USFS Office in Mountlake.)
- 12:50 – 1:00 Evaluate Meeting
 - What's Hot?
 - Studies Report for Baker Solution Team

NEW ACTION ITEMS

- Lloyd: Set up presentations on how PSE operates/traders and planners, etc for July/August time frame.
- Lloyd: Set up a presentation on PSE's Least Cost Plan with planner(s).
- Lloyd: See that phone participants get copies of today's handouts.
- Joel: Convene additional meeting of flood control teamlet to add timeline to flow chart. Keep Econ/Ops members informed along the way.
- Lloyd: Send out revised 5.0 PMEA document to Working Group members ASAP.

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- Lyn: Button up with Team Leaders re: how the Economic Working Group relates with the role of the Solution Team.

INTRODUCTIONS

We welcomed Steve Babcock, Michael Deering, and Ted Perkins of the Corps who participated by phone.

REPORT ON OLD ACTION ITEMS

- ☑ Dave: By May 10 sent to Lloyd a summary of what was decided between the Corps and Skagit County at the May 9th meeting so he can distribute to Working Group members. Also sent, if appropriate, a revised flood control study request for discussion at our June 11th meeting.
- ☑ ALL: Reviewed PDEA to see that issues had been adequately identified and that the affected environment had been adequately described. Gave feedback to Mark Kilgore prior to our June 11 meeting.
- ☑ Lloyd: Distribute list of consultants to team members for review.

ISSUE OF FLOOD CONTROL

Lloyd distributed the summary he received from Dave of the May 8th meeting between Skagit County and the Corps. Dave characterized it as a policy-level meeting focused mostly on project management of the existing Skagit River Feasibility Study.

Lloyd distributed a copy of a May 30th letter he received from the Corps in response to PSE's May 1st letter to them requesting information around the potential for implementation of a different level of flood control storage at the Baker Project.

Lloyd distributed a summary of a June 3 meeting with the Skagit County Commissioners along with a copy of a letter from the Upper Skagit Indian Tribe requesting that flood control measures be addressed in discussions directly with the Corps and outside this relicensing process.

Steve Babcock explained that the Corps is obligated through congressional mandate to operate the Baker project for flood control at 74K acre-feet. They don't have the authority to operate the project for additional flood control storage that may be included without their concurrence in a license article. They would have to submit a decision document to receive permission to do so.

Lloyd reported that at a June 3 meeting, the County *Commissioners expressed their valid concern for the flooding of downstream residents of Skagit County.* Commissioners recognized PSE's concerns about PSE not being in a position legally or otherwise to provide flood control. PSE agreed at that meeting to meet with the County to explore how the issue of flood control might be integrated into the relicensing process.

PSE met with representatives of the County on June 9 and reviewed a flow chart of a "Proposed Incremental Flood Control Analysis Process." Joel walked us through the flow chart. The aim is to address this issue in a way that respects the interests of all parties involved. At this point in time, the effects of additional flood control are not known. The question of feasibility associated with additional incremental flood storage is also unknown. PSE's concern is that the analysis of additional flood control should not impact the current work studies in the work groups that are being conducted under the

assumption of the existing 74K acre-feet of flood storage at Upper Baker. They want to protect the momentum of movement toward settlement.

The draft flow chart shows the first step as an assessment of whether additional flood storage passes a standard benefit/cost feasibility analysis. The flow chart shows that if *additional flood storage* passes initial tests, then a concurrent environmental analysis (*i.e. PDEA*) of incremental flood control rule curves would follow. If final feasibility study still shows an acceptable BC ratio and *PDEA* (e.g. no fatal environmental flaws), this would *be introduced* into the *ALP* process. If *ALP process is positive leading to settlement discussions concerning additional flood storage* and completed by the settlement deadline, the change would be included. If not, we would submit the license application with the 74K acre-feet based *PDEA* and settlement agreement with a potential modification caveat. Should it fail the initial feasibility test, the County could address the issue directly with FERC, try to work something else out with the Corps, or drop the issue altogether.

Cary distributed a June 10 paper prepared by Phil Hilgert of R2 on “Potential Effects of Additional Flood Control Storage at the Baker River Project on Aquatic Resources.” The paper provided a high-level description of potential positive and negative consequences for fish of additional flood control.

Concern was expressed about the lack of timeline associated with the flow chart. Joel explained that if this group approved, he would convene another meeting of the teamlet that met Monday to add a timeline to the flowchart.

Concern was also expressed about existing relicensing resources may be diverted to analyze the additional flood control issue. PSE assured team members that additional resources outside the current process would be garnered to help with the initial flood control analysis. Some members felt that we would run out of time to do an adequate environmental analysis since the economic analysis would be done first. We acknowledged that we are on an extremely tight timeline and that some of our existing studies might also adversely impact the timeline.

Concern was expressed about handling the issue of increased flood control through a license re-opener, as it would open it up to other additional changes from the settlement that we come up with through the collaborative process. For example, we don’t want instream flow measures to be questioned or re-considered after the fact.

Lloyd expressed confidence that we can come up with a PME that meets everyone’s interests. Part of this would include wording such as “as directed by the Corps”. This would ensure that ESA and other such issues are adequately addressed.

After considerable discussion, team members acknowledged that Skagit County, PSE and the *Corps shall work cooperatively* to conduct the benefit/cost feasibility analysis, *i.e.*, flood control as a separate teamlet of the economic operations work group. As a next step, the teamlet *will review the scope of work as drafted by the Army Corps* and apply a timeline to the flow chart. Joel envisions getting together with this teamlet (the Corps, Skagit County, and consultants) to further flesh out the scope of the initial analysis. He estimates this analysis to take 6-8 weeks. At that point, if it passes the feasibility portion of the analysis, the teamlet would report the results of that study to this group who would then determine next steps.

Dave distributed and walked us through the Scope of Work put together by the Corps.

We deferred discussion of the Skagit County-sponsored Flood Control Study Request until after the results of the initial feasibility analysis.

PDEA UPDATE

Lloyd distributed a draft PM&E of the input PSE is providing to the Louis-Berger Group for analysis and for inclusion in the fall draft PDEA. We made some changes to clarify that the existing assumption that is being used by the working groups for flood control storage is 74K acre-feet and not the 100K acre-feet mentioned in Article 32. Lloyd will send out the modified version of this to working group members prior to our next meeting. A memo accompanied it from Baker Relicensing Program Manager Connie Freeland explaining that much of the detail included was provided by PSE at the request of Louis Berger to facilitate the analysis.

R-E02: LOW FLOW AUGMENTATION

As far as Jerry and his clients are concerned they want to keep this tabled for the next month or two, as they look at various options for providing water during critical low flow periods. We will look at this again once we have the results from the instream flow studies. There had been some delay getting these due to the datum conversion issue.

Lloyd expressed concern about this request since it doesn't currently pass legal muster requiring a change in the DOE regulations. The group's filter first item for study requests "is it legal." Jerry will keep us informed about the status of this.

HYDROPS AND TECHNICAL SCENARIO TEAMLET REPORT

Mark walked us through the soft constraints that are being prioritized by the TST. Taking into consideration the interests of all the resource areas, the TST tentatively established the ranking below.

1. Minimum instream flows was ranked as a 1.
2. Ramping was also ranked as a 1.
3. Minimum reservoir level was ranked as a 3.
4. Maximum reservoir level was ranked as a 2.
5. Minimum powerhouse release was ranked as a 3.

This is our first cut, qualitative evaluation. These rankings will allow the TST to specify preliminary model runs. It is likely that recent historic conditions and the draft preferred operating alternative would have the constraints.

Flood control is currently being handled as total release hard constraints at both dams in the HYDROPS model.

They are trying to get the probabilistic forecast mode operative because this mode is much more appropriate for our analytical needs (to resemble more what happens in real time) than deterministic mode.

Key Economic Assumptions:

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- Aurora Power Price Monthly peak/off peak energy prices
 - Replacement costs for dependable capacity based on simple cycle Combustion Turbines (capital and fixed O&M costs)
 - Unit 3 replacement after 15-20 years
 - Corp/BPA flood control compensation agreement continues

Mark explained how he came up with five representative years. Mark got a memo from Phil Hilgert suggesting four representative years to use to cover the range of impacts on aquatic resources. Mark added an additional year to improve the spectral representation for our preliminary evaluation through the hourly HYDROPS model. The energy year used in HYDROPS is August 1 through July 31. Specific time periods analyzed are August; September through November, December through February; and March through May, June through July and of course year-round.

The energy years we are using as 1993 (dry), 1995 (normal), 1996 (very wet), 2001 (very dry), and 2002 (somewhat wet).

DEPENDABLE CAPACITY

Mark has made two tentative comparisons for dependable capacity impacts based on sample UB and LB flows. PSE peak load periods in terms of energy usage are at 6-10 AM and 5-9 PM. Under the recent conditions scenario, Mark showed how considerably more water (and hence generation) would flow through the turbines. Under more severe instream flow and ramp rate constraints, generation could decrease significantly. In the alternative case, the instream flow was almost quadrupled from 80 CFS to 300 CFS at much gentler ramp rates.

ROLE OF THIS WORKING GROUP

- Flood Control
- Review of all economic costs /benefits of proposed PMEs? (Being addressed n PDEA).
- Oversight for TST
 - Have combined meeting to evaluate progress and results
- Evaluate PME actions that will affect project operations (if not addressed by the Working Groups)
- Determine how to derive the maximum economic benefit from the project
- Understand how HYDROPS deals with economic assessment
- Tracking cost of PMEs by looking at the whole
 - Consider whether there may be more cost-efficient ways to proceed.
 - Could some actions be delayed a few years?
- Provide a standard way for all Working Groups to consider economic efficiency (to get the most result out of PMEs for the least dollars).
- Provide feedback to Solution Team.
- Accomplish our mission: *"To ensure that alternative project proposals, operations and emergency plans for the Baker River Project and its components provide for: (1) Public health and safety; and (2) Thorough analysis and evaluation of the economic costs and benefits (including non-market and economic impacts.)"*

REVIEW STUDY REQUESTS

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- R-01 – Low Flow Augmentation from Baker Project (Tabled for now- Jerry will keep us informed on the status of this.)
 - R-03 – Examination of Spawning and Incubation Flows in the Skagit River below the Baker Confluence during Brood year 2000. This is being addressed through the TST.

HANDOUTS (bolded handouts will be posted on the website)

- R-2 June 10, 2003 Draft of Potential Effects of Additional Flood Control Storage at the Baker River Project on Aquatic Resources
- May 30, 2003 letter from Colonel Ralph H. Graves (Corps) re: Responses to Questions Relating to Implementation of Additional Flood Control Storage at Baker River Hydroelectric Project, FERC No. 2150
- Summary of May 8, 2003 Proceedings of Skagit County Board of Commissioners, Meeting with Corps of Engineers
- Skagit County's Request for Additional Flood Control, County Commissioners, June 3, 2003
- June 2, 2003 letter from Scott Schuyler, Policy Representative Upper Skagit Indian Tribe to the Skagit County Commissioners re: Flood Control Measures
- June 11, 2003, Baker Project Relicensing DRAFT Proposed Incremental Flood Control Analysis Process Flow Chart
- June 11, 2003, Corps of Engineer, Seattle Division SCOPE OF WORK, Skagit River, WA- Skagit River Flood Damage Reduction Feasibility Study- Baker River Flood Damage Reduction Feasibility Study – Baker River Dams Storage Evaluation
- 5.0 Economics and Operations Draft Proposed Actions; 5.1 Maintain Current Levels of Flood Control at Upper Baker with accompanying cover letter from Connie Freeland

PARKING LOT

- New Baker EAP Inundation maps are available at end October 2002
- Consider who will be the number cruncher for this team: PSE? Other?
- Presentations:
- How will we define and share economic analysis (methods, assumptions re: unit costs, etc.) across Working Groups?

EVALUATION OF THE MEETING

Well Done

- Great meeting
- Good attendance
- Great meal – Thanks Lloyd!
- Nice presentation by Mark Killgore.

Change for Next Time

- Room was warm and stuffy

What's Hot?

- Flood control – economic evaluation and how it might (adversely) impact the settlement process and other analysis processes.

Study Report for Solution Team

- Flood Control Study Request was deferred until we see what comes of the initial feasibility analysis.

TENTATIVE AGENDA FOR NEXT MEETING

August 10, 2003 at PSE Office, Mt. Vernon, WA

9:00 to 2:00 PM

- 9:00 - 9:05 Introductions
- 9:05 – 9:10 Review/revise minutes and agenda
- 9:10 – 9:15 Review Action Items
- 9:15 – 10:00 HYDROPS and TST update (including status of R2 model)
- 10:00 – 10:45 Review of Least Cost Plan
- 10:45 – 11:00 BREAK
- 11:00 – 11:15 FERC Call
- 11:15 – 12:00 PME 5.06: Flood control (COE proposal and current article 321)
- Update on Corps/Skagit County flood coordination and possible integration into this process
- Status of Skagit County Flood Control Study Request
- Consider inviting Jim Smith of Corps to present his economic model for the Lower Skagit
- 12:00 – 12:20 LUNCH
- 12:20 – 12:30 Review Other Study Requests:
- R-01 –Low Flow Augmentation from Baker Project – Continuing discussion
 - R-03 –Examination of Spawning and Incubation Flows in the Skagit River below the Baker Confluence during Brood year 2000
- 12:30 – 12:45 Status of ER03: Spawning and Incubation Flows Study Request
- 12:45 – 12:50 Set September 10, 2003 agenda (at PSE Office in Mt. Vernon)
- 12:50 – 1:00 Evaluate Meeting
- What's Hot?
 - Studies Report for Baker Solution Team
- 1:00 – 2:00 HYDROPS Demo.

BAKER RIVER PROJECT RELICENSING STUDY REQUEST

The purpose of this form is to provide a uniform template for any working group member to request a study and to provide the working group(s) with information from which to evaluate and prioritize study requests. In-depth proposals will be developed after the working group(s) approve the study concept. This form is intended only to assist the working group(s) in the selection of studies, and is not intended to inhibit the working group(s) from pursuing other options that ultimately lead to a settlement agreement. The methods for approving and funding studies are described in the Baker Relicensing Process Document.

The steps involved in development of a study are:

1. Proponent completes the study request form and submits it to the working group.
2. The working group(s) or the Solution Team approves the study.
3. The technical working group(s) and/or consultant develops the study design.
4. Review and approval of the study design is conducted by the working group(s).
5. Final approval and funding will be decided based on methods described in the Process Document.

BAKER RIVER PROJECT RELICENSING STUDY REQUEST		
Name and Affiliation David Brookings, Skagit County Skagit County PUD No. 1 City of Anacortes Town of Concrete	Working Group Economics and Operations	Date: Revised 5/20/03
Study Title Evaluation of Optimal Flood Control Storage in Baker Project.		
Brief Description : The study would evaluate the optimal flood control storage in the Baker Project by evaluating the incremental effects (positive and negative) and cost effectiveness of modifying the flow regime in both Baker Lake and Lake Shannon. The study would evaluate incremental flood storage volumes in Baker Lake and Lake Shannon. (<i>SSC – Stan Walsh – The study needs to include an environmental analysis</i>).		
Purpose To determine the optimal flood control storage in Baker Lake and Lake Shannon in an effort to minimize future downstream flood damages and to further mitigate for the loss of valley storage eliminated by the development of this facility. The results of the study will be proposed for the new FERC license for the Baker River Project.		
Related Interests and Issues (bulleted list) <ul style="list-style-type: none"> • Flow augmentation and downstream water rights. • Flow augmentation for salmonids/bull trout. • Linkage to downstream future flood control project. 		

STEP ONE - Linkage to Relicensing. Briefly answer the following questions. All proposals must address at least one of the next four questions for further consideration.

A. Does the study eliminate a critical uncertainty that is essential to address a range of alternatives and/or Project impacts? Briefly describe the uncertainty.

Yes. The 1956 FERC license authorized the Baker River Project with conditional language that allowed for the implementation of additional flood control storage (in addition to the 16,000 acre-feet to replace lost valley storage) provided that it was financially justified. The U.S. Army Corps of Engineers (USACE) and PSE evaluated optimal flood control storage in 1976 (*Killgore – up to the 100,000 acre feet (84,000 additional) in the original license Article 32*) and as a result Congress **implemented** an additional 58,000 acre-feet of flood control storage in 1977. The 1976 study is the last time that the optimal flood control storage at the project has been evaluated and significant development along the Skagit River has occurred over the past 25 years. Skagit County, the USACE and all other downstream cities and towns need to understand the potential options for increased flood control prior to approving the submittal to FERC for the license renewal of this facility. By implementing this study now PSE will eliminate the need to perform the studies late in the environmental and public review process. (*SSC – Stan Walsh – it is also a critical uncertainty how the flood control regime effects instream flows outside flood periods and how the flood control regime may effect reservoir rearing capacity for juvenile sockeye*)

B. What information does the study provide that is needed to support protection, mitigation, and enhancement discussions?

Determination of flood control operations will have a significant impact on determining reservoir levels during the fall/winter timeframe. Having a better knowledge of how the reservoir might be operated for flood control under the new license will help provide a clearer picture of future reservoir levels which will help to direct studies that support protection, mitigation, and enhancement measures.

C. How will the results of the study help us to develop, evaluate or choose between proposed strategies and/or alternatives?

The study outcome will determine the optimal flood control storage volume in Baker Lake and Lake Shannon, which will be used to set the flood control reservoir elevation “rule curve” that will be used to limit maximum reservoir elevations during the fall/winter flood season. Identification of the reservoir elevation rule curve is a critical step in determining potential impacts of the project to the environment and is also a critical element to be considered with others in the final determination of the preferred alternative. (*SSC- Stan Walsh- effects on other aspects of downstream flow need to be analyzed so effects of the flood control reservoir regime can be weighed against other strategies, such as reservoir productivity for sockeye rearing and downstream instream flows during non-flood periods*)

D. What information does the study provide that addresses one or more statutory requirements (e.g., Endangered Species Act (ESA), Clean Water Act (CWA), Northwest Forest Plan (NWFP), Federal Power Act (FPA))?
(*Killgore – Flood Control Act 1962*)

STEP TWO – Study Context. Your response to these questions will be used by the working group(s) when setting study priorities. Please provide brief answers.

A. Does the study provide information that will allow the working group to achieve multipurpose goals that may be considered during the relicensing process (e.g., recreation and wildlife)? Describe how the information would achieve these goals. Is the study related to other studies in the basin?

This study will be used to guide the selection of the optimal fall/winter flood control storage volume in Baker Lake and Lake Shannon, which will be used to define the flood control “rule curve” (i.e., the target reservoir elevations required to provide optimal flood storage space). The study will also provide results to achieve the goal of improving public health and safety and protecting the region’s economy and downstream infrastructure. Definition of the flood control rule curve is a critical step that is needed before many other studies linked to reservoir operations (e.g., study of reservoir operations on fisheries and wildlife) can proceed. (*SSC – Stan Walsh – this study should be directly related to and incorporate all aspects of the instream flow study A-9 as well as reservoir productivity studies.*)

B. What existing data are relevant? Why aren't these data sufficient?

Significant information is available at the USACE and Skagit County that could likely be used for this study. Skagit County initiated a Skagit River Feasibility Study (SRFS) in 1996 and has since worked very closely with the USACE in the development of a current, sophisticated river hydraulic model that can be used to simulate flood events, an updated economics-based flood damage analysis using current GIS-based floodplain development data and other environmentally-based information associated with the SRFS. Other relevant information that already exist include 1) updated stage-damage functions within the lower Skagit River valley (in progress); 2) updated peak discharge-frequency relationships for the Skagit River that reflect current flood control operations at Baker Lake; and, 3) updated peak discharge-frequency relationship for Baker Lake inflow. *(SSC_ Stan Walsh- data from A-9, A-26a are also relevant to this study)*

C. Are there established methods for this study? Cite references.

Yes, in particular the USACE has many engineering and design guidelines that would be applicable to this study. In particular, USACE publication EM-1110-2-1619 describes standard procedures for estimating the expected benefits and costs of proposed flood damage reduction measures.

D. When are the study results needed? Will the results be available when needed in the relicensing process?

Study results are needed as soon as possible to be available in a timely fashion for use in the relicense process. *(SSC_ Stan Walsh- a complete analysis of flood control proposals will not be possible without completing A-9)*

STEP THREE – Study Description. This description is not the design, rather information that can be used to complete a draft of a detailed design. This section may be completed prior to or after preliminary evaluation by the working group, but must be completed prior to final approval for study design. If necessary, the working group can designate a technical working group and/or request a consultant to assist with the completion of step 3.

A. What questions will the study answer (specific objectives, hypotheses being tested or parameters being estimated)? (bulleted list)

- Can additional flood control storage (i.e., greater than the current 74,000 acre-feet) be provided in the Upper Baker Reservoir (Baker Lake) and Lower Baker Reservoir (Lake Shannon)?
- What is the incremental cost of providing this storage?
- What are the incremental benefits of the additional storage?
- At what point is the additional flood storage optimized?
- *(SSC_ Stan Walsh- what is the effect of flood control on instream flows during non flood periods is a question that should be asked in this study)*
- *(SSC_ Stan Walsh- What is the effect of the flood control reservoir regime on reservoir productivity for sockeye rearing is another question that should be asked.)*

B. What information needs to be obtained to meet the objectives or test the hypotheses? (bulleted list)

- Cost of implementation (design, construction, loss revenues, fisheries impacts).
- Savings associated with additional storage (reduced flood damages, reduced costs for downstream improvements, reduced flood insurance premiums, reduced public risk, ancillary benefits [i.e., fisheries, etc.]).
- (SSC_ Stan Walsh- how the proposal effects downstream flow during non flood periods, specifically meeting minimum flows for salmonid egg incubation and fry emergence)*

C. Will there be a statistical analysis in this study? If yes, what method and to what level of reliability? If no, why?

Yes, the methodology inherently incorporates statistical methods through the use of discharge-frequency relationships to describe the relationship between streamflow and probability of occurrence.

D. What are the assumptions of the study? (bulleted list)

- The project (including Baker Lake and Lake Shannon) will be operating over the period of the new license (likely 30 to 50 years).
- Growth will not decrease within the downstream floodplain.
- Flood control storage will be provided over roughly the same period (November 1 to March 1) as it is under the current license.

E. Proposed study schedule. Estimated timeframe of study before results are available to make management decisions?

This study would likely require a minimum of 6 months to complete.

F. Preliminary cost estimate or range, if available.

Not available.

G. Briefly describe the study methods and provide background literature, if available.

Stage-damage functions would be constructed based on current development within the downstream floodplain. These functions would be used to relate Skagit River stage to the associated economic impact of flooding. Stage-damage functions would likely only be used for the Sedro-Woolley/Mt. Vernon area (study area) since most of the existing infrastructure (in dollars) is located in this area. Stage-frequency curves for the study area would be developed for a range of flood storage volumes up to a maximum of 100,000 acre-feet. These stage-frequency curves would be developed by assuming various (incremental) flood storage volumes in Baker Lake and then using a reservoir model coupled with a hydraulic routing model to simulate the associated flood stage in the study area. This information would be used to compute the economic benefits of given flood control volumes, where economic benefits are defined as the flood damages prevented for a given volume of flood control space. The benefits of given flood control volumes would be coupled with the associated cost of providing the flood control volume to determine a benefit/cost ratio for each incremental flood storage volume considered in the study. The optimal flood storage space would be selected based on the flood storage volume that provides the maximum benefit/cost ratio.

There are a number of USACE publications that discuss various aspects of this type of evaluation. For instance, USACE publication EM-1110-2-1619 describes standard procedures for estimating the expected benefits and costs of proposed flood damage reduction measures.

(SSC_ Stan Walsh- an analysis of effects on downstream flow in non flood periods and reservoir productivity should be included)

H. How will the results be used to develop or implement protection, mitigation and enhancement measures?

Determination of flood control operations will have a significant impact on determining reservoir levels during the fall/winter timeframe. Having a better knowledge of how the reservoir might be operated for flood control under the new license will help provide a clearer picture of future reservoir levels which will help to direct studies that support protection, mitigation, and enhancement measures.

**Corps of Engineers Responses
To Questions Relating to Implementation of Additional
Flood Control Storage at Baker River Hydroelectric Project, FERC No. 2150**

Questions posed by Puget Sound Energy (PSE) in May 1, 2003 letter.

1. Question: Absent request from the District Engineer to FERC in accord with the appropriate Corps approval process, would COE object to a license article for the FERC Project that provided modified flood storage at Upper Baker that would be managed by an entity other than COE with prior approval from COE?

Response: We would not support shifting flood control responsibilities at Puget Sound Energy's (PSE) Upper Baker River Project (Upper Baker) from the Corps of Engineers (Corps) to another entity. Such a shift in management responsibility would not be the most effective means of providing flood control to the Skagit River valley and could lead to difficulty in making timely and sound operational decisions with less than desirable outcomes with respect to flood damage reduction in the lower Skagit River valley.

The Corps is presently authorized, and thus responsible, for providing flood control operations at Upper Baker on the Baker River and at Seattle City Light's Ross Dam on the Skagit River. The direct involvement of multiple entities in providing flood control operations within the Skagit River basin would not be operationally efficient. We do not believe that our current authorization would permit the transfer of flood control responsibilities at Upper Baker Dam to another entity. If the existing project for flood control storage at Upper Baker Dam were ever to be deauthorized by Congress, however, we would have to coordinate flood control operations at Ross Dam with that of the entity responsible for flood control at Upper Baker. In practice, flood control at these two projects is by necessity a well-coordinated operation in order to achieve the desired goal of providing optimal flood control to the lower Skagit River valley (downstream of Concrete).

Having a single entity responsible for flood control at both projects also has operational benefits, in addition to being the most efficient in terms of coordination. For example, effective flood control within a particular sub-basin of the Skagit River watershed generally requires careful tracking of the flood event from a basin-wide scale given the typically synoptic-scale character of weather events that cause flooding in the basin. In other words, observing how a weather event and associated flood hydrograph develop in the Baker River basin is often beneficial to understanding how the same weather event may affect the flood hydrograph in the upper Skagit River basin (i.e., inflow hydrograph to Ross Dam reservoir). The use of a single entity to administer flood control operations at both projects inherently creates a situation in which the entity charged with basin-wide flood control operations (reservoir operations) tracks conditions throughout the basin, thereby leading to a better understanding and execution of basin-wide flood control.

2. Question: Can FERC preempt the COE's statutory authority requirements for flood control at Baker by issuing a license article that authorizes a different level of flood control than authorized through House Document 95-149, United States Senate Resolution No. 201-86 (May 10, 1977), pursuant to Section 201 of Public Law 89-298 (79 Stat. 1073)?

Response: A license article in the new FERC license for the Baker River Hydroelectric Project that specified a different level of flood control at Upper Baker than authorized [United States House of Representatives Committee on Public Works and Transportation Resolution Docket No. 201-86 (adopted May 18, 1977) and United States Senate Committee on Environment and Public Works Resolution (adopted May 23, 1977) pursuant to Section 201 of Public Law 89-298 (79 Stat. 1073), substantially in accordance with House Document No. 95-149] does not preempt the Corps' statutory authority requirements for flood control at Upper Baker. The language of a new FERC license article would not convey authority to the Corps to operate Upper Baker for additional flood control storage specified in the license article.

The Corps will be required to obtain necessary authorization prior to operating Upper Baker for additional flood control storage specified in a FERC license article. Without knowledge of the specifics of an actual license article, the Corps cannot determine whether new Congressional authority would be required. The Corps' Division Commander or the Chief of Engineers (Commander USACE) may have delegated authority to approve changes to the authorized Upper Baker Flood Control Project. Engineer Regulation (ER) 1105-2-100, Appendix G, Section III at paragraph G-13 (Approval Authority) provides the following guidance (The ER is also available for download or review online at <http://www.usace.army.mil/inet/usace-docs/eng-regs/er1105-2-100/a-g.pdf>):

a. Approval Authority Delegated to Division Commander. Division commanders may approve changes to authorized projects, or elements thereof, if such changes meet all of the criteria listed below. Such changes shall be reported to HQUSACE through the Project Review Board process. Division commanders should submit doubtful or controversial cases to HQUSACE (CECW-P) for a determination of the proper approval authority, reports, and report processing.

(1) For projects authorized by the Water Resources Development Act (WRDA) of 1986, and subsequent legislation, an increase in total project cost no greater than increases in price level changes and cost of modifications required by subsequent legislation. For projects authorized prior to the WRDA of 1986, an increase in total baseline project cost estimate no greater than increases in price level changes and the cost of modifications required by subsequent legislation.

(2) Increase or decrease in scope no greater than 20 percent of the scope authorized by Congress. If the scope can be defined by several parameters, (for example, storage capacity, outputs, environmental impacts) and the change in any one parameter exceeds 20 percent, the change must be approved by the Chief of Engineers.

(3) Change in the location or the design of the project to the extent that the location and magnitude of the impacts of the change are determined to be insignificant compared to the impacts assessed for the authorized project.

(4) Change does not add or delete a project purpose, except deletion of water quality where the benefits attributed to water quality are less than fifteen percent of the total project benefits, pursuant to Section 65, of the WRDA of 1974.

b. Approval Authority Reserved by the Commander USACE. Any change to an authorized, uncompleted project that does not meet all of the criteria listed in paragraph G-13a and which does not require authorization by Congress pursuant to one or more of the criteria in paragraph G-13c shall be approved by the Director of Civil Works, HQUSACE, or specifically delegated by the Director to the Division Commander for approval.

c. Changes Requiring Authorization by Congress. The Chief of Engineers' discretionary authority to approve changes to authorized projects must not be abused. Changes in scope, including reduction in scope, beyond those listed in paragraph G-13a. should serve as an alert that the change may exceed the Chief of Engineers' discretionary authority. After review, the Commander USACE, in consultation with the Assistant Secretary of the Army (Civil Works) (ASA(CW)), will determine whether the change can be made under discretionary authority or whether additional Congressional authorization is required. In addition, the following always require authorization by Congress:

(1) Addition or deletion of a project purpose, unless permitted under existing general authorities as discussed in paragraph G-14.

(2) For projects more than ten percent complete as of 17 November 1986, addition of fish and wildlife mitigation measures requiring acquisition of lands by condemnation. Acquisition of water interests by condemnation.

(3) Change in the local cooperation requirements specifically referenced in the authorizing language, unless required by:

(a) Subsequent legislation; or,

(b) Addition of a project purpose within the general authority of the Chief of Engineers.

(4) Exceedence of the \$10 million Federal cost, exclusive of price level changes, if the ER 1105-2-100 22 Apr 2000 project was authorized under Section 201, prior to 22 October 1976; or \$15 million Federal cost if authorized under Section 201, as amended by Section 131, of the WRDA of 1976, on or after 22 October 1976.

(5) Deepening of navigation channels.

- (6) For projects authorized by WRDA of 1986 and subsequent authorizations, an increase in total project cost, exclusive of price level changes, of more than twenty percent of the total project cost stated in the authorizing legislation.

It is not clear that an increase in project storage would meet the limitations contained in ER 1105-2-100 for Corps approval authority, as opposed to requiring Congressional authorization. In any event, a decision document submitted by the Corps' Seattle District office would be required to support the recommendation for authorization for the Corps to operate Upper Baker for additional flood control storage. This decision document would have to demonstrate a Federal interest in additional flood control storage at Upper Baker. The decision document would thus have to demonstrate that the recommended plan is economically justified (i.e., flood damage reduction monetary benefits exceed project costs). The recommended plan would have to be demonstrated to be consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable Executive Orders and other Federal planning requirements. Section 16 of Appendix G of ER 1105-2-100 sets forth the information required by Corps Headquarters, and similar information is expected to be required by our Division Commander in the event the change fell within his authority.

One important issue would be compensation for power losses if a new FERC license article called for Federal compensation of PSE for power losses that would result from the additional flood control storage. The Corps' current Congressional authority provides for Federal compensation to PSE for power losses associated with 58,000 acre-feet of flood control. The Corps entered into a flood control operating agreement with PSE and operates the project for a total of 74,000 acre-feet of storage for flood control (16,000 acre-feet that PSE is required by Article 32 of the current FERC license to provide without compensation for lost valley storage associated with construction of the project, plus 58,000 acre-feet subject to Federal compensation). The existing flood control operating agreement with PSE is about to expire. A new agreement will need to be developed to prescribe the means of providing compensation to PSE for power losses associated with 58,000 acre-feet of flood control storage.

Implementation by the Corps of a new license article prescribing additional flood control storage may require environmental documentation, including National Environmental Policy Act (NEPA) and Endangered Species Act (ESA), over and above that contained in the FERC relicensing. Whether additional NEPA and/or ESA documentation would be required to satisfy Corps requirements is not known at this point.

3. Question: In the event that a license article authorizes a non-COE entity to manage flood control operations at Upper Baker River Project when flood stage levels exceeded 90,000 cfs near Concrete (USGS gaging station 12194000) to maintain flood storage above 74,000 acre-feet, would a discharge rate of more or less than 5,000 cfs implemented by said non-COE entity during flood events conflict with the COE Water Control Manual for Baker River Project, February 1997, pps. 7-9 and 7-10, regarding flood control operations over which COE has responsibility?

If such a conflict would occur with the stated Corps reservoir policy, to what extent would it be possible to allow a non-COE entity to regulate and pass inflow? Would the COE object to a non-COE entity being legally authorized to make operational decisions at the Project in conjunction with a license article that authorized a different level of flood storage than the COE must presently provide?

Response: For the same reasons cited in our response to question 1 above, it would not be either acceptable or operationally viable to have a shared flood control responsibility at Upper Baker between the Corps and another entity. Having multiple entities responsible for providing flood control at a single project would be difficult to effectively implement and could lead to situations in which the individual actions of the responsible entities result in conflict, confusion, and ultimately poor flood control management at Upper Baker, to the detriment of the Skagit River valley. For instance, an operational decision made by one of the responsible entities could be detrimental to the desired operations/goals of the second entity. Furthermore, while the definition of flood control responsibilities for multiple entities might appear very straightforward contractually, the transition of responsibilities during a flood event would be less clear. Transition of responsibilities in real-time would likely be further complicated by the typically rapid pace at which Skagit Basin flood events develop and the attendant need for quick and effective decision-making. The current situation in which the Corps provides flood control operations at both the Upper Baker and Ross Projects reflects an intentional decision by the Federal Government to place the responsibility of flood control operations (specifically reservoir control) with a single entity.



June 10, 2003

Potential Effects of Additional Flood Control Storage at the Baker River Project on Aquatic Resources

Providing additional reservoir flood control storage and operating the Baker River Project to reduce downstream flooding may affect aquatic resources both within, and downstream, of the Project reservoirs. Maintaining a low reservoir pool during the winter flood control season affects aquatic species overwintering in the reservoir environment. Evacuating reservoir storage in advance of the flood control season augments flows downstream of the Project and affects flow levels in the middle Skagit River that supports spawning populations of pink, chinook, chum, and coho salmon. Maintaining a low reservoir pool through the end of the flood control season in March forces Puget Sound Energy to refill the reservoir by storing inflow and reducing flows downstream of the Project during a time when juvenile fish are migrate downstream through the reservoir and the mainstem Skagit River.

While additional flood control operations may have detrimental effects to specific aquatic species and lifestages, other effects may be beneficial. As part of the Baker River Project relicensing efforts, nearly 40 studies are being conducted to evaluate effects of the Project on aquatic resources. Several of these studies provide background information that may be useful when evaluating effects of flood control activities on aquatic resources. Following is a brief description of the potential beneficial and detrimental effects of flood control operations at the Baker River Project and a list of ongoing relicensing studies that could be used to support an evaluation of alternatives (Table 1). Evaluation of the potential effects of flood control operations may provide insight into the difficult balancing of power, environmental and flood control interests. Qualitative and subjective characterizations of the degree of effect (major/minor) for various flood control effects have been provided based on personal opinion and perceived level of agency concern; these characterizations have not been confirmed through quantitative analyses or agency and tribal review. If you have any questions regarding the following descriptions, contact Phil Hilgert at R2 Resource Consultants (425/556-1288) or philgert@R2usa.com.

Table 1. Potential Environmental Effects of Flood Control at the Baker River Hydroelectric Project.
Qualitative characterization of the degree of effect (major/minor) represents subjective opinion based on perceived level of agency concern; characterization has not been confirmed through quantitative analyses or agency and tribal review.

Potential Reservoir Related Effects (Baker Lake)				
Potential Effect	Potential Benefit	Potential Added Risk	Description	Related Baker Relicensing Studies
Alluvial Fan Spawning		Major	The Upper Baker River alluvial fan contains gravel areas suitable for use by spawning salmonids. During the fall, salmon and bull trout may spawn within the alluvial fan at the reservoir/tributary delta transition zone. Drawing the reservoir pool down during the spawning period may cause newly formed redds to be at increased risk of dewatering and/or scour compared to redds constructed in natural stream channels.	<ul style="list-style-type: none"> • A-10 Baker River Delta Char Habitat Surveys (Corps BA) • A-15 Upper Baker River Delta Scour
	Minor		Drawing the reservoir pool down in late summer may cause fish to select spawning sites in tributary stream reaches upstream of the alluvial fan.	<ul style="list-style-type: none"> • Corps Supplemental BA • A-01b Reservoir Tributary Spawning Surveys
Reservoir Productivity		Minor	Baker Lake is critical to the production of lake-rearing juvenile sockeye; winter drawdown will reduce reservoir volume and may affect growth and survival of over-wintering sockeye.	A-26a Reservoir Productivity
Tributary Access		Minor	Reservoir drawdown will expose tributary reaches that are inundated during full pool conditions, anadromous and adfluvial fish will have increased length of exposed channel to navigate which may hinder their upstream movement and expose them to increased predation	<ul style="list-style-type: none"> • A-01c Reservoir Tributary Delta Surveys • A-10 Baker River Delta Char Habitat Surveys (Corps BA)
Baker Lake Smolt Migration		Minor	Refilling the reservoir during the spring may decrease the rate of downstream smolt movement through the reservoir, and potentially decrease fish guidance efficiency at the dam.	Various Upper Baker downstream fish passage studies

Potential Effects to Downstream Habitats (Middle Skagit River)				
Potential Effect	Potential Benefit	Potential Added Risk	Description	Related Baker Relicensing Studies
Salmon and Steelhead Spawning in the Mainstem Skagit River		Major	Evacuating Baker Lake to provide flood control storage will augment downstream flows during the salmon spawning period. The increased flow will allow salmon to spawn higher along the channel margins where the redds are at risk of subsequent dewatering – unless flows are sufficient to prevent dewatering during incubation (September through early March)	<ul style="list-style-type: none"> • HYDROPS • A-09a Mainstem Skagit Instream Flow Study • A-09c Skagit Salmon and Steelhead Spawning Surveys
	Minor		Evacuating the reservoirs to provide flood control storage will offer the opportunity to augment flows during severe fall droughts thereby increasing available spawning habitat. The volume of Baker Lake is too small to augment Skagit River flows on a long-term basis (days rather than months).	
	Minor		Evacuating the reservoirs to provide flood control storage during dry and average years will augment flows during early fall, thus allowing salmon to spawn higher along the channel margins where the redds are at less risk of channel scour.	
Mainstem Skagit River Water Quality	Minor		Reservoir releases during fall low flow/hot weather conditions may improve water temperature for fish in the Skagit River, but releases may be too warm to be beneficial.	A-05 Water Quality Assessment
Mainstem Skagit River Salmon Incubation		Minor	Maintain a low reservoir pool to provide flood storage will decrease the opportunity to augment flows during extreme low winter flows. Short-term dewatering (e.g. <48 hour) will harm incubating eggs, but will usually not cause mortality provided eggs remain damp and do not freeze.	<ul style="list-style-type: none"> • HYDROPS • A-09a Mainstem Skagit Instream Flow Study • A-09c Skagit Salmon and Steelhead Spawning Surveys
	Minor		Increased flood control (volume), or extending the flood control season earlier in the year (timing) will reduce flood peaks that are associated with poor egg-to-migrant survival.	
Mainstem Skagit River Salmon Fry Emergence		Minor	Holding the reservoir pool down to provide flood storage will decrease the opportunity to augment downstream flows and protect salmon alevins (hatched eggs living off the egg sac prior to emergence). Dewatering of redds in late February for only hours may cause high mortality of alevins.	<ul style="list-style-type: none"> • HYDROPS • A-09a Mainstem Skagit Instream Flow Study • A-09c Skagit Salmon and Steelhead Spawning Surveys
Mainstem Skagit River Channel Morphology		Minor	Reducing peak flow events will reduce rate of channel migration and side channel formation.	A-24 Hydrology and Channel Geomorphology

DON MUNKS
FIRST DISTRICT

KENNETH A.
DAHLSTEDT
SECOND DISTRICT

TED W. ANDERSON
THIRD DISTRICT



SKAGIT COUNTY BOARD OF COMMISSIONERS

Skagit County Administration Building
700 South Second Street, Room 202
Mount Vernon, Washington 98273
(360) 336-9300
FAX # (360) 336-9307

Agenda

Meeting with Corps of Engineers, Seattle District
May 8, 2003, 1000 - 1100

1. Flood project revised direction: focus on what's "doable"
2. Elements of a "doable project":
 - a. Widen 3-bridge corridor: transportation \$\$\$
 - b. Reduce volume of 100-year event: increased storage and/or revised hydro operation
 - c. Final phase: tie above elements together with downstream improvements
3. Recent actions / accomplishments (\$300k allocation in WSDOT Budget)
(Dike Districts 12 & 17 engaged in planning)
4. Skagit County game plan:
 - a. Work 3-bridge corridor initiative, RR bridge 1st
 - b. Study and gain additional flood storage and/or operational changes to Baker project through the FERC relicensing effort, within PSE/FERC timelines
 - c. Rewrite Project Management Plan to take advantage of strengths of both organizations
 - d. Aggressively pursue funding to move project forward

Requested Action:

1. FERC Relicense / Flood Storage
 - COE agree to be in review position with direction to meet relicensing time constraints
(Corps agreed to act in a review position. Left timing of support open.)
 - Modify SACCR language to accommodate this – see attachment
(Corps not concerned about modifications proposed to SACCR as presented)
2. Project Management Plan
 - Emphasize joint decision making: all work must be jointly agreed to
 - Bring in Baker Relicensing, 3-bridge corridor
 - Lay out specific timeline / milestones / costs
(Okay, however Corps wanted to be sure that the County will provide adequate managerial oversight over hired consultant)

3. Designate Division / HQ project team members

- Provide enhanced communication w/ Congressional staff
- Need DC staff member soon for upcoming Congressional visit
(Corps agreed)

4. Refocus on teamwork: combined capabilities of both organizations necessary for success

(Not sure we sold COE on this point. I think they see themselves as majority partner. Colonel said he is “project Manager” focused.

Justification for Schedule and Cost Change Request (SACCR) for Skagit River, Washington (012985)

1. The following discussion identifies the justification for the cost change for the Skagit River, Washington, flood damage reduction and ecosystem restoration feasibility study:

a. The scope of the flood damage reduction project has changed significantly in recent months, necessitating development of a new Project Management Plan (PMP). We intend to submit a new PMP and a SACCR for approval by 30 September 2003. Feasibility study scope changes include a number of items requested and strongly supported by Skagit County, the non-Federal sponsor. These include consideration of a diversion channel from the Skagit River to the Swinomish Channel near the southern end of Padilla Bay, analysis of additional flood control storage at Puget Sound Energy's Upper Baker Project, an alternative approach for funding and implementing the three-bridge corridor component of a flood damage reduction plan, and the incorporation of ecosystem restoration as a project purpose.

b. Changes in the without project condition necessitate updating and revising some key technical evaluations. A technical investigation will be undertaken to evaluate the current physical effectiveness of existing levees for benefit determination, resulting in establishment of new probable non-failure and probable failure points (PNP and PFP, respectively). The existing condition hydraulic model will then be modified and rerun. Model modifications include accounting for new levee PNP and PFP elevations, adjusting for the probable elimination of the Burlington Northern-Santa Fe railroad bridge pier debris buildup, and factoring in the possibility of additional flood control storage at Upper Baker project. The flood damage appraisal model (HEC-FDA) must subsequently be rerun based on the hydraulic model outputs, and the economic base study report revised accordingly.

c. By letter dated 4 February 2003, Skagit County requested reconsideration of additional flood control storage at the Upper Baker Project. A preliminary evaluation has been initiated, and will be followed by a more extensive economic evaluation if the preliminary evaluation is favorable.

2. The spending plan for the balance of fiscal year 2003, using existing balance of \$119,800 and SACCR funding, is as follows:

a. \$12,000 – Evaluate the current physical effectiveness of 26 miles of existing levees and provide new PNP and PFP for input to the existing condition hydraulic model of the Skagit River basin (Corps lead).

b. \$25,000 – Modify and rerun existing condition hydraulic model and produce revised flood inundation maps (Corps lead).

c. \$30,000 – Re-run the HEC-FDA model and finalize the economic base study (Corps lead).

d. \$75,000 – Complete hydraulic designs of alternative plans and perform economic screening to maximize net benefits (Corps lead, with Skagit County input).

f. \$40,000 – Initiate phase II geomorphology and sediment transport study, focusing on completing existing condition model by which to evaluate effects of alternative plans on geomorphologic processes and sediment transport in the Skagit River system (Corps contract).

g.

h. \$80,000– Initiate 35 percent design of three-bridge corridor, diversion channel and setback levee measures (Corps lead on diversion channel and setback levees, with Skagit County lead on three-bridge corridor).

i. \$ 125,000– Technical evaluation of additional flood control storage at Upper and Lower Baker Project. (lead by Skagit County, with Corps lead for review).

j. \$ 45,000 – Develop and coordinate revised project management plan to reflect changes in project scope and complexity of analysis (joint Corps and Skagit County effort).

k. \$88,000 – Conduct project management and programming activities (joint Corps and Skagit County effort).

Baker River Hydroelectric Project, FERC No. 2150

Skagit County's Request for Additional Flood Control

Background Information

PSE operates the Baker Hydroelectric Project pursuant to an existing FERC license that requires PSE to provide 16,000 acre-feet of flood storage for the original impacts of the project. The Corps of Engineers manages flood control at the Project, and received Congressional authorization in 1977 to direct operational control of the 16,000 acre-feet and to provide and operate an additional 58,000 acre-feet of flood control at the Upper Baker dam, for a total of 74,000 acre-feet.

The FERC Alternative Licensing Process supports a collaborative settlement agreement and PSE must submit a license application in April 2004. Relicensing working groups have been working in earnest for the past two- (2) years to meet this deadline.

Skagit County's Interests

- Increased flood control storage at the Baker River Hydroelectric Project due to perceived favorable regional benefit/cost analysis.

PSE's Interests

- Achieving a collaborative settlement agreement within the FERC mandated timeline.
- Supporting flood control operations at the Baker River Hydroelectric Project.
- Ratepayers being compensated for all costs associated with power and non-power impacts caused by flood control operations.

Army Corps of Engineers Stated Concerns

- Revisions to the level of flood control provided at the Baker River Project, including the operational aspects of flood control, will require a Army Corps of Engineers' approval, i.e. a Corps decision document.
- The Corps would not support shifting flood control responsibilities to another entity or sharing operational control at Upper Baker.
- The FERC does not preempt the Corps' statutory authority requirements for flood control at Upper Baker.

Potential options for Skagit County

1. Collaborative – FERC license process:

- Active participation by Skagit County in the Alternative Licensing Process.
- Adherence to collaboratively developed and accepted Communication Protocol and Process Document.
- Relicensing working group participants will be concerned about the adverse impacts of additional flood control at Baker.
- Adding a new flood control level for analysis at this late stage is likely to have a significant, detrimental effect on relicensing deadlines.

- Without following relicensing process protocols, Skagit County has authorized its own study of optimal flood storage at Baker, which has not been submitted to the appropriate relicensing working group for consideration. The study of Baker flood control would include an analysis of environmental costs associated with flood control.
- Actual flood control must await FERC's issuance of the Baker River license. Prior to issuance FERC will ask for comments at which time the Corps may elect to accept, modify or reject proposed flood control measure.

2. Non-collaborative – appeal directly to FERC

- Skagit County would need to seek consensus amongst the participants for additional flood control within the approved licensing protocols.
- Process Document calls for Solutions Team discussion. The Solutions team has recognized the use of Resolve™ Process to resolve conflicts.
- Conflicts that are not resolved using this process may be appealed to FERC in accordance with the FERC dispute resolution process. There must be a lack of consensus regarding study scope or process in order to initiate this process.
- If dissatisfied with the FERC dispute resolution process, Skagit County can make a recommendation directly to FERC.

3. Outside Relicensing Path – Corps of Engineers:

The Corps has an environmental/ESA review process for the existing flood authorization associated with the Memorandum of Understanding with PSE. The existing flood control agreement between PSE and the Corps is up for annual renewal this fall.

- The incremental impacts of additional flood control would be evaluated subsequent to the completion of the appropriate Corps feasibility study.
- FERC must accept Corps/Congressional approved changes to the existing flood control authorization.
- PSE can support Skagit County through the relicensing process by promoting a license article as a placeholder pending completion of the Corps process. In addition, some study information developed during the relicense process may assist Skagit County in the Corps process.

SCOPE OF WORK
Skagit River, WA
Skagit River Flood Damage Reduction Feasibility Study
Baker River Dams Storage Evaluation

A. Scope of Work. Engineering services to be provided by Skagit County under this delivery order (D.O.) will be to participate in and provide hydraulic engineering expertise for an evaluation of the optimal flood storage that can be utilized for Lower and Upper Baker Dams to reduce flood damages for the Skagit River floodplain.

B. Services to be performed. Skagit County will provide the following services under this D.O. as an in-kind service under the FCSA:

Optimization of Flood Storage Evaluation.

A complete evaluation of flood control utilizing the Baker projects will be performed. This includes the following elements:

1. **Upper Baker Dam Optimization in Isolation**

Determine the benefits that Upper Baker Dam can provide by itself for 3 new conditions. This work will require the following elements:

- a. Determine maximum storage that provides noticeable downstream benefits.
- b. Modify existing USACE HEC-5 model for 3 new rule curve conditions to include the maximum useful storage and two other conditions between the maximum and the existing condition (i.e., if 100,000 acre-feet is the maximum and existing is 74,000 acre-feet, then 82,500, 91,000 acre-feet, and 100,000 acre-feet could be chosen)
- c. Route 10-, 25-, 50-, 75-, 100-, 250-, 500-year flows through the 3 new HEC-5 models to produce the peak flow hydrology at Concrete for the 3 new rule curve conditions.
- d. Run the 5% and 95% chance of exceedance inflows for the 10-, 25-, 50-, 75-, 100-, 250-, 500-year events through the 3 new HEC-5 models to characterize the hydrologic uncertainty at Concrete (42 runs).
- e. Provide Exceedance Probability Function with Uncertainty data for the Skagit River at Concrete in electronic HEC-FDA format to the Corps of Engineers (Corps).

(NOTE: Corps/Tetra Tech will then run the existing condition HEC-FDA model to determine damages, residual damages and damages reduced downstream of Sedro-Woolley).

Corps/Skagit County Decision Point: Do these damages reduced appear large enough to continue evaluating flood storage at Upper Baker? If so, then evaluate whether the dam meets Probable Maximum Flood Standards.

f. Develop the Probable Maximum Flood for Upper Baker Dam to HMR-57 standards.

g. Route Probable Maximum Flood through Upper Baker using the existing condition HEC-5 model developed by the Corps following the guidelines set out in Section 13-5 in EM 1110-2-1417.

h. Evaluate dam structures (spillway, outlet works, etc. with necessary freeboard) to see if they meet USACE standards (see ER 1110-8-2 and Chapter 14 of EM 1110-2-1420 for requirements).

(NOTE: If no structural modifications are necessary then move forward with power loss computations by the Corps' Northwestern Division for the 3 new conditions. Seattle District economist will then compute a benefit-to-cost (B/C) ratio. If B/C ratio is positive, then Skagit County will evaluate environmental issues and develop estimates of associated environmental costs.)

(NOTE: B/C ratio will need to be recomputed when environmental costs are known).

Corps/Skagit County Decision Point: If current dam needs to be structurally modified to meet the PMF standard, then the following items are required:

i. Determine new spillway design that will meet the structural standards set in EM 1110-2-2400, the hydraulic criteria set in EM 1110-2-1603, and the hydrologic criteria set in EM 1110-2-1420 so that an appropriate cost can be derived for this structure.

j. Design new outlet works that will meet the structural standards set in EM 1110-2-2400, the hydraulic criteria set in EM 1110-2-1602, and the hydrologic criteria set in EM 1110-2-1420 so that an appropriate cost can be derived for this structure.

k. Modify HEC-5 models to reflect changes in the dam due to the PMF improvements and re-run the 3 new rule curve conditions and the existing condition.

- l. Route 10-, 25-, 50-, 75-, 100-, 250-, 500-year flows through the 4 new HEC-5 models to produce the peak flow hydrology at Concrete for the 4 new reservoir conditions.
- m. Run the 5% and 95% chance of exceedance inflows for the 10-, 25-, 50-, 75-, 100-, 250-, 500-year events through the 4 new HEC-5 models to characterize the hydrologic uncertainty at Concrete (56 runs).
- n. Provide Exceedance Probability Function with Uncertainty data for the Skagit River at Concrete in electronic HEC-FDA format to the Corps of Engineers (Corps).

(NOTE: Corps/Tetra Tech will then re-run the existing condition HEC-FDA model to determine damages, residual damages and damages reduced downstream of Sedro-Woolley. If these damages reduced exceed the costs of improving the dam to PMF standards, then power loss computations by the Corps' Northwestern Division for the 4 new conditions will be calculated. Seattle District economist will then compute a benefit-to-cost (B/C) ratio. If B/C ratio is positive, then Skagit County will evaluate environmental issues and develop estimates of associated environmental costs.)

(NOTE: B/C ratio will need to be recomputed when environmental costs are known).

2. **Lower Baker Dam Optimization in Isolation**

Determine the benefits that Lower Baker Dam can provide by itself for 4 conditions. This work will require the following elements:

- a. Collect data to help develop a reservoir routing model for Lower Baker Dam.
- b. Develop an existing condition reservoir routing model for Lower Baker Dam. The model must be in a format in which the Corps has free access to, which restricts the analysis to be done with either HEC-5 or HEC-ResSim.
- c. Develop the Probable Maximum Flood for inflow to Lower Baker Dam that is not coming from Upper Baker Dam. The PMF is to be developed to HMR-57 standards.
- d. Route outflow from HEC-5 existing condition PMF run for Upper Baker Dam and inflow developed in part 2.a above through the Lower Baker Dam model following the guidelines set out in Section 13-5 in EM 1110-2-1417.

e. Evaluate dam structures (spillway, outlet works, etc. with necessary freeboard) to see if they meet Corps standards (see ER 1110-8-2 and Chapter 14 of EM 1110-2-1420 for requirements).

Corps/Skagit County Decision Point: If current dam needs to be altered to meet the PMF standard, a reconvening is necessary to lay out what needs to be modified and what is the best way to get this done. It is likely for Lower Baker Dam that major modifications will be necessary. If this is the case, task 2.r and 2.s below will be necessary to perform first to determine what the structure will look like to perform the rest of the analysis. If no alterations are required, the analysis can start with the following:

f. Develop Rule Curve from the guidelines in Chapter 3 of EM 1110-2-3600 for an improved spillway (one in which the spillway gates are modified so they can be remotely operated).

g. Develop Spillway Regulation Schedule for an improved spillway that makes the current spillway gates operational. This schedule should be developed following Chapter 4 of EM 1110-2-3600.

h. Develop a HEC-5/HEC-ResSim model of Lower Baker Dam with improved spillway.

i. Develop Rule Curve from the guidelines in Chapter 3 of EM 1110-2-3600 for Lower Baker with new outlet works that allows full utilization of the reservoir for flood control.

j. Develop Spillway Regulation Schedule for improved dam with new outlet works. This schedule should be developed following Chapter 4 of EM 1110-2-3600.

k. Develop a HEC-5/HEC-ResSim model of Lower Baker Dam with new outlet works.

l. Develop Rule Curve from the guidelines in Chapter 3 of EM 1110-2-3600 for Lower Baker with new outlet works that only uses half of the space between the bottom of the spillway gates and an empty pool.

m. Develop Spillway Regulation Schedule for improved dam with new outlet works that only uses half of the space between the bottom of the spillway gates and an empty pool. This schedule should be developed following Chapter 4 of EM 1110-2-3600.

- n. Develop an additional reservoir model with the new outlet works, which utilizes only half the storage between the bottom of the spillway gates and the bottom of the reservoir.
- o. Route 10-, 25-, 50-, 75-, 100-, 250-, 500-year flows through the three new reservoir models to produce the peak flow hydrology at Concrete for the 4 conditions.
- p. Run the 5% and 95% chance of exceedance inflows for the 10-, 25-, 50-, 75-, 100-, 250-, 500-year events through the 3 new reservoir models to characterize the hydrologic uncertainty at Concrete (42 runs).
- q. Provide Exceedance Probability Function with Uncertainty data for the Skagit River at Concrete in the HEC-FDA format to the Corps of Engineers (Corps).

(**NOTE:** Corps/Tetra Tech will then run the existing condition HEC-FDA model to determine damages, residual damages and damages reduced downstream of Sedro-Woolley).

Corps/Skagit County Decision Point: Are these benefits large enough to continue evaluating flood storage at Lower Baker? If yes, then compute power losses.

(**NOTE:** Power losses will be computed by the Corps' Northwestern Division for 3 new conditions. Benefit-to-cost ratio will be computed by Seattle District).

Corps/Skagit County Decision Point: Do the benefits still largely outweigh the power loss costs presented so far? If yes, then conduct analysis to estimate cost of required modifications to Lower Baker Dam.

- r. Determine new spillway design that will meet the structural standards set in EM 1110-2-2400, the hydraulic criteria set in EM 1110-2-1603, and the hydrologic criteria set in EM 1110-2-1420 so that an appropriate cost can be derived for this structure.

s. Design new outlet works that will meet the structural standards set in EM 1110-2-2400, the hydraulic criteria set in EM 1110-2-1602, and the hydrologic criteria set in EM 1110-2-1420 so that an appropriate cost can be derived for this structure.

Corps/Skagit County Decision Point: Do the benefits still outweigh all costs? If yes, then Skagit County will evaluate environmental issues and develop estimates of associated environmental costs.

(NOTE: The B/C ratio will need to be recomputed when environmental costs are known).

3. **Use of Upper and Lower Baker Dams in Conjunction**

Determine the benefits that the combined use of Upper and Lower Baker Dams can provide to maximize benefits. This work will require the following elements:

a. Determine which of the Upper and Lower Baker scenarios provide the largest B/C ratio. Keep that dam (first added) scenario constant while changing the other dam (second added) to the three different conditions laid out in the above analyses.

b. Route 10-, 25-, 50-, 75-, 100-, 250-, 500-year flows for all 3 of these conditions.

c. Run the 5% and 95% chance of exceedance inflows for the 10-, 25-, 50-, 75-, 100-, 250-, 500-year events through the 3 reservoir models to characterize the hydrologic uncertainty at Concrete (42 runs).

d. Provide Exceedance Probability Function with Uncertainty data for the Skagit River at Concrete in electronic HEC-FDA format to the Corps of Engineers (Corps).

(NOTE: Corps/Tetra Tech will then run the existing condition HEC-FDA model to determine damages, residual damages and damages reduced downstream of Sedro-Woolley).

Corps/Skagit County Decision Point: Are these benefits large enough to continue evaluating flood storage? If yes, then

(NOTE: Power losses will be computed by the Corps' Northwestern Division for 3 conditions).

Corps/Skagit County Decision Point: Do the benefits still largely outweigh the Power Loss costs presented so far? If yes, then add in the

design costs of the modifications derived in r and s of part 2 or perform this work if not done as part of 2. Do the benefits still outweigh the costs? If yes, then Skagit County will evaluate environmental issues and develop estimates of associated environmental costs.

(NOTE: The B/C ratio will need to be recomputed when environmental costs are known).

(NOTE: This analysis is designed in a way that the Corps can appropriately respond to the results if additional flood storage is proposed for Upper and/or Lower Baker Dams through the FERC process. It is not designed to meet the standards of a complete alternative analysis for a flood damage reduction study.)

C. Government - Furnished Data and Services. The Corps' Seattle District will furnish the following to Skagit County:

1. Hydrology developed for Skagit River Flood Damage Reduction Study, which includes 10-, 25-, 50-, 75-, 100-, 250-, and 500-year events.
2. Existing Condition HEC-5 Models of Upper Baker Dam.
3. Links to the referenced engineering manuals, regulations, and technical letters are as follows:

EM 1110-2-1417 - <http://www.usace.army.mil/publications/eng-manuals/em1110-2-1417/toc.htm>

EM 1110-2-1420 - <http://www.usace.army.mil/publications/eng-manuals/em1110-2-1420/toc.htm>

EM 1110-2-1602 - <http://www.usace.army.mil/publications/eng-manuals/em1110-2-1602/toc.htm>

EM 1110-2-1603 - <http://www.usace.army.mil/publications/eng-manuals/em1110-2-1603/toc.htm>

EM 1110-2-1619 - <http://www.usace.army.mil/publications/eng-manuals/em1110-2-1619/toc.htm>

EM 1110-2-2400 - <http://www.usace.army.mil/publications/eng-manuals/em1110-2-2400/toc.htm>

EM 1110-2-3600 - <http://www.usace.army.mil/publications/eng-manuals/em1110-2-3600/toc.htm>

ER 1110-8-2 - [http://www.usace.army.mil/publications/eng-regs/er1110-8-2\(FR\)/toc.htm](http://www.usace.army.mil/publications/eng-regs/er1110-8-2(FR)/toc.htm)

ETL 1110-2-537 - <http://www.usace.army.mil/publications/eng-tech-ltrs/etl1110-2-537/toc.html>

4. Any other engineering manuals, regulations, and standards, which might be needed by Skagit County for completion of this delivery order will be available upon request.

D. Coordination. During the progress of the work, Skagit County shall maintain periodic coordination with the COE to assure the orderly progression and completion of the work. Skagit County shall provide immediate notification to the Contracting Officer, if at any time during the review, certain elements or features of the proposed assumption, design and/or analysis are found to be in error to such a degree that the problem cannot be corrected without wholesale revision to the entire design.

E. Submission. All items furnished to Skagit County will be returned to the COE. All technical analysis and backup materials generated as a result of this work order will be reviewed by the Corps prior to public release.

F. Technical Review. The technical analysis for additional flood control storage will be technically reviewed by the Corps. The Corps will prepare a write-up that details the results of the technical review. Skagit County will address technical review comments provided by the Corps and respond in writing to the review comments and revise the technical analysis as necessary. A back-check will be performed by the Corps to verify that review comments have been appropriately responded to in the technical analysis.

G. Progress Schedule. Time allowances for the completion of this work order are shown below. Skagit County shall furnish sufficient technical, supervisory, and administrative personnel to ensure execution of work in accordance with approved progress schedule. Skagit County shall keep the Corps' Seattle District closely advised at all times concerning the details or problem areas which may adversely affect completion or require extensive revision of the work in accordance with provisions of this work order.

Work Item

Schedule (after NTP)



Upper Skagit Indian Tribe

25944 Community Plaza Way
Sedro Woolley, WA. 98284
Phone: (360) 854-7000 Fax: (360) 854-7004

June 2, 2003

Skagit County Commissioners
Skagit County Court House
Mount Vernon WA. 98273
Re: Skagit County Flood Control Plans Discussion in the Baker Dam Alternative
Licensing Process

Dear Sirs:

It is our understanding that Skagit County is requesting that flood/control measures be included in the Baker Alternative Licensing Process. The tribe is cognizant of the importance of the flood control issue in here in Skagit County however; these discussions should take place outside of the ALP. The tribe believes that Skagit County flood control measures should be addressed in discussions directly with the Army Corp of Engineers.

The tribe would be willing to work with the Skagit County Commissioners and the Army Corp on this issue if an agreed to forum outside of the ALP. I can be reached at the above number if you have any questions.

Sincerely,

Scott Schuyler, Policy Representative USIT

5.0 Economics and Operations Draft Proposed Actions

5.1 Maintain Current Levels of Flood Control at Upper Baker

Summary of Action

Maintain current levels of flood control operations at Upper Baker. This provides for 16,000 acre-feet as replacement storage and provides for an additional storage amount up to 84,000 acre-feet for a total of 100,000 acre-feet.

Relevant PMEs

This action addresses interests expressed in PME 5.04.

Description of Action

The current Corps of Engineers' flood control operation at Upper Baker was set by Congress in 1977 as 58,000 additional acre-feet with compensation provided to the Licensee, above the 16,000 acre-feet as replacement storage.

Article 32 of the current Baker License states:

“The Licensee shall so operate the Upper Baker River reservoir as to provide each year 16,000 acre-feet of space for flood regulation between November 1 and March 1 as replacement for the valley storage eliminated by the development. Utilization of this storage space shall be as directed by the District Engineer, Corps of Engineers.

“In addition to the above-specified 16,000 acre-feet, the Licensee shall provide in the Upper Baker River reservoir space for flood control during the storage drawdown season (about September 1 to April 15) up to a maximum of 84,000 acre-feet as may be requested by the District Engineer, provided that suitable arrangement shall have been made to compensate the Licensee for the reservation of flood control space other than the 16,000 acre-feet specified herein.”

Rationale for Action

The Corps in a November 11, 2002, letter requested that the existing Corps flood control operation be the basis for further work. They made this request in the interest of health and public safety.

Skagit County Commissioners passed a resolution on August 7, 2001, pointing out the value of the Baker Project for flood control and requesting “no net loss of flood control storage.”

Skagit County Commissioners on February 4, 2003, wrote Colonel Ralph Graves of the Corps, requesting that the Corps consider obtaining the additional 26,000 acre-feet of storage available at Upper Baker.

The Economics/Operations Working Group is considering a study, R-E02, to determine the benefits and costs of increasing the flood control storage at Upper Baker above the current 74,000 acre-feet, up to a maximum additional 26,000 acre-feet.

With reimbursement from the Corps for its 58,000 acre-feet storage, the net-cost to PSE for current flood control operations is zero.

DON MUNKS
FIRST DISTRICT

KENNETH A.
DAHLSTEDT
SECOND DISTRICT

TED W. ANDERSON
THIRD DISTRICT



SKAGIT COUNTY BOARD OF COMMISSIONERS

Skagit County Administration Building
700 South Second Street, Room 202
Mount Vernon, Washington 98273
(360) 336-9300
FAX # (360) 336-9307

Agenda

Meeting with Corps of Engineers, Seattle District
May 8, 2003, 1000 - 1100

1. Flood project revised direction: focus on what's "doable"
2. Elements of a "doable project":
 - a. Widen 3-bridge corridor: transportation \$\$\$
 - b. Reduce volume of 100-year event: increased storage and/or revised hydro operation
 - c. Final phase: tie above elements together with downstream improvements
3. Recent actions / accomplishments (\$300k allocation in WSDOT Budget)
(Dike Districts 12 & 17 engaged in planning)
4. Skagit County game plan:
 - a. Work 3-bridge corridor initiative, RR bridge 1st
 - b. Study and gain additional flood storage and/or operational changes to Baker project through the FERC relicensing effort, within PSE/FERC timelines
 - c. Rewrite Project Management Plan to take advantage of strengths of both organizations
 - d. Aggressively pursue funding to move project forward

Requested Action:

1. FERC Relicense / Flood Storage
 - COE agree to be in review position with direction to meet relicensing time constraints
(Corps agreed to act in a review position. Left timing of support open.)
 - Modify SACCR language to accommodate this – see attachment
(Corps not concerned about modifications proposed to SACCR as presented)
2. Project Management Plan
 - Emphasize joint decision making: all work must be jointly agreed to
 - Bring in Baker Relicensing, 3-bridge corridor
 - Lay out specific timeline / milestones / costs
(Okay, however Corps wanted to be sure that the County will provide adequate managerial oversight over hired consultant)

3. Designate Division / HQ project team members

- Provide enhanced communication w/ Congressional staff
- Need DC staff member soon for upcoming Congressional visit
(Corps agreed)

4. Refocus on teamwork: combined capabilities of both organizations necessary for success

(Not sure we sold COE on this point. I think they see themselves as majority partner. Colonel said he is “project Manager” focused.

Justification for Schedule and Cost Change Request (SACCR) for Skagit River, Washington (012985)

1. The following discussion identifies the justification for the cost change for the Skagit River, Washington, flood damage reduction and ecosystem restoration feasibility study:

a. The scope of the flood damage reduction project has changed significantly in recent months, necessitating development of a new Project Management Plan (PMP). We intend to submit a new PMP and a SACCR for approval by 30 September 2003. Feasibility study scope changes include a number of items requested and strongly supported by Skagit County, the non-Federal sponsor. These include consideration of a diversion channel from the Skagit River to the Swinomish Channel near the southern end of Padilla Bay, analysis of additional flood control storage at Puget Sound Energy's Upper Baker Project, an alternative approach for funding and implementing the three-bridge corridor component of a flood damage reduction plan, and the incorporation of ecosystem restoration as a project purpose.

b. Changes in the without project condition necessitate updating and revising some key technical evaluations. A technical investigation will be undertaken to evaluate the current physical effectiveness of existing levees for benefit determination, resulting in establishment of new probable non-failure and probable failure points (PNP and PFP, respectively). The existing condition hydraulic model will then be modified and rerun. Model modifications include accounting for new levee PNP and PFP elevations, adjusting for the probable elimination of the Burlington Northern-Santa Fe railroad bridge pier debris buildup, and factoring in the possibility of additional flood control storage at Upper Baker project. The flood damage appraisal model (HEC-FDA) must subsequently be rerun based on the hydraulic model outputs, and the economic base study report revised accordingly.

c. By letter dated 4 February 2003, Skagit County requested reconsideration of additional flood control storage at the Upper Baker Project. A preliminary evaluation has been initiated, and will be followed by a more extensive economic evaluation if the preliminary evaluation is favorable.

2. The spending plan for the balance of fiscal year 2003, using existing balance of \$119,800 and SACCR funding, is as follows:

a. \$12,000 – Evaluate the current physical effectiveness of 26 miles of existing levees and provide new PNP and PFP for input to the existing condition hydraulic model of the Skagit River basin (Corps lead).

b. \$25,000 – Modify and rerun existing condition hydraulic model and produce revised flood inundation maps (Corps lead).

c. \$30,000 – Re-run the HEC-FDA model and finalize the economic base study (Corps lead).

Justification for Request for Cost Change for Skagit River, Washington (012985)

- d. \$75,000 – Complete hydraulic designs of alternative plans and perform economic screening to maximize net benefits (Corps lead, with Skagit County input).
- f. ~~\$80,000~~40,000 – Initiate phase II geomorphology and sediment transport study, focusing on completing existing condition model by which to evaluate effects of alternative plans on geomorphologic processes and sediment transport in the Skagit River system (Corps contract).
- g. ~~\$25,000—Transfer funding to U.S. Fish and Wildlife Service under the Fish and Wildlife Coordination Act (USFWS).~~
- h. ~~\$40,000~~80,000– Initiate 35 percent design of three-bridge corridor, diversion channel and setback levee measures (Corps lead on diversion channel and setback levees, with Skagit County ~~input~~lead on three-bridge corridor).
- i. ~~\$1,00,000~~125,000– Technical evaluation of additional flood control storage at Upper and Lower Baker Project. ~~Evaluation to include HEC-5, Skagit FLO-2D and UNET, HYSSR, and HEC-FDA models~~ (preliminary evaluation lead by Skagit County, with Corps lead for detailed evaluation review).
- j. \$ 45,000 – Develop and coordinate revised project management plan to reflect changes in project scope and complexity of analysis (joint Corps and Skagit County effort).
- k. \$88,000 – Conduct project management and programming activities (joint Corps and Skagit County effort).