HANDOUT #4

DOCUMENT E-4

ADVISORY COMMITTEE INPUT ON CORPS MEASURES AND CONSIDERATION OF LOCALLY IDENTIFIED PROJECTS

May 18, 2009

The following table provides input from the Skagit Comprehensive Flood Hazard Management Plan (CFHMP) Advisory Committee (AC) on the Skagit GI measures. It also includes locally identified projects that the AC considered for inclusion in the Comprehensive Flood Hazard Management Plan (CFHMP). The input was developed at a workshop the AC held on February 18, 2009 and at several regular AC meetings (March 16 and April 20, 2009). The AC provided its comments, suggestions, questions, and thoughts on whether an individual measure/project should be further considered and evaluated by either the Army Corps or for the CFHMP.

The purpose of this effort is for the AC to provide a local perspective on the Skagit GI measures for the Corps to consider as it begins its process of narrowing and combining individual measures into a shorter, more focused list of alternatives. Additionally, the work of the AC will be used as one of the processes for determining which measures/projects should be recommended in the CFHMP. These comments and recommendations will be presented to the FCZD Board of Supervisors for consideration. While the decision of the Board of Supervisors will be the final work product related to the measures and local projects, it is expected that the Army Corps will consider the results of this initial effort in its narrowing process.

In a parallel effort, the AC is developing criteria for screening measures and projects. While these criteria have not been completed, they have been considered by the AC and were part of the process of commenting on the measures. It is anticipated that the AC criteria discussion notes will be considered by the Army Corps in narrowing the measures. The AC hopes to complete its work on selecting screening criteria in the spring of 2009.

Table 1 summarizes the AC's discussions of the measures.

Green highlighted projects could be eligible for early action implementation. Yellow highlighted projects need additional analysis, development, design, and alternative packaging. Red highlighted projects should be abandoned, considering any caveats listed under comments. Blue highlighted comments or projects need additional AC review and comment.

Table 1 - Advisory Committee Input on Skagit GI Measures
WHOLE BASIN EFFECTS -Storage
(Range of Possible Additional Storage for Each Measure)

Recommendation	Comments	Missing Info
Measure #1—Upper Baker		
Continued evaluation/ project development	• Meets all criteria • Must be consistent with Baker Settlement Agreement • Need more PSE involvement. This has limited ability to understand this project. PSE expressed willingness to actively participate when Upper and Lower Baker are being discussed. Contact – Mark Killgore • Need to make sure WCM working for flood concerns • Many environmental concerns. Understanding among Baker Settlement Committee is that Skagit GI must be complete and license reopened for this to go forward. Aquatics Research Group would be logical starting point. • Maximize storage and modify operations to reduce flood flows (Measure #1C)	• Need to continue Corps analysis and modify WCM • Skagit GI Analysis • Need PSE input • What about increasing flood storage capacity by raising the dam?
Measure #2—Lower Baker		
Continued evaluation/ project development	• Same comments as for Measure #1 • Continues to demonstrate significant benefits during recent events. Dike Districts request that the Interim Protection Plan remain in effect until Corps Skagit GI study is completed. • Maximize storage and modify operations to reduce flood flows (Measure #2C)	• Same as for Measure #1
Measure #3—Ross		
Continued evaluation/ project development	• Meets all criteria and could be improved with operational changes. • Maximize storage and modify operations to reduce flood flows • This is the only measure that would help the people above Concrete. • This concept has been discussed for about 20 years. Serious concerns include – impacts to fish, need for FERC license amendment, financial costs, and normal flow issues. Revenue loss to SCL would be very large. Downdrafting the reservoir can't be done quickly in anticipation of flood. • As proposed, project would have high impacts to Chinook and pink salmon. May be workable if consistent with Skagit Settlement Agreement and Skagit GI. Recent dam operations have resulted in tremendous gains for fish. Dewatering of redds was problem before.	• Quantify hydropower loss • Need Corps analysis to modify WCM • Skagit GI Analysis • Need Seattle City Light input

Table 1 (continued) - Advisory Committee Input on Skagit GI Measures

WHOLE BASIN EFFECTS - Nonstructural

Recommendation	Comments	Missing Info
Measure #25— Nonstructural (Evacuation, Flood Warning, Floodproofing)		
Inclusion in Corps alternatives and CFHMP	• No downside. • Support good land use decisions. • Need to review existing and potential land use regulations; including Shoreline Management Act • May include proposed Measure 38 – interior drainage • Includes flood proofing, flood warning, and evacuation systems	• Needs to be coordinated with DEM • Need information on specifics
Measure #27— Debris Management		
Inclusion in Corps alternatives and CFHMP	• Need debris management program to keep LWD passing bridge structures • Railroad bridge upstream from Highway 9 is particularly bad for trapping debris. Bridge needs to be removed. • Ongoing maintenance needs to be coordinated better. • LWD should be passed downstream rather than pulled out. In nonemergency situation, need to be more consistent about how LWD is handled. Can pieces be removed and replaced downstream? • Standardized guidance may be needed so individual entities understand requirements for LWD to stay in the system. • Corps views as local responsibility. Would look at bridge designs, bypass channels, etc. for debris passage.	• Programmatic permits
Measure #23— Estuarine Restoration		
Continued evaluation/ project development	• Prioritize projects that have a positive impact on flood control and improve interior drainage and outlet facilities. Example: New Stanwood outlet WCS at bayfront. • Design should meet Salmon Recovery goals.	• Need location and design

Table 1 (continued) - Advisory Committee Input on Skagit GI Measures

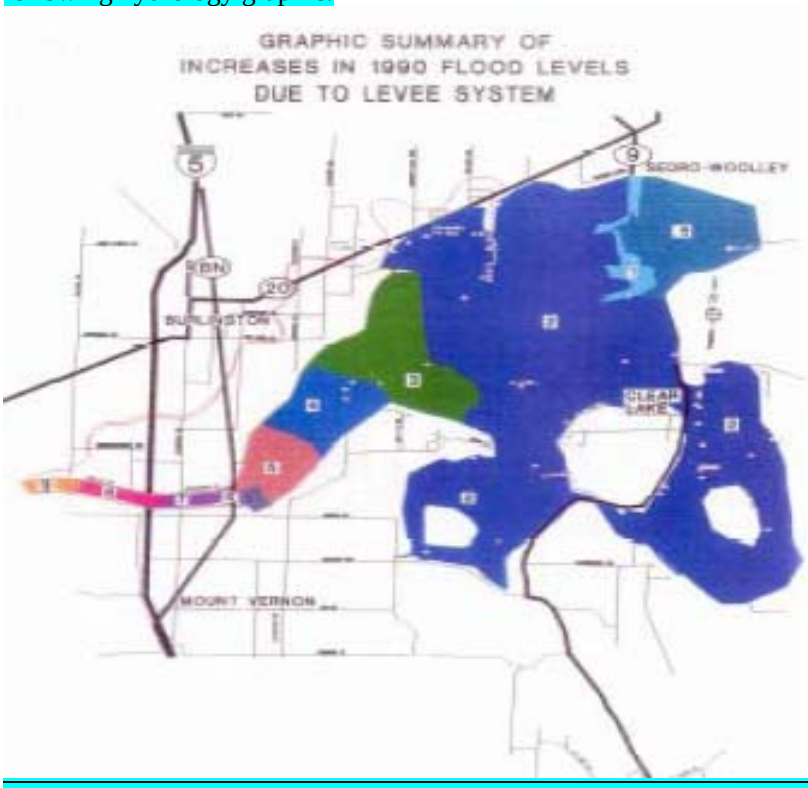
UPPER BASIN

Recommendation	Comments	Missing Info
Measure #22— Cockreham Island Levee Removal		
Continued evaluation/ project development	• Emphasis on potential environmental benefits. Habitat restoration potential is good. Some concern about potential loss of main stem habitat. • As flood project, some concern that it impacts farm land with minimal flood control benefits. • County may need to address because of legal issues • Corps analysis concludes it doesn't pencil out for flood reduction, but environmental benefit could be good.	• Need design info • Impacts unknown • Flood control benefits unknown
Measure #24— Riparian Restoration		
Continued evaluation/ project development	• Combine with flood projects - "combined" may be as mitigation • Not meant to threaten existing infrastructure. • Corps approach – what are best flood projects, then what are riparian restoration projects that are appropriate with those.	• Impacts to critical infrastructure • Design, and specific projects • Existing list could be expanded
Measure #26— Hamilton Relocation		
Inclusion in Corps alternatives and CFHMP	• Meets criteria • Incorporate wetland and slough habitats where possible	• Funding sources

Table 1 (continued) - Advisory Committee Input on Skagit GI Measures
MIDDLE/LOWER BASIN - Small-Scale Storage

Recommendation	Comments	Missing Info
Measure #4— Nookachamps		
Drop from further analysis by GI and CFHMP	• Technical feasibility is poor because of overflow timing requirements and ability to get water back out of Nookachamps following overflow • Environmental concerns related to new hardened structures along the river • Concerns about upstream and downstream impacts • Any additional consideration would require new design. • Cost **Additional AC discussion on 4/20/09:** • Preliminary analysis done was done by PIE. It identified three options. • Who would do analysis and additional project development if it were turned back to yellow? Corps could not do in timely way. • PIE project would not increase flood levels, just manage timing. It would need to be done to Corps standards so it would be acceptable for GI. Expensive design. Approach is too mechanical for Corps standards, design didn't fit conditions. • Improving management of timing of Nookachamps filling has merit. Other redesign elements could include redesigned levees, environmental features. • Project will induce more severe flooding depths into the artificial storage basin thereby lowering flood levels downstream. (Source: Page 23 Skagit River Flood Reduction Feasibility Study, PIE April 2006) • Corps of Engineers has been telling us since 1897 to get our levees off the edge of the river. What do these projects do…..they put new levees on the edge of the river. • There is a 12 foot drop in ground elevation between the Highway 9 Bridge and the Mt. Vernon gage. By taking 8,000 acres out of the floodplain for "minor" flooding events (i.e. narrowing the channel), you increase the velocity of the river in the channel. • By narrowing the channel you increase the frequency and intensity of "minor" flooding events, (i.e. you would have 1975 to 1990 flood events, depending on the height of the levees on a more frequent basis). • Between Highway 9 and Strawberry Bar the area is used by Pink (Humpy) and Chum (Dog) Salmon as a spawning area. By increasing the velocity and frequency of the flooding events the redds in those areas will be destroyed. • Since these will be "new" levees the question has never been addressed as to who will own these levees. Who will maintain them? DD 12? DD 17? All the taxpayers in Skagit County? Perhaps the City of Burlington since they seem to be the only major proponent of the project? This despite the fact that allegedly all they want to do is certify their levees to the 100 year flood level.	—

- Project is cost prohibitive. Estimated to cost between $116 million and $135 million and that's just the construction cost. Estimate does not include the cost for the real estate, flowage easements, environmental enhancement, or operation and maintenance cost. (Source: Skagit River Flood Reduction Feasibility Study, PIE April 2006)
- Project does not meet Corps of Engineers standards; therefore, no money from the Corps will be forthcoming. (Source: Corps of Engineers Preliminary Measures Presentation August 18, 2008).
- Project was looked at by Corps of Engineers in 1966 and again in 2001. Rejected both times, for many of the reasons stated herein but primarily because the project doesn't work. You cannot drain the water fast enough out of the storage area in order to prepare for the second and in some cases multiple flood events that have historically been more severe then the first flood. Why, because the overbank storage is not available. Based on experience in the 1975 (130,000 cfs), 1979 (112,000 cfs), and 1980 (113,000 cfs) flood events, once Francis Road went underwater, it took 4 days to be able to use the road again. A week or more for the water to leave the fields. You really think you can levee the "induced flooding storage area" and drain it more rapidly then it does under natural conditions? The project will have a severe impact to interior drainage.
- I take great issue with the following verbiage that I am assuming was handed out at the Dike and Drainage Sub-committee: "The Nookachamps floodplain historically has provided various levels of natural storage, depending on the magnitude of the flood peak and shape of the hydrograph, to significantly reduce flood peaks." (Source: Skagit River Flood Reduction Feasibility Study, PIE April 2006) The truth of the matter is that there is very little that is "natural" about the storage in the Nookachamps as is demonstrated by the following hydrology graphic:



- In short the project violates all of the three E's: Environment – Detrimental to fish habitat., Economics – Cost prohibitive, Engineering – Doesn't work.
- Some willingness to consider a redesigned Nookachamps project at some later time if it is determined to be a benefit.

Measure #5—Hart's Slough		
Drop from further analysis by GI and CFHMP	• Recommend dropping for same reasons as Measure #4	—

Table 1 (continued) - Advisory Committee Input on Skagit GI Measures

MIDDLE/LOWER BASIN - Levees

Recommendation	Comments	Missing Info
Measure #6a— Sterling Levee		
Drop from further analysis by GI and CFHMP	• See Measure 6b	—
Measure #6b— Sterling Levee		
Continued evaluation/ project development	Recommend a better design that combines Measures #6a and #6b. Need more complete info from Burlington project. Believe Burlington project is similar to 6b with overtopping. Concerns about any new hardened structures along the river • More study needed	• Realign per proposal from City of Burlington • Trigger flows
Measure #9— Overtopping Levees		
Continued evaluation/ project development	• Consider request from LUTC related to additional overtopping locations. • Overtopping would have happened very infrequently based on historical floods. Under Corps analysis it may happen more in the future. • Since overtopping happens anyway, need to direct flow to reduce damages. • Levees would need to be strengthened in areas designed for overtopping. • Concern if existing level of protection is reduced for adjacent areas. • Problems from Corps perspective – where would overtopping happen, and ability to quantify benefits. • Critical to have interior drainage addressed in conjunction with this measure (new measure #38). • Cost must include flowage easement – this is significant cost. • May fit more in CFHMP than GI	• Locations • Fish loss and up/downstream effects • Flow paths and easements needed
Measure #11— Raise All Levees		
Drop from further analysis by GI and CFHMP	• Big concern if levees are raised to provide 100-year protection for rural areas. Moderate concern if levees raised to provide less than 100-year protection for rural areas • Does not meet environmental criteria	—

Measure #12— Setback Levees with Excavation		
Continued evaluation/ project development	• Several setback levee measures are presented - #7, 8, 10, 11, 12, 13. While the Committee believes the concept of setback levees has merit, there are some concerns as well. Those are listed here for all setback levee measures, and comments specific to each measure are listed with the individual measure. • Farmland impacts must be addressed. Compensation should include future agricultural production (i.e. if farming is possible in setback area, need to compensate for inability to grow crops that must overwinter). • The concept of no net loss of farmland (potentially a criterion) is incompatible with setback levees, so this will have to be reconciled somehow for all setback levee options • Existing levee / rock armoring needs to be removed with minor excavation as needed to install effective fish habitat features. Needs to restore riverine processes. • Upstream/downstream impacts must be identified and addressed. • Cost is a big factor. • Excavation can't increase risk to levees	• Need locations, design, and elevation • Needs additional analysis. • Incorporate habitat restoration
Measure #13— Setback Levees Entire System		
Continued evaluation/ project development	• See Measure #12 regarding general comments on setback levees, farm impacts, environmental design considerations, critical infrastructure protection, cost and impacts analysis. • Some preference for Measure # 12, because existing levee/rock armoring needs to be removed with minor excavation as needed to install effective fish habitat features	• Cost
Measure #8— Levee Setback 3-Bridge		
Continued evaluation/ project development	• See Measure #12 regarding general comments on setback levees, farm impacts, environmental design considerations, critical infrastructure protection, cost and impacts analysis. • Should be noted that this project is phased. 1st phase is levee setbacks. 2nd phase will be modifications to bridge(s) • Must be combined with other measures, especially downstream	• Impact analysis • Design, hydraulic and sediment transport impacts
Measure #7— Levee Setback below 3-Bridge (Main stem, S. & N. Fork)		
Continued evaluation/ project development	• See Measure #12 regarding general comments on setback levees, farm impacts, environmental design considerations, critical infrastructure protection, cost and impacts analysis. • Preferred over Measure #10, which does not include the south fork.	• Locations, elevations, levee heights • Design, hydraulic and sediment transport impacts
Measure #10— Levee Setback below 3-Bridge (Main stem & N. Fork)		
Continued evaluation/ project development	• See Measure #12 regarding general comments on setback levees, farm impacts, environmental design considerations, critical infrastructure protection, cost and impacts analysis. • Measure #7 is preferred because of opportunity to restore riverine functions to south fork.	• Design, hydraulic and sediment transport impacts • Analysis regarding levee heights

Measure #14— Improve Left Bank Levees		
Drop as stand-alone concept. May be needed in specific areas.	• Doesn't meet criteria as stand-alone. • Improving all levees along one side will cause increased hazard on the opposite side. • In reality, these would be in combination with other measures, including setback levees.	• Location and elevation
Measure #15— Improve Right Bank Levees		
Drop as stand-alone concept. May be needed in specific areas.	• Doesn't meet criteria as stand-alone. • Improving all levees along one side will cause increased hazard on the opposite side. • In reality, these would be in combination with other measures, including setback levees.	• Location and elevation
Measure #16— Mount Vernon Floodwall		
Continued evaluation/ project development	• Major environmental concerns • Existing levee/rock armoring needs to be removed with minor excavation as needed to install effective fish habitat features • Needs to restore riverine processes. • Concerned about cost-benefit if this project goes forward separately. • Funding is not fully secured • Project is redevelopment of downtown area. • Want downtown Mt. Vernon to be elevated. LUTC did not believe analysis of this was appropriate to their role. • EIS complete and public process ongoing	—

Table 1 (continued) - Advisory Committee Input on Skagit GI Measures

MIDDLE/LOWER BASIN — Bypass

Recommendation	Comments	Missing Info
From the ETC - Bypass project requirements: The ETC believes that a bypass may be a suitable flood risk reduction project if it: • a) Has a wet channel with a minimum flow of water and adjacent riparian habitat, • b) Is wide enough and has a channel forming flow regime so as to allow development of natural stream sinuosity (meandering) and habitat complexity at channel forming or designed flows, • c) Includes a significant restoration component that may include off-channel habitat that could benefit multiple salmonid species such as Chinook, chum and coho salmon. The required width of the "natural" riverine/riparian corridor would be based on what flows would be passed through the channel. The ETC believes there is opportunity for areas outside of that corridor, but within the bypass, to be used for farming or other uses – i.e. a wide bypass with habitat in the middle), and • d) there is no significant damage to the estuarine receiving waters and its key species and habitats either through project construction or utilization, particularly areas currently designated for long-term resource protection.		
Measure #17— Swinomish Bypass		
Continued evaluation/ project development	Note: AC wants to consider forming a joint subcommittee to determine: 1. What would be an acceptable design for the Swinomish bypass? 2. Under what circumstances would this bypass be acceptable? 3. Would the bypass channel be wet, dry, farmland, or is there a hybrid approach? 4. What would the design features be? 5. What could the different interests live with? • Different generation of Avon bypass project • Skepticism that it will ever get built because of cost • Only project that would actually stop flooding in lower valley, although stopping flooding may not be best thing for farming in lower valley • Skepticism that cost would be prohibitive – don't have enough information to make this determination • Would have to be done in a way that would have substantial fish and wildlife benefits • What is level of knowledge about possible fish benefits? • Design dictates a lot – which of the following is it? o Dry bypass o Wet bypass o Grass weir o Hybrid • If it's to stay on the list, project needs better definition • Salmon money could be possible if wet channel design • Could decide through the following: o If only wet acceptable for environmental interests o If only dry acceptable to farming community o Then not worth pursuing • Expense of operation is extremely high. o Would have to create new dike district o Conflicts with existing infrastructure – pipelines o Annual maintenance needs and requirements • Under what circumstances could people support – possible TC assignment • Measure 38 could interact with this one – possible outlet for interior drainage • Real estate would have to be purchased by County • Concern about dropping this project off before we have more conclusions from the hydrology – may or may not need this project based on that.	—

Table 1 (continued) - Advisory Committee Input on Skagit GI Measures

MIDDLE/LOWER BASIN — Bypass

Recommendation	Comments	Missing Info
Measure #18— Fir Island Bypass		
Continued evaluation/ project development	• See notes above under Measure #17 • Note that DDD prefers setback levees to bypass in this area • Environmental perspective – bypass has potential for big ecosystem restoration because of fish access to center of bay. Could be biggest restoration project potential in Puget Sound • General question – will dike and drainage districts assume ownership and maintenance for new projects in their service area? • Although this (and other bypass projects) is shown as straight channel, in fact it would not be. • Wet, dry, or grass channel? • Possible funding through salmon money is good reason to keep it on the list • Connects to measure #38 (interior drainage) too • Concern about south fork closing off. May not be hydrologically sustainable to distribute flow among three channels.	—
Measure #19— Samish Bypass		
Remove from further evaluation/project development	• See notes above under Measure #17 • Examined and rejected in 1993, 2004. Problem was transferring fish and the cost (twice the cost). Not enough info to know whether fish issues are deal breaker. • Design concept comes into play again; hard to evaluate until design concept more certain. Wet would be confusing to fish. • Rationale for Red designation from Land Use – cost and political will to build bypasses in general. Not considered to be viable. Want to know if fish issue is potential fatal flaw, don't want any more effort spent on it. • Large gradient would require some channel armoring. Would increase cost and likely decrease habitat quality. • From DDTC – belief that this bypass would not be activate except at high flows. May require significant excavation.	—
Measure #20— Mount Vernon Bypass		
Continued evaluation/ project development	• See notes above under Measure #17 • Not preferred by Mt. Vernon. Prefer channel improvements. • Environmental perspective – with proper design, could be beneficial • Question feasibility • Lahar deposits shown in geologic map. May be unstable for bypass construction and longevity, especially during earthquake. • Maintenance must be considered; new dikes would be needed. • Would create a dike around west Mt. Vernon. Could be turned into passive park (no infrastructure). Financially would probably be better to use setback levee. • Would only address flooding in downtown Mt. Vernon area. Would have to be combined with other measures downstream. This is not standalone project	

Table 1 (continued) - Advisory Committee Input on Skagit GI Measures

SPOT ISSUES — Ring Dikes

Recommendation	Comments	Missing Info
Measure #28— Sedro-Woolley Ring Dike		
Drop from further analysis by GI and CFHMP	• Project concept not technically feasible	—
Measure #29— Sedro-Woolley WWTP Ring Dike		
Inclusion in Corps alternatives and CFHMP	• Design needs to address any habitat issues	—
Measure #30— Sedro-Woolley Hospital Ring Dike		
Inclusion in Corps alternatives and CFHMP	• Must be coordinated with Burlington project. • Design must address any habitat issues • Must have plan in place to evacuate patients. Could increase risk if levee breaks on "pressure" side.	—
Measure #37— Anacortes WTP Ring Dike		
Inclusion in Corps alternatives and CFHMP	• Need to update Corps measure with Anacortes plant upgrade design which includes flood protection for facility. Need to incorporate this design. • Levee upgrade to 100 year protection already underway • Would like more involvement from City of Anacortes	• Anacortes design • Update from Anacortes
Measure #31— Burlington Ring Dike		
Drop from further analysis by GI and CFHMP	• Burlington does not want; prefer levee certification project below	—
Measure #32— North Mount Vernon Ring Dike		
Continued evaluation/ project development	• City of Mt. Vernon does not support this configuration – would probably like it to be further west. • Difficult for AC to support without support and participation from Mt. Vernon. • Expression that this is important project to protect freeway, railroad, and connect to downtown Mt. Vernon project • Suggest support, but must connect on both ends • Supported by DD17 to preserve farmland and protect critical infrastructure • Need updated configuration – actual map with lines on it • Needs to be linked with other project – AC wants to see how this connects to other projects	—
Measure #33— West Mount Vernon Ring Dike		
Drop from further analysis by GI and CFHMP	• MV does not like this concept	—

Table 1 (continued) - Advisory Committee Input on Skagit GI Measures

SPOT ISSUES — Ring Dikes

Recommendation	Comments	Missing Info
Measure #34— East Mount Vernon Ring Dike		
Continued evaluation/ project development	• Support from WSDOT and MV • No environmental benefit. Would need to combine with mitigation projects. Would not support as standalone as this would have environmental impact. • May impact restoration project on opposite bank. • What is linkage to other projects? • Is there another project that would achieve similar outcome with less environmental impact? • Problems – doesn't really connect into high ground. Levee setback in DD3 is probably a better project. • MV wants 100 year flood protection for everything within City limits. What the specific project is will be fleshed out for each area.	—
Measure #35— La Conner Connector Dike		
Continued evaluation/ project development	• Environmental concerns may focus on Sullivan Slough • La Conner needs this project no matter what else is done. Environmental restoration would be part of the project • Suggest rename from La Conner Ring Dike to La Conner Connector Dike	—
Measure #36— Clear Lake Ring Dike		
Continued evaluation/ project development	• Part of 1979 Corps project. Protects downtown Clear Lake from river coming over Highway 9. Most important is that Beaver Lake area still rising after water going down in this area. Flows up East Nookachamps Creek and down Beaver Creek. Very important project • Needs good environmental analysis – fish use this area as a refuge during high flows	—

LOCALLY DEVELOPED PROJECTS

The following sections describe local projects identified by the Technical Committees and local sponsors.

Measure #31A— Burlington Levee Certification Project

Recommendation

Continued evaluation/project development. Need more project information.

AC Discussion

- Burlington project (from Margaret Fleek) not ring dike. Certify existing levee segments.
- What is Plan B? Only project being considered by Burlington
- Need to keep in mind that cities are doing reasonable thing to try to get lower flood levels on FEMA maps. Only way to do this is through levee certification. Also provide greater protection against flooding.
- Flaws in data that may indicate this project not needed? Skepticism that flow through railroad bridge limited to 170,000 cfs. If you assume more water can get through, then problem is not as severe for Burlington. Trouble is then you have to get rid of the water somehow. Historically you would only have had that happen once in the last 87 years. Some belief that don't need to certify levees, just need to make a way for more water to pass through that bridge corridor. Railroad bridge is a safety hazard – desire to pressure BNSF to remove bridge.
- Where will "excess" water go?
    - Hospital must be protected. Used as flood fight center
    - Highway 20 – concern from Sedro Woolley about keeping open
    - What does DD12 own? Past Lorenzo's, up into Sedro Woolley.
    - In 1979 Corps looked at raising SR20; this raised water levels in Nookachamps by 4 feet.
    - Impact to Sterling area is major concern.
- PIE and NHC hydrology vs. Corps hydrology. Clarification about comment "if accepted" Looking to resolve locally through one-day conference with Corps. For benefit of region, not just Burlington. Difference is in data input, not actual modeling methodology.
- Comprehensive approach to flood risk reduction – feels that any regional flood project will include a certified levee to protect this portion of Burlington.
- Is this an essential part of a comprehensive flood plan for the region. Yes. And for Mt. Vernon too. Funding from various sources will be needed.
- Project is not very far along. Geotechnical evaluation of levee is ongoing. Also using 1979 Corps data on levees.
- Michael Baker and Will Thomas reviewing Mt. Vernon CLOMR submittal.
- Setbacks? Just in 3 bridge corridor. Also in study phase.
- Are there any outlets to saltwater from Gages Slough or other ditch/slough? Response: There are no good outlets. There is a small pump in Gages Slough. Water generally drains naturally.
- CFHMP goal should be to get urban areas out of 100-year floodplain. Stated purpose of GI is to provide 100 year protection to urban areas and critical transportation corridors.
- 71% of city of Burlington designed to drain into Gages Slough

Potential Measure #38 - Need interior drainage projects to handle excess flows

Recommendation

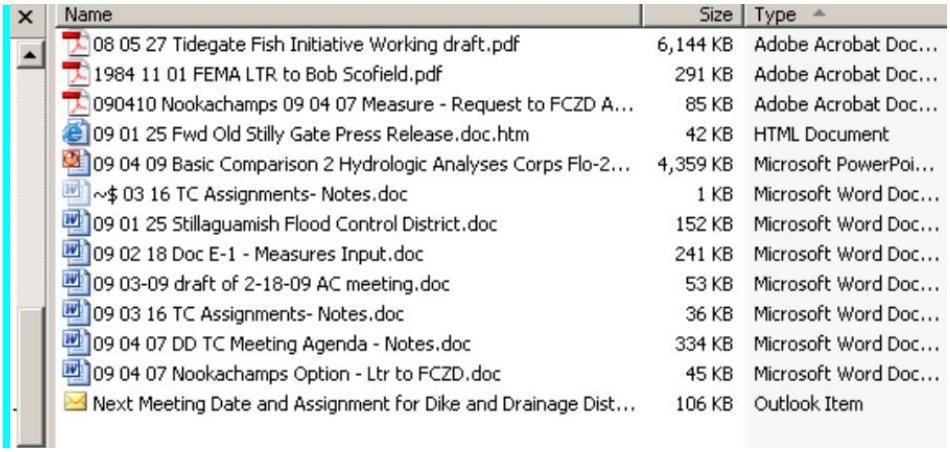
Continued evaluation/project development. Need more project information.

AC Discussion

- Need to identify locations to direct overland flow to discharge via control structures into Samish, Padilla and Skagit bays.
- Everything needs to be engineered from the bottom to upstream.
- Drainage or flood damage reduction? Flood damage reduction. Idea is reduce velocity of water coming onto and off the floodplain. And reduce water surface elevation. Increase capacity of drainage system. Also reinforcing the downstream face of road embankments to reduce erosion.
- Big issue if going to address internal drainage from overflow.
- Often requires dike breaching to exit water
- Interior drainage should be addressed in all Corps measures where applicable.

From D&D District TC – Response:(also see Handout #5, notes from DDTC 4/7/09 meeting)

- See list of documents provided (email attachment).



Name	Size	Type
08 05 27 Tidegate Fish Initiative Working draft.pdf	6,144 KB	Adobe Acrobat Doc...
1984 11 01 FEMA LTR to Bob Scofield.pdf	291 KB	Adobe Acrobat Doc...
090410 Nookachamps 09 04 07 Measure - Request to FCZD A...	85 KB	Adobe Acrobat Doc...
09 01 25 Fwd Old Stilly Gate Press Release.doc.htm	42 KB	HTML Document
09 04 09 Basic Comparison 2 Hydrologic Analyses Corps Flo-2...	4,359 KB	Microsoft PowerPoi...
~$ 03 16 TC Assignments- Notes.doc	1 KB	Microsoft Word Doc...
09 01 25 Stillaguamish Flood Control District.doc	152 KB	Microsoft Word Doc...
09 02 18 Doc E-1 - Measures Input.doc	241 KB	Microsoft Word Doc...
09 03-09 draft of 2-18-09 AC meeting.doc	53 KB	Microsoft Word Doc...
09 03 16 TC Assignments- Notes.doc	36 KB	Microsoft Word Doc...
09 04 07 DD TC Meeting Agenda - Notes.doc	334 KB	Microsoft Word Doc...
09 04 07 Nookachamps Option - Ltr to FCZD.doc	45 KB	Microsoft Word Doc...
Next Meeting Date and Assignment for Dike and Drainage Dist...	106 KB	Outlook Item

- Members also mentioned other studies that include:
  - LBS Drainage Study dated 1984
  - Evaluation Areas Report completed by Tetra Tech for the County / Corps – 2002
  - HDR report dated 2008 (no other information on this report provided)
- Group continues to request additional modeling (where does the water go and how much) before the this question can be answered.
- Site visit planned for April 23rd. Trip summary attached.

Potential Project - Habitat restoration projects in Upper basin tributaries – From Environmental Technical Committee – Needs better definition from Environmental Technical Committee at May 18th meeting

Description

- Habitat restoration projects in Upper basin tributaries could be evaluated for habitat restoration projects with flood damage reduction potential.
- Benefits include reduction in sedimentation and LWD (mass wasting) and increased off channel flood water attenuation (storage).
- Possible locations include Hansen, Coal, Wiseman, Jones creeks etc.
- Sources of information include the Chinook Recovery Plan and the Skagit Watershed Council strategy document and "Three year list."

Recommendation

None at this time. Need more project information.

From ETC - Response:

There are no new specific habitat restoration projects being proposed at this time. Rather the ETC recommendation was to consider future restoration of the upper river tributaries (primarily the north side; e.g., Hansen Creek) if needed for mitigation or as stand-alone restoration projects. Restoring these tributary natural processes should have multiple benefits including increased flood storage and reduced sedimentation. It is acknowledged that flood risk reduction from any individual upper tributary restoration project is probably minimal.

Further response from ETC (4/XX/09) - pending

AC Discussion from 4/20/09 Meeting:

- Genesis was acknowledgement of cumulative effects.
- Why not Nookachamps Creek? Focus is on reducing flood input from tribes, possibly by increasing natural flood storage in headwater areas. Not aware of project on Nookachamps that would achieve this.
- This measure is not focused on mitigation. Mitigation projects could be drawn from Chinook Recovery Plan.
- Some discussion about Tidegate and Fish Initiative; much confusion about how all this relates.
- Questions about whether it should remain in the CFHMP; send back to ETC for more work.

Emergency Overflow Spillway – New From Larry Kunzler – AC requested TC input for May 18th AC meeting

Description

Widen the 3 bridge corridor 500 feet (or more) and install an emergency overflow spillway (not to be confused with an overflow levee) in the Avon area. This spillway would only be activated when flows reach 145,000 cfs at the Mt. Vernon gage. In the last 82 years, the spillway would only have had to be used once and possibly twice (1990 and 1995). The floodwaters would then flow naturally towards Padilla Bay, which is where they are going to flow anyway during a major flood event. It's not like we would be spilling the entire flow of the river. During the 1990 flood event, the spillway would only have been spilling water for a period of 11 hours for an average of 5,100 cfs per hour. We would have to make sure that the water did not cross Highway 20 by either installing a berm on the south side of the highway or by raising the highway. Granted, during a 100-year event the spillway could be spilling as much as 30-50,000 cfs but what is the alternative? To have the water flow through the City of Burlington or be forced into the Samish River Basin?

There would be many benefits to the spillway approach:

- It would allow the flood waters to pass the City of Burlington and spill onto the floodplain in a safe manner before it reaches the City of Mt. Vernon thus saving the Urban areas from catastrophic flooding and cutting the cost of the current proposals drastically (i.e. the Mt. Vernon floodwall wouldn't have to be anywhere near as high as is currently being proposed).
- By allowing the farmland to be subject to flooding (once in the past 82 years) it would preserve the farmland from urban encroachment. Fir Island and Samish River flooding would be drastically lowered.
- By designating the area as a floodway it would prohibit further development in the natural corridor where under current conditions the floodwaters are going to go anyway thus decreasing future damages. Further, it would keep the floodway designation out of the Urban areas which under current conditions in all likelihood it will be placed.
- Out of all the projects looked at, this could be the most affordable; provide the most benefits, meet the three E's, perhaps even be acceptable to the majority of the voters who should have the final say in any proposed project. Admittedly, the people living in this floodway corridor would object, but what they must realize is that if we do nothing, which is what we have done for the last 100 years, during any catastrophic levee failure or even if the levees hold under current conditions the water will end up in that corridor as they have in so many floods in the past.
- What about the fish you ask? Wouldn't providing an emergency overflow spillway put fish out onto the floodplain? The simple answer is yes. Once in the last 82 years we would have impacted some fish. In the last 82 years, there have been many levee failures. The most recent on Fir Island in 1990. How many fish were impacted by the levee failures? If there were no levees, how many fish are stranded on the floodplain? The fish issue like any other adverse impact can be mitigated if given a chance.

Recommendation

Send to TCs for Discussion and Evaluation

AC Discussion

Ag community opposed in the past?

The AC believes it needs more information on the 5-year overflow level from Corps. They request that Amy look into this and whether or not the Corps is resolving this internally. There was some thought that

this may have been preliminary and is still up in the air. AC members recall Corps technical staff relating that there may be "too much water to do anything else." There was general agreement that a 5-year level would likely kill this concept. Previously the Corps said you can't have mechanically-controlled structure to release water. Not clear if there is a policy, but there may be some discomfort. The bottom line is that the less left that is subject to possible human error, the better. It relates to a level of confidence. It was also confirmed that there is nothing that says a local community can't take an action on its own even if the Corps doesn't support it financially.

Response from Technical Committees:

Response from the LUTC:

Land Use Technical Committee comments on "emergency spillway(s)":

1) Not enough project detail to comment on land use implications.

2) Urban and urban growth areas need to be protected.

3) Land impacted by flowage from any diversion of flood waters must be mapped and land so mapped must be protected with easements/purchase and zoning restrictions.

4) Internal drainage capacities will likely need to be increased to get rid of water one it is spilled.

5) Project should be noted as "yellow" as a concept the Army Corps or CFHMP should consider with any river by-pass project.

6) Final flowage pathway(s) must be recognized in future comprehensive land use plans to avoid intensifying development in harms way.

Response from ETC:

"Emergency Overflow Spillway" comments: The ETC applied its screening criteria to the proposal and determined that, as presented, there were not enough project details to fully evaluate the proposal or to recommend it be forwarded to the Army Corps of Engineers to be considered as part of the Skagit GI. It was agreed that spillways, as a concept, may have potential environmental benefits especially when compared to other by-pass options and emergency levee failures. But at this time there just was not enough information to warrant moving the proposal, as a specific project, from red to yellow. The following questions need to be answered: 1) Hydrodynamic modeling. Where would the water go? Will there be a defined channel and/or flowage easement? Will sediment reach the Swinomish Channel and Padilla Bay? 2) What provisions can be made for stranded fish and habitat restoration? 3) What about interior drainage capacity to move the water to the saltwater? 4) Will there be a need to fortify roads, pipelines, and other infrastructure west of Mount Vernon? 7) What happens to the homes that will be in the flowage path? 8) Will there need to be additional fortification (hardening) of the existing levee system near the spillway site(s)?

The ETC sees levee setbacks and by-passes, in general, as having the most potential for habitat restoration, depending on design details. Spillways, as a type of by-pass control mechanism, may have potential in the future depending on design details.

Response from the DDTC:

Dike and Drainage Technical Committee offers the following comments on the potential local project, "Emergency Overflow Spillway":

The use of a spillway(s) as a flood control measure has numerous challenges. They include:

1. Dike and drainage districts are generally in the business of keeping or moving water out of their respective districts. Designing a measure that directs water onto private property through a "spillway" flies in the face of this general mandate and is contrary to the required nexus between district taxes benefiting the lands being assessed. This raises concern about "liabilities".
2. What to do with the water once it leaves the river. It is unlikely there would be many property owners volunteering to take flood waters for the good of the whole. A flood flowage easement or outright purchase of the flowage pathway would be necessary. This will likely be expensive and contentious.
3. Water leaving the river will have a major impact on drainage districts, especially districts #15, #12, #19 and #22 (depending on the selected flowage pathway(s). Once the water leaves the river it becomes an interior drainage problem requiring improvements to both drainage infrastructure capacities and ability to outlet to the saltwater bays. This would need to be put in place before the spillway is built.
4. Non-mechanical overtopping of levees is preferred. Flooding is then seen as an "act of God" rather than a man directed event (again from a liability standpoint).

The DDTC believes that a spillway would be an appropriate outlet to get water (once it has left the river) out to the saltwater. This would have application for the Samish River as well as any overflow areas of the Skagit (e.g., "sea gates" on Fir Island).

Additional Comments and Ideas from Technical Committees

Forest Management

The ETC respectively recommends that a review of the research of hydrologic effects of forest practices on flooding be addressed in the Skagit GI environmental baseline reports and the updated CFHMP. Published research suggests the impact of current forestry practices is scale-dependent and not detectable downstream during major flood events.

AC Discussion from 4/20/09 Meeting– no action on this item

Climate Change

From ETC: A collaborative, multi-agency effort is underway to link climate and hydrology models to produce an inundation map using the best predictions of climate change. Ideally this information should be incorporated into the Skagit GI and updated CFHMP when available.

AC Discussion from 4/20/09 Meeting

- Corps is addressing.
- Science is evolving, so no standard protocols exist.
- Should this be forwarded to Corps? Is there a downside to not forwarding this?
- Climate change mostly affects hydrology.
- Decision to leave this item in.

Additional Levee Overtopping/Spillage Locations

LUTC notes that earlier flood reduction studies (see site plan pdf attachment #5) had considered additional overtopping/spillage locations than that currently being proposed in Skagit GI measure

#9. The Skagit GI and CFHMP should further study these additional locations or provide rationale for their elimination.

AC did not discuss yet.

WSDOT Proposal to Extend Mount Vernon flood wall project

LUTC forwards proposal from WSDOT (see site plan pdf document #6) to extend Mount Vernon flood wall project (Skagit GI measure #16) to include protection of Interstate 5 and BNSF railway south of Mount Vernon.

Comments from the City of Mount Vernon about the USACE Skagit GI Measures that have a direct and significant impact on the City of Mount Vernon

Measure 16 – Mount Vernon Floodwall

Part of the GI Measures slide show mentions four "Potential Disadvantages" to the MV Floodwall.

The City has some level of concern with all four of the potential disadvantages comments.

- ***Does not provide significant flood protection as a standalone project*** – The floodwall will provide significant flood protection to downtown Mount Vernon. The City can show that this is the case with both the ACE GI Hydrology model and the Cities own modeling.
- ***Impacts to commercial structures (i.e. parking) –*** The Downtown and Waterfront Master Plan, which the flood wall is a key part of, calls for the replacement of all parking plus more in the downtown area. A parking structure will be built between the transportation hub and the waterfront. No long term affect on commercial business. The retail business will be replaced and additional upscale residential condos will allow local residents the full enjoyment of the Skagit River.
- ***Restricts public access to the river –*** The City will remove the existing parking revetment which is currently a restriction to public access to the river. The City intends to increase the density of downtown, building on and enhancing existing retail activity along First Street to create a vibrant, attractive and safe waterfront and downtown, with enhanced public access to the shoreline and river, new and improved public amenities, and mixed-use redevelopment that will generate new jobs and create housing that preserves the character of downtown Mount Vernon. It is a place where people come to live, work, and play, enjoying the riverfront promenade, boutique shopping, fine dining, and entertainment of all sorts. Its public spaces are enlivened to include a farmer's market and live music. People will come for its fairs, festivals, and riverfront setting.
- ***Need to determine if impacts to historic buildings –*** The City has completed the NEPA process and consultation with the tribes. As part of the NEPA process the City has a firm inventory of all the significant buildings within the area of impact. Of all the buildings in the area of impact only one was found to be of historic significance, the Eddy Laughlin building. The City mitigated the impacts of demolishing the building by working with the Skagit County Historical Museum and an architectural salvage company to save those building elements which have some value before we raze the building. The City of Mount Vernon inventoried the historic buildings within the entire downtown area. The City has all of the concerns addressed in a Memorandum of Understanding between the City, Washington State Historic Preservation Officer (SHPO), and the Skagit County Historical Museum.

On an additional note related to the floodwall and Skagit GI hydraulic model. It has come to the City's attention that the historic sandbag wall is not included in the existing conditions hydraulic model. The City has historically constructed flood protection along Main Street during every major flood event. In addition the City has recently purchased a mobile flood fence and constructed a concrete footing to further assure that the flood fighting operation in downtown Mount Vernon is facilitated. The City's concern is that if a 4-foot flood or sandbag wall is not included in the existing conditions hydraulic model but the proposed 4-foot Mount Vernon Flood Wall is added to the future conditions (measures) hydraulic model then the future conditions model may indicate changes in upstream and/or downstream conditions that, in reality, do not exist.

It is completely understandable that modeling protocols need to be followed. However, the decision makers and public still needs to understand what the actual impacts of the Mount Vernon Flood Wall will be. If the ACE modeling protocols require only permanent structures can be placed within the existing hydraulic model then this should be noted in any report. Any hydraulic report or modeling results associated with the change in conditions related to the floodwall should be fully explained to include the fact that upstream and downstream impacts may be insignificant or none at all due to the fact that the historic City of Mount Vernon sandbag wall was not included in the existing conditions hydraulic model.

Measure 20 – Mount Vernon Bypass

The bypass has some very good advantages and could provide substantial flood protection especially in conjunction with the floodwall.

One concern worth mentioning is low flow design. The City of Mount Vernon is working extremely hard to create a waterfront and downtown environment that enhances the public access to the shoreline and Skagit River. Many of the envisioned uses, like the farmers market, live music, fairs, and riverfront festivals, would take place during the traditional low flow season. The City would like to see a design that keeps the maximum amount of the river's low flows along Mount Vernon's historic downtown waterfront area.

The City appreciates all of the USACE's hard work and dedication. We look forward to an ongoing relationship and future successes.

Take care,

Blaine Chesterfield

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