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Corps' Measures Workshop Public Comment Sheet

August 18th, 2008

Comments can be submitted in any of the following ways:

- 1) Mail written comments to Lorna Ellestad, 1800 Continental Place, Mount Vernon WA 98273.
- 2) Drop off written comments to Lorna Ellestad, 1800 Continental Place, Mount Vernon.
- 3) Email comments to: Lornae@co.skagit.wa.us
- 4) Email Lornae@co.skagit.wa.us, request an electronic comment form, complete the form and email it back.

Comments will be accepted until **4:00 pm September 30, 2008.**

Name: <u>DARYL HAMBURG</u>	Phone: <u>360-708-7670</u>
Address: <u>14293 Riverband Rd MV, 98273</u>	<u>Skagit County D.P. 17</u>
Email address: <u>dhamburg@msn.com</u>	<u>WE WILL BUILD IT!</u>

General comments are welcome. To direct a comment towards a specific measure, please identify the measure by the measure name and number as listed in Measure table 1.

Measure number and name from Table 1.	Comment:
#32 #21	Produce a cut off levy at the city limits, none at the Riverband Rd / Stewart Road area. low impact 100 levy - leave 30 year existing risk reduce
#8	with connection with #32 ^{#21} will produce 100 year flood risk to all of North MV with nearly 0 impact
#9	Needs to produce a water evacuation to pugel sound through the Drainage Districts - Better than a BE-PASS gates will work
#11	An ongoing maintenance program by the Diker Districts with coordination with PL 8499 specifications
#20	Does not remove the water from the river - still high down stream impact. By Pass needs to go to Pugel-Sound
#22	Should be used as a mitigation program only. Not a Flood measure.
#27	Needs to be proactive not just the Bridge as a reactive measure
#38	Needs to be a Corp mandate in order to "wake up" BNSF to the dangers of that bridge.
General	Flood Storage, Ring Dikes, Cutoff Dikes produce the least environmental impact.

BNSF IS AND HAS CREATED A LIABILITY WITH
THE BRIDGE. THIS SHOULD NOT BE A MEASURE
BY THE CORP TO REPLACE THIS BRIDGE, IT
SHOULD BE A MANDATE! REGARDLESS OF
ANY FLOOD MEASURES THAT ARE MADE BY THE
CORP., THIS MAN MADE STRUCTURE SHOULD BE
REPLACED IN ORDER TO TAKE BNSF OUT OF
THE LIABILITY TO DOWN STREAM IMPACTS, THIS
BRIDGE IS THE #1 DAMAGE POTENTIAL FOR
THE SKAGIT RIVER SYSTEM.



Skagit Co. Dike Dist. #17

P.O. Box 2926

Mt. Vernon WA 98273

Comment on Corps' Measures

These comments are directed at selected measures. These comments are those of Daryl Hamburg and are not the thoughts of any one else affiliated with Dike District 17 or any other persons affiliated with any other Dike District the Skagit Delta. Any questions on other measures listed may also be approached. I am accessible at 360-708-7670 or dhamburg@dnr.wa.gov.

Measure

(1) Baker River management may give significant support in flood control on the Skagit River. Legislative order would give the Corps the ability to consistently manage the upper and lower Baker dams in order to efficiently control peak flows.

(8) The Three Bridge Corridor widening project has been actively perused by Dike District 17 and 12. For the past 14 plus years these two entities have been working together to purchase property for this project. Congressman Larson has earmarked Federal Transportation funding to help these districts to continue to move forward with property purchases.

(9) Five year levies for this project? The attached documentation shows the historic abilities of the existing levies to hold flood waters. Why would it even be on the radar to take any of the levies down to a five year level? (Spill Gates) are far and away the logical way. The overflow can be regulated by predicted volumes. Reduction of long term damages can be accomplished with affordable construction costs.

(20) Mount Vernon by-pass does not do anything for overall flood issues. If we spend the amount of money to create a by-pass, why would we put the water back in the system? If a large investment is to be put into a bi-pass, let's get the water out to Puget Sound.

(21) The River Bend cut off make no sense. The Anacortes Water Treatment Plant supplies fresh water to all of Fidalgo and Whidbey Islands. This includes the U.S. Naval Air Station on Whidbey Island. The existing levies on the River Bend will not be removed! Who came up with this proposal and what is their motivation? If a cut off levy is to be constructed to give Mount Vernon 1% flood risk, it will not be at the expense of existing levies.

(22) Cockerham Island is the Golden Goose. Do not give up anything on this island without huge environmental trade offs in down stream flood risk management projects.

(28-37) Ring Dike produce concerns of building bath tubs. We need more studies on the impacts and history of ring dikes.

(38) Bridge modification is in progress. The 99 Bridge has already been built for a future levy set back project. The federal Highway Department is working on a new I5 bridge. The focus needs to be on the BNSF Bridge and pressure BNSF into a replacement program. The bridge produces huge down stream liability and needs to be taken head on.

Whereas channel storage had a marked effect on the sharpness of the peak between Concrete and Mount Vernon, an absence of precipitation in the lower basin at the time of this flood partially explains the reduction in crest in the lower reaches of the channel. The Sedro-Woolley precipitation gage indicated that very little rain fell in the lower part of the basin.

2.7.3 February 1951 Flood

The February 1951 flood had a peak discharge of 139,000 cfs at Concrete, a recorded peak of 150,000 cfs at Sedro-Woolley, and a peak of 144,000 cfs at Mount Vernon. Reservoir storage reduced the peak discharge at Concrete about 13,000 cfs. However, due to the long duration of the peak discharge between Concrete and Mount Vernon, channel storage and attenuation had little effect on reducing the peak stage in the lower reaches: The flood remained near its peak for 6 hours at Mount Vernon. The duration of this peak was more significant than its magnitude because it minimized the effectiveness of natural storage in the Nookachamps Creek area, and dikes failed because they lacked sufficient cross-sectional dimensions to withstand a long period of high water. Breaks were often at the sight of old slough "heads".

2.7.4 November 1990 Floods

The month of November 1990 included significant floods on November 9-11 (the first flood) and November 24-25 (the second flood). The first flood was slightly larger in volume than the second flood, but peak discharges were similar during both floods, having approximately a 5 percent exceedance frequency at the Concrete streamgage. The two November 1990 floods broke through the Fir Island levee, and inundated most of the interior farmland in this major farming region between the North and South Forks of the Skagit River, about 3 miles downstream from Mount Vernon. Both events required extensive flood fighting in the vicinity of Mount Vernon. For example, during the November 1990 flood events, the peak discharge of 149,000 cfs at Concrete increased to 152,000 cfs at Mount Vernon, while the discharge of 160,000 cfs at Concrete during the November 1995 flood was reduced to 141,000 cfs at Mount Vernon. During the 1990 and 1995 floods, the stages at Mount Vernon were nearly equal, 37.34 feet and 37.37 feet, respectively.

The major levee failure at Fir Island during the November 1990 floods increased the river slope and velocity below Mount Vernon, causing an artificially low crest stage at the Mount Vernon gage. Total flood storage used at both projects amounted to approximately 194,000 acre-feet during the first flood and approximately 153,900 acre-feet during the second flood. The above volumes include 112,000 acre-feet stored

in Ross reservoir, and 82,000 acre-feet stored in Upper Baker reservoir during the first November 1990 flood; and 100,000 acre-feet stored in Ross, and 53,900 acre-feet stored in Upper Baker during the second November 1990 flood. Inflow to both projects peaked on November 10, 1990 (first flood) as follows: 46,000 cfs at midnight at Ross, and 33,000 cfs at 10 a.m. at Upper Baker. Outflows at both projects were regulated to a minimum of 5,000 cfs through the main part of the flood.

The Fir Island levee failure caused the Skagit River to fall abruptly. The hydraulic relief provided by the Fir Island levee failure was probably instrumental in preventing failure of other major levees in the vicinity. Emergency repairs to the Fir Island levee were made between the first and second floods, but time was insufficient to fully stabilize the levee and the levee failed again during the second flood. Flood peaks between Concrete and Mount Vernon are normally reduced by attenuation and limited local inflow. This relation was reversed during the second flood due to significant local inflow, saturated soil conditions, and remaining pondage from the first flood.

2.7.5 November 1995 Flood

Flows on the Skagit River reached 160,000 cfs at Concrete and 141,000 cfs at Mount Vernon during the November 28-30, 1995 flood. Concrete was above zero damage stage for four days and above major damage (90,000 cfs) for one and a half days. Mount Vernon was above zero damage stage for approximately 4 days and above major damage for approximately 3 days. As a result of the reservoir regulation and sandbagging efforts, levees at Mount Vernon and Fir Island were able to withstand the flood without failing. Runoff stored at Ross and Upper Baker reservoirs are estimated to have reduced flood levels by about 5 feet and 2 feet at Concrete and Mount Vernon, respectively.

This flood set a new crest-stage record at the Concrete gage despite the regulation at Ross and Upper Baker. The Concrete gage reached a crest of 41.57 feet. The Mount Vernon gage reached a crest of 37.34 feet, approximately equal to the record stage of 37.37 feet during the November 25, 1990 flood.

Reservoir inflow caused Ross Lake to fill to elevation 1602.38 feet, which is within 0.12 feet of the maximum full flood control pool. Upper Baker started to evacuate storage at 6 p.m. on November 30, nearly a day after the river crested at Concrete.

2.7.6 October 2003 Floods

The floods of October 2003 started with a smaller peak followed by a larger peak. The first flood peaked at 94,700 cfs at Concrete and

2007

Glada Hinds
Tim Hinds
Burlington R.V. Pk.
(360) 708-2459

The Corp.

To whom it may concern:

Please address, publicly, the

issue of displacement of low

income families from areas where

Levie set back/letting the river

run through - such as: notification

& time allowance for relocation

! Help to relocate, physically

& financial - Proposed Time element

Publish heurst information

about results of meeting, etc

in a manner that does not cause

Panic to those who do not know

(or are unable to understand)

The whole situation -

Each Time there has been

a report (in the news media)

IT has caused rumors to run

rampant causing unnecessary panic
among many residents - this
has been going on for years

We would appreciate

your care in this matter

Sincerely,

Glada Hinds

6-18-08

Corps' Measures Workshop Public Comment Sheet

August 18th, 2008

This is the electronic version of the public comment form. Thank you for providing your comments electronically.

To submit comments, reply to: Lornae@co.skagit.wa.us

Name: Dan O'Donnell

Phone: 360 466 3057

Address: PO Box 532

La Conner, WA 98257

email: laconnerdan@gmail.com

Comment #	Measure number and name from Table 1.	Comment:
1	Overall	This presentation was merely a Power Point rehash of PIE's 2006 report. It contained nothing new, and it appears that the U.S. Army Corps of Engineers (COE) has actually done no real planning since the PMP was adopted.
2	Attitude	The presenter had such a negative attitude, and she showed zero enthusiasm for any-thing, so I wonder why she even came here.
3	Scope	The COE failed to take a systems approach to Skagit River flooding. Instead of deriding each measure separately, the Corps should have shown how the different measures could work together to control the river. If there is no way to contain the Skagit, then the COE should say so.
4	Threat	There is no agreed 100 year flood data set. At the February, 2007, meeting with the County Commissioners, the COE refused to look at new and more scientific information. That remains a serious mistake because a forensic study of the Crofoot homes indicates that the 100 year unregulated flow should be 241,800 cfs, not 278,000 cfs. Ted Perkins' May 1 release uses the old figures. Without scientifically proven and generally accepted discharge data, we cannot plan.
5	Money	In 2007 the COE spent \$220,737.81 on studies. What are the deliverables? Where can a layman see them? Where did that money go? Total spending on studies since 1997 is now \$10,346,204.07. There will come a time when the locals will say "enough" and we will seek a divorce from the COE.
6	1 - Additional storage at Upper Baker dam	Do not let FERC reduce the already-approved storage down to 88,000 acre feet. The 1977 water supply paper is still valid, and FERC cannot administratively change it.
7	2 - Additional storage at Lower Baker dam	Of all the 37 measures, this one is both available and actually works. The 29,000 acre feet of storage behind Lower Baker saved us in 2003 and 2006. The COE signed an IPP in 2000 that requires this storage, but now the Corps says it does not exist. The COE hides behind an engineering planning regulation to avoid any responsibility for this dam. The COE could help us with the FERC relicensing on this issue, but it refuses to do so. This arrogance transcends engineering and may become a political issue.
8	4 - Nookachamps storage	This may be expensive, but it is a necessary component of our flood fight strategy and tactics. If my memory is correct, this would shave 40,000 acre feet off of the crest. With reasonable timing in response to accurate flow data from upstream, this is a very worthwhile measure and should not be dropped from the list.
9	11 - Raise and strengthen existing levees	Especially in Dike District #1 this measure really makes sense. The threat of failure at the end of Calhoun Rd. should be analyzed and at least two feet should be added to the levee height.
10	13 - Set back levees w/o excavation	This does not make sense. If the goal is to improve capacity, then excavation is a necessary component of levee setbacks in the three bridge corridor.
11	20 - Mount Vernon bypass	As unpalatable as it may seem, this measure makes sense because it would relieve the City of the major portion of the flood threat, and, like the Nookachamps, it provides another very effective tool for the flood fight.
12	22 - Cockreham Island	In view of the fact that the benefited property owners refuse to set up their own dike district, the obvious solution is to remove the dike and let the river restore itself. There should be restoration funds available for this purpose.
13	35 - La Conner ring dike	The COE's stance on agricultural dikes that have worked for over 100 years is not acceptable. At least the COE should be willing to look at them and try to fit them into the plan. There should be some middle ground between brand new dikes certified by the COE, and working dikes that meet the needs of a community, while reducing flood insurance premiums to some extent. What is wrong with a 90% certification? What is wrong with certification for a 50 year flood event? A Section 205 application from the Town of La Conner deserves a response in writing. Surely, the COE can find 15 minutes of staff time to be courteous. Section 205 projects do not require congressional approval, so why did the presenter instruct us to obtain our own funding through Rep. Larsen?

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This is the electronic version of the public comment form. Thank you for providing your comments electronically.
To submit comments, reply to: Lornae@co.skagit.wa.us

Hard copies can be mailed to Lorna Ellestad 1800 Continental Place, Mount Vernon WA 98237 or dropped off at the same address.

Comments will be accepted until **4:00 pm September 30, 2008**.

Darrin Morrison 360.661.1566

19212 Morrison Road Mount Vernon, WA 98274

dlmorrison@verizon.net

General comments are welcome. To direct a comment towards a specific measure, please identify the measure by the measure name and number as listed in Measure Table 1 (attached). Example below:

Comment #	Measure number and name from Table 1.	Comment:
1	Measure 8 - 3 bridge corridor	Needs to be changed to include the Division St. bridge and North fork bridges. (5 bridge Corridor)

Dear Lornae Ellestad:

SEP 4, 2008

In response to the Army Core of Engineer's request for public input to the Skagit River flood problem, I offer this suggestion.

I am a retired electronic engineer for Hewlett Packard. I don't have any background in hydrology. However, I have some fundamental grasp of the magnitude of the flood problem due to the Skagit River.

But in the years past, one thing that Hewlett Packard mandated was innovation and functionality. Design for the best outcome in accuracy and performance that was a genuine contribution to the development of technology within the discipline and not "a me too".

The overview of my proposal is that water from the Skagit River be diverted through a series of controlled gates into a major aqueduct that open and close in response to water level and water speed changes relayed by sensors located at strategic points from the head waters to along the length of Skagit River.

I have selected the bend in the river west of the I-5 bridge in Burlington just before the Harper road exit. To the west of the bridge is a bend in the Skagit River. At that point I would build an underground aqueduct 30 to 42 feet in width that would head west toward Padilla Bay approximately 5.15 miles from the bend.

The complex of gates entering the aqueduct would operate like apertures allowing varying volumes of water through based on sensor data from the upper Skagit. A proprietary algorithm would be developed to operate these gates in an anticipatory manner thus responding to the rise and speed of the river to closely maintain a consistent volume of water flow that could be handled by the river to its final destination.

Back in 1896, the first major hydropower development at Niagara Falls required the engineering of a massive bypass for water from the generating turbines. The water flowed under the city of Niagara to rejoin the flow below the Niagara Falls. The bypass would have accommodated a large semi truck of today. From this development back in 1896, I began to think about how flood levels of water could be managed if an aqueduct were big enough and the control of the flow through it would be predicated on sensor data along the river's path in anticipation of what is coming down the river.

If my thinking is clear on the principles needed to manage flood levels of water, it may be possible to remove the designation of "flood plane" from this region.

Sincerely Yours,

A handwritten signature in blue ink, appearing to read "John Vieira". The signature is fluid and cursive, with a large initial "J" and "V".

From: Stan Nelson [stannelso@gmail.com]
Sent: Wednesday, September 10, 2008 9:17 AM
To: LornaEllestad
Subject: gi study
Lorna,

The following are my personal thoughts not the district's.

Some of these projects, overflows and bypasses, will cause either some areas to get wet more often or restrict ag use of by pass areas esp. if they are to be wet all the time in order to support salmon. This will have a huge impact on the ag community and I'm not sure we will be able to get them on board. Many crops we grow are winter crops and the insurance cost would shoot through the roof if they were going to drown out every 5 yrs or so due to over flows. It also will have an impact on the amount of ag land available, this land is already under stress due to urbanization, salmon recovery and other impacts.

If major setbacks are used won't sedimentation increase either in the stream bed or on the new benches due to slower water flows during high water events. Also the river will probably migrate back and forth across the new flood way and may be at the base of the new levee in a relatively short period of time.

Increased storage behind the dams seems like a good idea assuming the cost of power replacement and improvements to dams are not cost prohibitive.

The Nookachamps and Sterling storage areas seem like good ideas, but I think it is very problematic for the Corps to go along with them when you are deliberately flooding an area at a certain time vs letting nature take it's course. Also the environmental impacts would be huge, the creek.

I also wonder about building urban areas to 100 yr protection and rural to 50 yr. It seems that if you build the urban upstream areas to 100 yr protection that the water in 50 to 99 yr. events will be moved downstream to areas with only 50 yr. protection hence the rural areas will get wet more often.

If we are going to look at increasing flow thru bridges we need to start at the bottom, North and South Forks and work upstream not upstream and work down.

One of the options is to build in place, to me this seems the simplest and would have the least environmental impacts both negative and perhaps positive. In many places if the road was just moved over about the width of the road the levee could both be raised and slopes improved.

Stan Nelson
Conway

From: Mike Woodmansee
Sent: Wednesday, September 03, 2008 12:56 PM
To: 'rschwartz@skagitvalleyherald.com'
Subject: Corps presentation

Ralph, I received your message seeking my impression of the recent Corps of Engineers' presentation regarding numerous theoretically possible flood projects for the Skagit River system.

My first impression is, after a decade of study and millions of dollars spent, there is a remarkable lack of specificity both related to doable projects as well as costs/benefits and timelines.

Here are my further impressions, I'll try not to ramble but the subject begs rambling:

1. From a flood insurance perspective and property use perspective, if the sum of any/all eventually implemented solutions doesn't result in 100-year flood protection then there is no relief from the forthcoming revised base flood elevation maps and resulting expanded insurance requirements and use limitations. Citizens don't yet understand this but when the new maps are finally released you'll see a groundswell of interest. From an insurance and property use perspective if the protections don't provide 100-year protection they may as well not exist.
2. #1 is especially important to Mount Vernon and Burlington, due to the amount of developed property, both residential and commercial, lying within their city limits and within the 100-year flood plain of the Skagit River. A GREAT DEAL OF PUBLIC/PRIVATE INFRASTRUCTURE LIES WITHIN THIS FLOODPLAIN AS WELL AS A SUBSTANTIAL PORTION OF OUR LOCAL TAX BASE AND JOBS, so the affects are far greater than just who owns what property.
3. It should be abundantly clear the Corps G.I. Study will produce no useable end product(s) and the Corps has little or no money even if the Study were to produce implementable solutions. Just listen to Linda Smith, she is telling us this; during her presentation virtually every potential or partial solution had fatal flaws or insurmountable obstacles. This process is a bureaucratic exercise with no particular goal(s) and no money to fund any results even if desirable results are identified. And the Study process is so slow that city, county, state and national administrations come and go, citizens grow old, constituencies change and nothing happens. Pathetic is a neutral one word description of the G.I. Study process as currently staffed, funded and managed. It will take local leadership to generate, fund and build solutions given the current state of Corps funding and performance.
4. In light of #3, citizens need to realize whatever the revised base flood elevation maps provide in the way of base flood elevations, once appeals are resolved and elevations adopted, are what we are going to live with for at least 10 years? 20 years? 30 years? However long it takes local citizens/political leaders to decide what level a priority 100-year flood protection is and where, and then fund, design and implement constructible projects.
5. Again listening to Linda Smith, most of the Skagit River dike system improvements listed and currently being studied, CAN'T be funded by the Corps because they provide enhanced protection to rural areas which I gather is specifically prohibited within the Corps guidelines. This is likely a good thing because I believe most Skagitonians appreciate their

rural heritage, but this is a change from our historical approach wherein the entire lower Skagit Valley has about the same level of protection. Said differently, it appears there will be little or no federal funding or energy put to raising or improving dikes in rural areas yet many of the stakeholders at the local level represent these rural constituencies and are especially passionate about flood protection. I am not sure how this will be sorted out.

6. I think all of the by-pass options will go nowhere because of their massive scale, costs, environmental issues and enhanced flood protection for rural areas.

Given these impressions, I think the cities of Burlington and Mount Vernon are on the right track and that Skagit County needs to support their efforts to the maximum practicable extent along the following general strategies:

1. Get the Skagit River hydrology right because this ultimately drives the 100-year base flood elevation maps and provides the thresholds which projects must meet to fulfill the 100-year protection requirement. Real progress is being made by the cities in this regard; with support from county staff, and their latest efforts deserve community and agency support.

Check into this Ralph. This is a big deal, the Corps has their head in the sand STILL, but I believe FEMA is listening. It is unconscionable for the Corps to not put forth the effort to understand and embrace the scientifically based results and hydrologic projections recently documented by the cities' consultants and presented to agencies in cooperation with Skagit County staff.

2. Find effective means to protect urban development and infrastructure, and although largely dismissed by Linda Smith in her presentation, this ought to include; enhanced dam management for lower flows during severe flood events (all of the barriers to this are paper barriers for the dams will work as managed), moving back and raising dikes through the 3-bridge corridor to the maximum practicable extent without substantial bridge alteration if possible, a flood wall for downtown Mount Vernon, a new dike paralleling Freeway Drive and release of excess floodwaters in the Avon area, but without the construction of a conveyance system. Instead, buy flowage easements. It isn't true water would have to be released at the 5-year flood event level, as stated by Linda Smith, **IF** one assumes the upriver dikes are raised in height. Think of it this way, a major flood event would overtop the current levies, which is our current reality, and water is largely going to leave the current dike system before or at Avon anyway and just pour across the fields to the channel or bay. So if this is our do nothing reality, why can't it be part of an ultimate solution if by so doing other improvements become feasible and result in 100-year protection for urban areas? A few hydrologic iterations would need to be conducted to tune this approach and determine what combinations of implementable solutions could provide 100-year flood protection for urban areas, maintain the current level of protection for rural areas, be environmentally acceptable and locally supported and fundable. This is what I think local citizens and agencies thought the G.I. Study might do; Using accurate, modern hydrologic calculations; find the thread of solutions that when connected achieved an implementable overall solution providing 100-year flood protection where appropriate, maintaining current flood protection in rural areas and including a federal funding component that when coupled with local matching dollars produced constructed projects.

Thanks for asking, Mike Woodmansee

From: Glenn Ash [glennash@windermere.com]
Sent: Tuesday, September 09, 2008 3:29 PM
To: LornaEllestad
Subject: flood control-public comments

Follow Up Flag: Follow up
Flag Status: Purple

Dear Lorne, please accept the following comments for the U. S. Army corp study.

The most compelling thoughts on flood control measures for the Skagit River that I heard in eight years of public office were offered by Mr. Bayse (sp), attorney for the Sacramento Basin Flood Control project. Speaking some months back to the County commissioners, he urged locals to forge ahead with projects and not to wait around for federal dollars on some single grand scheme. It appears our population base will not justify the influx of large federal dollars now or in the near future. Will we wait around sand bagging indefinitely, dreaming of the promise; some year some decade, some millennium? If New Orleans is only 30% re-built, massive federal dollars will still need to flow that way for quite some time, and other metropolitan regions are waiting behind that.

The time for action is NOW on projects that have already passed through the GIS process for our County. Mount Vernon has a great flood plan for its Downtown core that will protect huge City/County public investments and promote private economic resurgence. Its affect on downstream or lateral dispersion is so minimal it doesn't even register. Engineers have calculated that a 100-year flood flow at 221,500 cubic feet per second would "fill in" the downtown area with 10 feet of water in approximately 2.25 minutes! That is a 3 million square feet of area in a long eye blink. In the scheme of things, this is not even a drop in the bucket when you speak of flow in the Skagit River....

How many years have we been studying; 50, 70 or 90 years going back to Stewarts investigations? Its time to act.

Glenn Ash
301 Lilac Dr.
Mount Vernon, WA 98273

Corp's Own Comments from September 4th presentation to Dike Districts

Measure 1 - Corps starts operating at 90K cfs

Measure 4 - 15'x20' gate would take out most of flow up to 100 years. There is a danger to urban areas if the dam fails. Costs are highly understated. Would put more frequent, high water on downstream levees and potentially create worse flooding conditions in back-to-back flood events. What do you do with natural creek flow?

Measure 6 - Does not work on its own

Measure 7 - One of lines goes through water treatment plant. Need to look at setback levees as an option. Diking District has drawings it can provide to Corps. What are the impacts to LaConner bridge?

Measure 9 - Diking District has right to condemnation. There are many willing sellers, however, farmers do not seem as willing to sell. Lease backs?

Measure 11 - Need to improve all levees regardless of alternative chosen

Measure 12 - Diking Districts want levees improved/raised in place

Measure 17 - Don't know sediment impacts. Padilla Bay bypass?

Measure 18 - Don't have alignments. Possibly install an additional outlet to draft water away from South Fork.

Measure 19 - Not final that lower and upper basin fish cannot mix. Samish would only be wet about 3 days per year during 100 flood periods. Samish is flooded every other year by the river.

Measure 20 - Very complex because bypass would become main channel since it removes the long, sharp turn. Have sewage treatment plant outlet at end of bypass.

Measure 22 - Want to reconnect portion of slough. Can get environmental credits for mitigation.

Measure 27 - Affects toe of Diking District 12's levee. DOT did a study but Burlington Northern RR backed out.

Measure 30 - Diking District 12 proposed berm, but hospital did not.

Measure 37 - Two refineries. Need alignments of pipelines
Corps needs to get copy of Anacortes 'plan' for protection

General

Districts protecting urban areas seek 100-year protection

Districts protecting rural areas seek 80-year protection

Use the term 'multi-bridge corridor' rather than 3-bridge corridor

Corps does not like any flood protection measure that requires manual operation to be effective.

Questions re Corps 18 August 2008 presentation:

Measures 1 and 2 call for reducing flows to zero from Upper Baker (Measure 1) and Lower Baker (Measure 2) during the peak of a storm event. This action (reducing flow to zero) is described as being “not feasible for Corps implementation” under Measure 2 at Lower Baker because of the difficulty (impossibility?) of providing “perfect” prediction of timing and magnitude of peak flow. Why is Measure 1 at Upper Baker not also considered infeasible for the same reason.

Where in the Corps regulations is the requirement for “perfect” predictions covered? If the stated requirement of “perfect” prediction were applied literally, then the Corps would presumably never rely on forecasts for any project operations. Please provide a more realistic scenario, if there is one, of the conditions under which forecasts would be acceptable.

Measure 3 (Ross Dam) assumes full flood control storage available starting October 15, compared with the current December 1. As far as we are aware, the existing condition hydrologic analysis already assumes full flood control storage starting October 15. Is there an inconsistency in the existing condition analysis? How much storage is typically available at Ross Dam by October 15 under current operating practices?

Measure 7 (Levee Setback Downstream of 3-Bridge Corridor) does not seem to recognize that the Anacortes WTP is in the setback zone.

Measure 9 (Overtopping Levees). Does this measure assume a gated or ungated overflow section?

Measure 11 (Improve Existing Levees). Please provide costs for two assumptions – 1) assuming the existing levees can be added to and 2) assuming that the existing levees will need to be replaced wherever 100-year protection (and levee certification) is required.

Measures 11, 14, 15 (Improve Existing Levees). What is the thinking behind providing measures for improving all levees (Measure 11), left bank levees only (Measure 14), and right bank levees only (Measure 15) when it is acknowledged that improvements would be required to the entire system?

Measure 17 (Swinomish Bypass). Is the overflow weir assumed to be a gated or ungated structure?

Measure 19 (Samish Bypass). The B/C ratio is given as “0” – does this mean the Corps analysis shows no benefit from this measure?

Is debris accumulation on bridges in the 3-bridge corridor considered in the existing condition hydraulic analysis? If so, what assumptions have been made regarding impacts on hydraulic conditions?

Corps' Measures Workshop Public Comment Sheet August 18th, 2008		
Name: Larry Kunzler		Phone: Unlisted
Address: Skagit County		
email: floodway@wavecable.com		
Comment #	Measure number and name from Table 1.	Comment:
1	General Comment	Corps of Engineers brought 8 people. A huge waste of taxpayer's money. How much did this meeting cost the taxpayer? Corps has taken 10 years and 10 million dollars and is now asking us for our comments on 38 possible flood projects. Corps understatement at meeting, "Doing anything with us is kind of complicated." Corps needs 1.3 million to "stay on schedule" for completion of study. If they don't get it, they will have to revise schedule. I'm sorry but meaning no disrespect to the Corps employees, this appears to be a never ending process based on <u>funding</u> that may or not ever be realized.
2	General Comment	It would appear that the money is not going to be there for even completing study, probably will not be there for any project that we have to compete for from other areas of country. If we want flood control in Skagit County we are going to have to fund it ourselves. Ten years, <u>preceded by 93 years of studies after studies is enough</u> .
3	General Comment	There were some disturbing things at the Corps presentation. They did not know status of moving Hamilton which suggests a lack of communication between Corps and County staff. Corps staffer was looking at map and couldn't locate Mt. Vernon. When the person in <u>charge</u> can't even locate a major city in the floodplain, it doesn't bode well for confidence in the <u>Corps</u> .
4	General Comment	Aren't we putting the cart before the horse? How are we going to pay for any flood control project? Property taxes on all citizens? What about those who won't receive the same benefits as others? Sales tax? Do the citizens of Burlington support a ring dike (bathtub project)? Shouldn't we have an advisory vote on these issues?
5	General Comment	It was very heartening to hear the Corps state how their projects cannot induce flooding without compensating landowners. It was also very heartening to hear the Corps state that the 3 bridge corridor acts as a dam. This public admission has been long overdue.
6	<u>Measure #2</u> . General Statement by Corps: <i>Must have 90% accuracy of weather forecasting before the Corps could put together plan for Baker Dams.</i>	Good luck with that! However, shouldn't the agency be basing its decisions on "Best Available Science" and if they were to error shouldn't that error be on the side of safety of the residents of the flood hazard areas instead of the corporate interest of power brokers? Wouldn't taking control of the dams at an earlier flood flow stage say 60,000 cfs instead of 90,000 cfs be beneficial from the standpoint of managing the <u>outflow with respect</u> to the timing of the crest of the flood event?
7	<u>Measure #'s 1, 2, 3</u> . General Statement by Corps: Compensation for hydropower losses are a local sponsor responsibility.	This is the first time that I believe the Corps has stated publicly that compensation for dam storage would be the responsibility of the local <u>sponsor</u> . I have no problem with that and in fact have been recommending for over 2 years that if we wanted more storage behind the <u>dams</u> that we should offer to pay for it. (See www.skagitriverhistory.com: Angry Citizen September 2006, The Realities of Flood Control in Skagit County and March 2008 E-mail discussion re: Plan B)
8	<u>Measures #'s 1 & 2</u> . <i>"If structural changes are required to Baker Dams they would be cost prohibitive because Baker only contributes 25% to the flow in a major flood event."</i>	Isn't 25% or 1/4 of the flood flows significant from the standpoint of letting the crest from the Sauk River pass the Baker River before or after that 25% is released into the system?
9	<u>Measure #2</u> . <i>"Decision on what to do with Baker Dams is at least 2 years away except that nothing will be done with Lower Baker because it is something the Corps does not have authority to do. Also, Corps wants "passive system" and Seattle District does not expect headquarters to approve."</i>	It appears we have wasted a lot of time looking at storage in Lower Baker because they "do not have the authority to make it happen". To me, if it has the potential to be beneficial, something that the Corps in 1966/67 suggested that it might be (See www.skagitriverhistory.com: Letter to Puget Power from Corps of Engineers, MFR re: Corps Investigation of Existing Baker Sites, Corps Memorandum re Lower Baker River Storage Projects, Corps Memorandum re Preliminary Report on Baker River Regulation) then the Corps should seek the authority to look at modifying the procedures such as taking control of the dams at an earlier stage of the flood event not wait until river reaches <u>90,000 cfs</u> .
10	<u>Measure #3</u> . <i>"Any changes to Ross Dam storage would require re-opening of FERC license."</i>	Given the fact that FERC has so far been totally non-responsive to protecting the lives and property of Skagit Valley residents, without the full support of Seattle City Light, we would <u>probably be wasting our time</u> .
11	<u>Measure #'s 4 & 5</u> . <i>Corps would "probably" not support Nookachamp or Harts Slough (Sterling area) storage project (i.e. Measures 4 & 5), levees in Nookachamps). Reasons given, very expensive, would induce 5 feet of flooding in Sedro-Woolley, would have to purchase flowage easements from Nookachamp residents due to "induced flooding". Causes more frequent flooding at higher levels downstream. Double pump event not studied by Corps.</i>	This is actually a good thing. This proposal was originally looked at in the 1960's and pretty much abandoned because of the same reasons. During a "double-pump" type of flood events, the basin would not be available for any kind of storage and the resulting floods would be <u>even</u> more severe. By putting levees on the edge of the river the smaller flood events would become more serious for downstream residents resulting in more damages than are currently experienced. Induced flooding (5 ft in Sedro Woolley) is also unacceptable. It was nice to hear the Corp would require flowage easements for induced flooding. What the Corps did not state is that the severity of the flooding in the Nookachamps and Sterling during 10 year events and higher is already induced flooding due to the impacts of the existing levees.
12	<u>Measure #6</u> . <i>Sterling levee could not be 100 yr levee in accordance with EO 11988 because it would promote development in rural areas.</i>	Yet another good thing. 100 year levee would not only induce several feet of flooding into Sterling/Nookachamp basin but would <u>promote urban development</u> in all lands north of Highway 20 to across Cook Road and <u>from I-5 East to Sedro-Woolley</u> .

13	<u>Measure #7</u> . 500 ft setback would make sense, preliminary cost 428 million.	Agree, a good idea but is probably cost prohibitive. Corps has been trying to get the levees off the edge of the river since 1897. Dike District #12 responded in the mid-1950's by moving them 4,000 feet closer to the river.
14	<u>Measure #8</u> . 3 bridge corridor, 500 ft setback system, 3 bridge corridor acts as a dam, opening it up would cause less flooding upstream but more downstream. Corps does not have authority to make this happen. R/R bridge construction cost alone would cost 32 million. This does not include cost to R/R for shutting down its bridge while construction is underway.	One has to wonder how the Corps was going to do this in 1979 if they didn't have the authority and why are we even talking to the Corps if every positive project that Skagit residents are interested in it seems that they don't have the authority to make it happen.
15	<u>Measure #9</u> . Overtopping Levees. To get enough water out of the system you must start flooding at 5 year event. This is one the Corps will probably drop.	Say what? A lot of money was spent in the early 1990's promoting overtopping levees. Never was it ever mentioned that they would have to start overtopping in the 5 year event for that project to work . In fact, overtopping levees (i.e. spillways) have been promoted in the Valley since 1922. What analysis has been performed to reach that conclusion? No data was presented at the meeting to support that conclusion. What public document is this analysis contained in? Why wasn't a failure scenario in the Avon area studied?
16	<u>Measure #10</u> . Setback levees for Dike 17 side would be required to run along Freeway Drive.	So what would happen to the existing levee system and what would you do with the Anacortes Treatment Plant if you moved the levee to Freeway Drive? See presentation 53:50.
17	<u>Measure #12</u> . Setback levees with excavation, Corp will not pursue because it "would destabilize the river system."	Again, what analysis was done to support this conclusion? In the early 1990's during the feasibility study, it appeared to be one of the preferred alternatives. Hasn't the current levee system "destabilized" the natural chain of events? Leaving it as it is seems to be the "do nothing approach".
18	<u>Measure #16</u> . Mt. Vernon floodwall not a stand alone measure. Issue is you don't have connectivity with river. You don't see the river.	Is this to say that it shouldn't be happening by itself or that the Corps would not pursue it because of adverse impacts created if it is built by itself?
19	<u>Measure #17-20</u> . Bypass systems, would have to start to use in 5 to 10 year event, and would not function unless the 3 bridge corridor is widened.	This is perhaps the most serious statement made by the Corps as far as I was concerned. It has always been my position that we must widen the 3 bridge corridor, get the water past Burlington and get rid of it before it gets to Mt. Vernon. I have even asked Corps personnel about this proposal and have always been told that we would have to design the levee system in the Avon area to fail in order for it to work. If the current amount of storage and the current level of protection was in place since 1921 (and possibly back to 1900 if you feel that the Stewart figures are wrong) we would have only had to dump water onto the floodplain once and possibly twice in the last 87 years. Now we are being told that it would have to be designed to begin passing floodwaters in a 5 year event. Clearly that would not work. Again, I ask for the documentation to support that hypothesis.
20	<u>Measure #'s 28, 31-36</u> : Ring dikes not favored because of safety issues. "Creates bathtub effect." Could create induced flooding.	I think the Corps is right on point on this issue. Ring dikes are a disaster waiting to happen. Yes, they can protect you from small flood events up to a 100 year flood but when they fail or when you have a 250 year event they will create an even greater disaster than if you had no levees at all. Levees in general create a terrible sense of false security.
21	<u>Measures #28, 29</u> : Sedro-Woolley Sewage Treatment Plant, "not sure ring dike is needed."	Really?? After 13 years and 10 million dollars we still don't even know if a simple ring dike around the sewage treatment plant is needed? I'm sorry but that is a terrible tribute to us spending a lot of money and having little if anything to show for it.
22	<u>Measures #30</u> : Ring dike for United General. Issue ingress and egress.	Wouldn't the bath tub effect like in #15 above be the major concern.
23	<u>Measure #26</u> : No federal funds can be used as a matching fund for moving Hamilton.	Is that just Corps federal funds or is that FEMA funds as well? So where is the funding for moving Hamilton going to come from?
24	<u>General Comment</u> : "Corps has no authority to tell locals that they can't build flood control structures."	Really? That's not what was just reported in the Sacramento Bee August 21, 2008: "Stein Buer, SAFCA executive director, said the main reason for the delay is a 2006 federal policy change requiring any physical change in an urban levee to be approved by officials at U.S. Army Corps of Engineers headquarters in Washington, D.C. This policy's effect on Natomas, he said, only recently became clear."
25	<u>Measure #27</u> : Corps will not deal with debris management.	Once again a federal decision that makes no sense. Structures built in the floodway; in the river channel itself (i.e. bridge abutments) that collect debris which can in some situations redirect flood waters into flood control structures, thus giving them less stability and possibly cause the destruction of the structure, and the Corps will not deal with that? Absurdity never had a finer hour.
26	<u>General Comment</u>	Absent from any of the Corps 38 projects is an emergency plan to widen the 3 bridge corridor in order to get the water past the City of Burlington and get rid of it before it gets to Mt. Vernon. This concept has been talked about at several Skagit County Flood Control Meetings in the past and was a major part of my "Plan B" proposal to the County Commissioners. I am curious as to why the Corps never pursued this kind of proposal. I'm not talking about building a by-pass. I'm talking about releasing the water out onto the floodplain where Mother Nature is trying to put it. If we had over the last 84 years the current level of storage behind the dams, and the current levee system, we would only have had to dump the water on one and at the most, two occasions. Yes, it would create a terrible inconvenience and some mitigation would be required, but would probably be very cost effective, would preserve the farmland, get rid of the floodway designation for Burlington and Mt. Vernon, and would be more fish friendly than doing nothing. Why is this not one of the Corps projects that have been analyzed to date?

12

Corps' Measures Workshop Public Comment Sheet

August 18th, 2008

Name: Ric Boge		Phone:
Address:		
Email address:		
Measure number and name from Table 1.	Comment:	
1, 2 and 3 - dam storage	Negotiate earlier drawdown to flood pool levels in recognition of recent flood events, some significant, in October	
4 - Nookachamps storage	Bad idea! Continue to utilize it as a natural flood storage area with strict landuse regulations accordingly.	
5 - Hart slough storage	Bad idea! Continue to utilize it as a natural flood storage area with strict landuse regulations accordingly.	
6 - Steerling levee	Through landuse controls (ie. floodway), maintain the ability for this area to be a release point for flood water that can not make it through the multi-bridge corridor, including events that exceed 100-year.	
7, 10 & 13 - Setback levees	Good idea! Widen the channel to best protect the urban areas by increasing conveyance to get more flood water through the system, more quickly no matter if it's a 10-year event, or a 250-year event.	
8 - Multi-bridge corridor setback levees	Good idea! Widen the channel to best protect urban areas by increasing conveyance to get more flood water through the system, more quickly no matter if it's a 10-year event or a 250-year event. Work with DOT on replacing the I-5 bridge and find ways for the RR to cooperate in the replacement of its bridge.	
9 - Overtopping levees	Good idea to consider with Dike Districts so willing.	
11, 14 & 15 - Improve existing levees	Good idea where setbacks are not feasible.	
12 - Setback levees with excavation	Bad idea!	
16 - MV floodwall	Bad idea without a well developed education/evacuation plan to go with it. Concern is with what happens to people and property protected by the wall when it suffers a structural failure and/or is breached by a greater than a 100-year event.	
17 - Avon bypass	Not feasible. Real estate costs, and affected landowner and environmental concerns put it out of reach for this community.	
18 - Fir Island bypass	Good idea! Increasing conveyance at the outlet will help get more flood water through the system, more quickly no matter if it's a 10-year event, or a 250-year event. Work with affected landowners on design.	
19 - Samish bypass	Not feasible. Real estate costs, and affected landowner and environmental concerns put it out of reach for this community.	
20 - MV bypass	Idea to consider because increasing conveyance will best protect the urban areas by getting more water through the system, more quickly if it's a 10-year event or a 250-year event.	
22 - Cockreham island restoration	Good idea!	
23 - Estuarine restoration projects	Good idea!	
24 - Riparian restoration projects	Only where levees are not key to flood protection.	
25 - Non-structural measures	Good idea, especially in the floodway and for establishing evacuation routes, including for floods greater than 100-year.	
26 - Hamilton	Good idea!	
27 - Debris management	Good idea! Debris buildup has potential to cause catastrophic failure of flood protection, despite the level of protection.	
28-37 - Ring Dikes	Idea to be considered when used to protect infrastructure, but bad idea when used to protect people without well developed education/evacuation plan. Concern is with what happens to people and how do they escape when the ring dike suffers a structural failure and/or is breached by a greater than a 100-year event.	
General	I advocate spending time and money to first, improve conveyance before 2nd, improving upstream storage and higher levees because, when the Skagit gets hit with a flood event that exceeds 100-year, we want assurance the water is getting out to the bay as quickly as possible. We should develop and maintain a safe, efficient conveyance system that will minimize risk, especially to the urban areas from upstream storage failures or levee failures when we are hit with events exceeding 100-year.	

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September 22, 2008

Attn: Lorna Ellestad
Skagit County Dept. of Public Works
1800 Continental Place
Mount Vernon, WA 98273

**Re: Our Client: Skagit County Dike, Drainage, and Irrigation
Improvement District No. 12**
**Matter: Public Comments by Dike District re: Army Corps
of Engineers Measures Workshop/Skagit River Flood
Damage Reduction Study**

Dear Lorna:

We represent Skagit County Dike, Drainage, and Irrigation Improvement District No. 12. This is a special purpose district responsible for diking and drainage within its district, under RCW 85, and 86. The following are comments for Dike District No. 12 regarding the recent Army Corps of Engineers Measures Workshop on August 18, 2008, and relating to the Skagit River Flood Damage Reduction Study.

Dike District No. 12 is responsible for managing diking, drainage and irrigation in its district in portions of unincorporated Skagit County, and provides protection for the entire City of Burlington, and substantial outlying areas in Skagit County. Dike District No. 12 has statutory duties and powers, under RCW 85 and RCW 86, which includes a vital interest in flood control and flood protection for public health and safety, and the protection of hundreds of millions of dollars of property value and over 110,000 residents in Skagit County. The District also deals with water quality issues, debris in the river, and issues relating to river contamination, erosion, water quality, fish habitat, and numerous other environmental issues relating to water quality in connection with maintenance and improvement projects.

Prior to making comments below, regarding the various options for projects and measures, the District would comment on the overriding G.I., or General Investigation process, relating to the projects and measures. Any options or measures for construction must first be analyzed and be found acceptable in the G.I. process for ultimate project improvement. However, this G.I. process has been shown to be fundamentally flawed, in its implementation, and with questionable future benefit in terms of projects, timing, and funding.

By way of background, the G.I. study process has been ongoing now since approximately 1993. The process has been long, slow, and uncertain in terms of practical effects on future projects. It is projected that a project may be approved under the study by 2012, and there may be construction by 2014. It is felt by a number of the Districts and local entities that this is very optimistic, and unlikely to occur.

It should be noted that this study has gone on for many years, and over a decade, and in excess of \$10 million has been spent on the study. After a project is approved at the end of the G.I. study, then federal funding will be needed to construct the project, along with a passage of a WRDA by Congress, in addition to other requirements, such as an ACOE Chiefs Report, after a thorough analysis of various factors by ACOE.

Any future approval is contingent upon funding by Congress, for both the study and projects and construction. Congressional funding has been very tight, and funding was halted in 2008, and has resumed, but continued funding is uncertain in the future. Local funding has been made on an annual basis, which has been very expensive, and with future anticipated funding difficulties, just to keep the G.I. process and study ongoing. Funding clearly will be a continuing and future problem, given the severe uncertainties in the U.S. economy and Congressional authorizations.

In addition, other issues need to be resolved, including battles with local entities and FEMA regarding the accuracy of hydrology, with local engineering and hydrology at odds with historical engineering and hydrology, including USGS hydrology, FEMA's utilization of hydrology, and the Army Corps' adoption of historical hydrology which is disputed by local entities. It is felt that concerns regarding the accuracy of hydrology need to be addressed prior to measures and projects, since the hydrology may very well have an effect on the viability and rating of future projects.

In addition, in the G.I. study process, the Corps has adopted a more restrictive analysis of projects, which not only look at technical and engineering aspects of projects, but also must analyze issues relating to environmental and ecosystem factors, Tribal, cultural and social issues, feasibility of projects, and the economic benefits of projects. This analysis culminates in arriving at a benefit-cost ratio, taking into consideration the cost of projects, and the ultimate effects and benefits to the community. Accordingly, protection of cities may receive a higher benefit, than protection of farmland, or vacant land, which may possibly reduce flood plains and encourage development in flood-prone areas.

In addition, ring dikes around cities may not be favored, because upon breach of the ring dike, residents may be prevented from escape from flood hazard, and it may concentrate damage and danger in populated areas. The result is that, based on the criteria, and myriad of factors which must be considered in the G.I. study, that there may be a flood of factors to be considered, some relevant to flooding, and some not, which may result in a form of analysis-paralysis. This results in a loss of focus on what is important for protection of life and property from flooding,

and the requirement that so many issues be analyzed that very few projects could ultimately meet the test of acceptance under the G.I. process.

It is noteworthy that because of the reduction of available funding, that there must be a benefit-cost relationship of one-to-one (1:1) in order to be accepted. This is a very high hurdle to attain, and it is noteworthy that, thus far, there apparently have been no measures or projects which have qualified for such a high benefit-cost ratio. Given the significant analysis, the stringent process for considering various factors, the environmental and other unrelated issues which must be considered, the length of time for the study, the near-prohibitive benefit-cost threshold, the lack of funding, the competition between measures, and the sheer complexity of the process, a number of local entities are very pessimistic about the productive results, if any, from the G.I. study, if and when it is ever completed, and approval of projects.

As a related matter, at the presentation, the ACOE did specify certain projects that could be favored, including setback levees in various Districts. This could provide beneficial flood control, with the possibility that these projects could be improved, given that new levees would be constructed on the landward side of the existing levees, and not affecting water or aquatic resources, do have a high benefit-cost potential, and may be less expensive and with a greater likelihood of permitting. Setback levees could be possible and beneficial in Dike Districts such as Dike District No. 1, Dike District No. 12, and Dike District No. 17, which have areas in which setback levees may be appropriate.

Also, in the presentation, there was reference to the Corps' desire to engage in and consider projects which had county-wide benefits, and presumably, projects which would not be single, stand-alone projects, but would be projects which could be undertaken in contiguous Districts along the length of the Skagit River. In this regard, rather than single, stand-alone projects, it may be that Districts could combine together for projects, including setback levees, which could transition from one District to another contiguous District, to provide larger areas of flood control for the protection of populated and municipal areas.

This would also give consideration and potential solution to problems where one District provides a project which has an effect on downstream Districts. Coordination of these types of activities would seem to be a better utilization of funding and proposed projects, due to the coordination of Districts upstream and downstream. There may be a higher benefit-cost ratio in larger projects which provide larger benefit, as opposed to projects which are stand-alone and piecemeal. A consortium, or partnership of a number of Dike Districts, could be beneficial and a productive vehicle to employ cooperative efforts to partner with the ACOE to provide larger projects through contiguous Districts and enhance overall, and comprehensive, county-wide flood control.

In reference to general comments addressing the specific flood control measures, Dike District No. 12 would make the following comments:

MEASURE NO./NAME	COMMENTS
1. Upper/Lower Baker Dams	These need to be operated to provide more flood storage ahead of/during floods-starting in October of each flood season. Upper Baker needs to have additional storage up to the original 100,000 acre feet in the old license agreement.
2. Lower Baker Dam	Same as No. 1. ACOE needs to exercise discretion in allowing an additional 29,000 acre feet of storage as provided in the PSE/FERC relicensing process under Article 107.
3. Ross Dam	Additional storage is needed, and to operate the Gorge/Diablo area to maximize efficiency to prevent adding additional flood flows to the river.
4. Nookachamps Storage	Nookachamps storage as is, now works well. There are problems with this as designed now.
5. Hart's Slough	Same as above.
6. Sterling Levee	The District is looking into this option in conjunction with downstream improvements.
7. Levee Setbacks	River from BNSF Bridge to Skagit Bay needs more capacity, and setback along the entire system is needed. DD-12 embarked on setback plan after 1995 floods. The District started buying properties from boundary with DD-1 upstream to BNSF Bridge. To date, the District has invested over \$5,000,000.00 in property purchases and is moving ahead with plans for setback levees to provide 100-year protection to Burlington and maximum 8-year protection to rural areas.
8. Levee Setbacks/Three-bridge corridor only	Same as No. 7.
9. Overtopping Levee	District will not accept or allow overtopping of levees of anything less than the current protection level. Overtopping at the five-to-ten year flood event is not acceptable and would not protect life and property.
10. Mainstem/North Fork	Even with setbacks only in some areas all levees would need to be worked on in the system.
11. Improve Existing Levees:	DD-12 has been working on this for the last 11 years and has done the area from BNSF bridge upstream to Gardner Rd. boat launch and at Lafayette Rd. (Strawberry Point) with a small stretch from Lafayette to Gardner Rd. left to be done. District is working on now). Levee has been widened from 15' top 2:1 backslope to as much as 50' with 18.9:1 backslope at Burlington sewer plant and 80' top and 8:1+1 at Lafayette Rd. (Strawberry Point). District has been proactive in this area of maintaining and improving the structural integrity of its levee, and will continue to do so in the future.

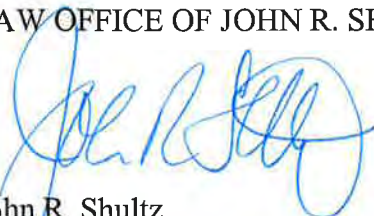
12. Setback with Excavation	This measure is unacceptable.
13. Setback Levees	This would be a good proposal.
14. Improve Existing Levees	A good proposal. The entire system would need to be done on both sides of the river. This would provide 100-year flood protection for urban areas and 80-year maximum rural areas so as to not violate Executive Order 11988. Improvement of current levees would not cause significant impacts or environmental impact and mitigation would not be needed. Also, an overall system plan would mitigate impacts on downstream Districts from upstream projects and would provide a coordinated effort and beneficial project for flood control.
15. Improve Existing Levees/Right Bank	Same as No. 14.
16. Mount Vernon Flood Wall	This would be beneficial and long overdue.
17. Swinomish Bypass	This is not a beneficial measure. There should be no recreational or environmental features. This would have to be a dry system that remains in Ag land and not flooded and five-to-ten year event-nothing less than what protection is now as far as DD-12 is concerned. This is not acceptable.
18. Fir Island Bypass	Why not consider a North Fork setback instead, which would be a better proposal.
19. Samish Bypass	This would be a beneficial measure, which would take water away above the cities and take care of the Samish River flooding. Arguments about mixing fish species is nonsense, as all fish swim in the same ocean and come back to their respective rivers, adding genetic diversity to runs. Misguided environmental policies should not stop a good flood protection proposal.
20. Mount Vernon Bypass	This would be acceptable if done as dry channel with control structures (inlet/outlet) and farming to be allowed in the meantime.
21. City Ring Dike	This is a good alternative if done right. DD-12 is working with Burlington, has tried to work with United General Hospital, and S.W. sewer plant. Critical facilities such as hospitals, water/sewer plants need higher level of protection.
22. Cockerham Island	Should not remove levee segment that protects Hwy. 20.
23. Estuary Restoration	Not acceptable.
24. Riparian Restoration	Not acceptable.
25. Nonstructural Measures	This should be done anyway.
26. Hamilton Relocation	This is long overdue. It should finally be done.

27. Debris Management	This cannot effectively be done unless we do No. 28. Both measures should be done.
28. Sedro-Woolley Ring Dike	Sedro-Woolley needs a dike along the river in the low areas.
29. Sedro-Woolley Sewage Treatment Plant Ring Dike	This project should be done for the protection of life and property.
30. Sedro-Woolley Hospital Ring Dike	UGH needs to be done. Attempts were made to get the hospital to start this when building a new building. Even though hospital would have to be evacuated if flood was large enough, this was done in 2003 as a precaution with no problems.
31. Burlington Ring Dike	DD-12 is working with the City of Burlington on this measure, and certification of the levees.
32. North Mount Vernon Ring Dike	This measure needs to be done.
33. West Mount Vernon	N/A
34. East Mount Vernon Ring Dike	N/A
35. LaComer Ring Dike	N/A
36. Clear Lake Ring Dike	N/A
37. Anacortes Water Treatment Ring Dike	This would be an acceptable measure.

We would hope that the above information and comments will be useful and will assist you in your current G.I. Study process. Please contact our office, or the respective Commissioners of Skagit County Dike, Drainage and Irrigation Improvement District No. 12 in reference to further information or questions regarding the above.

Very truly yours,

LAW OFFICE OF JOHN R. SHULTZ



John R. Shultz
JRS:maf
cc: clients

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September 22, 2008

Attn: Lorna Ellestad
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1800 Continental Place
Mount Vernon, WA 98273

Re: **Our Client:** Skagit County Dike District No. 1
Matter: Public Comments by Dike District re: Army Corps
of Engineers Measures Workshop/Skagit River Flood
Damage Reduction Study

Dear Lorna:

We represent Skagit County Dike District No. 1. The District is a special purpose district under RCW 85, located in Skagit County, Washington. The following are comments for Dike District No. 1 regarding the recent Army Corps of Engineers Measures Workshop on August 18, 2008, and relating to the Skagit River Flood Damage Reduction Study.

Dike District No. 1 is responsible for managing diking, and flood protection from downtown Mount Vernon on the right bank of the Skagit River, and West to the Town of LaConner, and including outlying areas in Skagit County. Dike District No. 1 has statutory duties and powers, under RCW 85 and RCW 86, which includes a vital interest in flood control and flood protection for public health and safety, and the protection of hundreds of millions of dollars of property value and over 110,000 residents in Skagit County. The District also deals with water quality issues, debris in the river, and issues relating to river contamination, erosion, water quality, fish habitat, and numerous other environmental issues relating to water quality in connection with maintenance and improvement projects.

Prior to making comments below, regarding the various options for projects and measures, the District would comment on the overriding G.I., or General Investigation process, relating to the projects and measures. Any options or measures for construction must first be analyzed and be found acceptable in the G.I. process for ultimate project improvement. However, this G.I. process has been shown to be fundamentally flawed, in its implementation, and with questionable future benefit in terms of projects, timing, and funding.

By way of background, the G.I. study process has been ongoing now since approximately 1993. The process has been long, slow, and uncertain in terms of practical effects on future projects. It is projected that a project may be approved under the study by 2012, and there may be construction by 2014. It is felt by a number of the Districts and local entities that this is very optimistic, and unlikely to occur.

It should be noted that this study has gone on for many years, and over a decade, and in excess of \$10 million has been spent on the study. After a project is approved at the end of the G.I. study, then federal funding will be needed to construct the project, along with a passage of a WRDA by Congress, in addition to other requirements, such as an ACOE Chiefs Report, after a thorough analysis of various factors by ACOE.

Any future approval is contingent upon funding by Congress, for both the study and projects and construction. Congressional funding has been very tight, and funding was halted in 2008, and has resumed, but continued funding is uncertain in the future. Local funding has been made on an annual basis, which has been very expensive, and with future anticipated funding difficulties, just to keep the G.I. process and study ongoing. Funding clearly will be a continuing and future problem, given the severe uncertainties in the U.S. economy and Congressional authorizations.

In addition, other issues need to be resolved, including battles with local entities and FEMA regarding the accuracy of hydrology, with local engineering and hydrology at odds with historical engineering and hydrology, including USGS hydrology, FEMA's utilization of hydrology, and the Army Corps' adoption of historical hydrology which is disputed by local entities. It is felt that concerns regarding the accuracy of hydrology need to be addressed prior to measures and projects, since the hydrology may very well have an effect on the viability and rating of future projects.

In addition, in the G.I. study process, the Corps has adopted a more restrictive analysis of projects, which not only look at technical and engineering aspects of projects, but also must analyze issues relating to environmental and ecosystem factors, Tribal, cultural and social issues, feasibility of projects, and the economic benefits of projects. This analysis culminates in arriving at a benefit-cost ratio, taking into consideration the cost of projects, and the ultimate effects and benefits to the community. Accordingly, protection of cities may receive a higher benefit, than protection of farmland, or vacant land, which may possibly reduce flood plains and encourage development in flood-prone areas.

In addition, ring dikes around cities may not be favored, because upon breach of the ring dike, residents may be prevented from escape from flood hazard, and it may concentrate damage and danger in populated areas. The result is that, based on the criteria, and myriad of factors which must be considered in the G.I. study, that there may be a flood of factors to be considered, some relevant to flooding, and some not, which may result in a form of analysis-paralysis. This results in a loss of focus on what is important for protection of life and property from flooding,

and the requirement that so many issues be analyzed that very few projects could ultimately meet the test of acceptance under the G.I. process.

It is noteworthy that because of the reduction of available funding, that there must be a benefit-cost relationship of one-to-one (1:1) in order to be accepted. This is a very high hurdle to attain, and it is noteworthy that, thus far, there apparently have been no measures or projects which have qualified for such a high benefit-cost ratio. Given the significant analysis, the stringent process for considering various factors, the environmental and other unrelated issues which must be considered, the length of time for the study, the near-prohibitive benefit-cost threshold, the lack of funding, the competition between measures, and the sheer complexity of the process, a number of local entities are very pessimistic about the productive results, if any, from the G.I. study, if and when it is ever completed, and approval of projects.

As a related matter, at the presentation, the ACOE did specify certain projects that could be favored, including setback levees in various Districts. This could provide beneficial flood control, with the possibility that these projects could be improved, given that new levees would be constructed on the landward side of the existing levees, and not affecting water or aquatic resources, do have a high benefit-cost potential, and may be less expensive and with a greater likelihood of permitting. Setback levees could be possible and beneficial in Dike Districts such as Dike District No. 1, Dike District No. 12, and Dike District No. 17, which have areas in which setback levees may be appropriate.

Also, in the presentation, there was reference to the Corps' desire to engage in and consider projects which had county-wide benefits, and presumably, projects which would not be single, stand-alone projects, but would be projects which could be undertaken in contiguous Districts along the length of the Skagit River. In this regard, rather than single, stand-alone projects, it may be that Districts could combine together for projects, including setback levees, which could transition from one District to another contiguous District, to provide larger areas of flood control for the protection of populated and municipal areas.

This would also give consideration and potential solution to problems where one District provides a project which has an effect on downstream Districts. Coordination of these types of activities would seem to be a better utilization of funding and proposed projects, due to the coordination of Districts upstream and downstream. There may be a higher benefit-cost ratio in larger projects which provide larger benefit, as opposed to projects which are stand-alone and piecemeal. A consortium, or partnership of a number of Dike Districts, could be beneficial and a productive vehicle to employ cooperative efforts to partner with the ACOE to provide larger projects through contiguous Districts and enhance overall, and comprehensive, county-wide flood control.

In reference to general comments addressing the specific flood control measures, Dike District No. 1 would make the following comments:

MEASURE NO./NAME	COMMENTS
1. Upper/Lower Baker Dams	These need to be operated to provide more flood storage ahead of/during floods-starting in October of each flood season. Upper Baker needs to have additional storage up to the original 100,000 acre feet in the old license agreement.
2. Lower Baker Dam	Same as No. 1. ACOE needs to exercise discretion in allowing an additional 29,000 acre feet of storage as provided in the PSE/FERC relicensing process under Article 107.
3. Ross Dam	Additional storage is needed, and to operate the Gorge/Diablo area to maximize efficiency to prevent adding additional flood flows to the river.
4. Nookachamps Storage	Nookachamps storage as is, now works well. There are problems with this as designed now. The District is concerned that any measures or projects upstream need to give consideration to possible increased river flows and velocity of flooding which may result in impacts to DD-1 and its levees.
5. Hart's Slough	Same as above.
6. Sterling Levee	The District is looking into this option in conjunction with downstream improvements. The District is concerned that any measures or projects upstream need to give consideration to possible increased river flows and velocity of flooding which may result in impacts to DD-1 and its levees.
7. Levee Setbacks	The District would like to look at setback levees and the possibility of future projects. The District has already purchased property on the water side of the levee, and it may be possible to purchase additional property for setback levees. A three-bridge, or four-bridge corridor project, which could be undertaken with several Districts or a partnership, would be a possible beneficial project to coordinate Districts, and deal with upstream and downstream flows, and to provide a county-wide project which would not involve stand-alone or piecemeal projects. The District is concerned that any measures or projects upstream need to give consideration to possible increased river flows and velocity of flooding which may result in impacts to DD-1 and its levees.
8. Levee Setback/three-bridge corridor only	Same as No. 7
9. Overtopping Levee	District will not accept or allow overtopping of levees of anything less than the current protection level. Overtopping at the five-to-ten year

	flood event is not acceptable and would not protect life and property.
10. Mainstem/North Fork	Even with setbacks only in some areas all levees would need to be worked on in the system.
11. Improve Existing Levees	Dike District No. 1 has been working for a number of years in constantly improving its levees. DD-1 has engaged in several seepage berm projects, and also has installed prior keyway-for levee improvements. District has been proactive in the area of maintaining and improving the structural integrity of its levees, and will continue to do so in the future. The District is concerned that any measures or projects upstream need to give consideration to possible increased river flows and velocity of flooding which may result in impacts to DD-1 and its levees.
12. Setback with Excavation	This measure is unacceptable.
13. Setback Levees	This would be a good proposal.
14. Improve Existing Levees	A good proposal. The entire system would need to be done on both sides of the river. This would provide 100-year flood protection for urban areas and 80-year maximum rural areas so as to not violate Executive Order 11988. Improvement of current levees would not cause significant impacts or environmental impact and mitigation would not be needed. Also, an overall system plan would mitigate impacts on downstream Districts from upstream projects and would provide a coordinated effort and beneficial project for flood control.
15. Improve Existing Levees/Right Bank	Same as No. 14.
16. Mount Vernon Flood Wall	This would be beneficial, but should also consider and coordinate impacts on downstream Districts.
17. Swinomish Bypass	N/A
18. Fir Island Bypass	N/A
19. Samish Bypass	This would be a beneficial measure, which would take water away above the cities and take care of the Samish River flooding.
20. Mount Vernon Bypass	This would be acceptable if done as dry channel with control structures (inlet/outlet) and farming to be allowed in the meantime.
21. City Ring Dike	This is a good alternative if done right. DD-1 is working with Burlington, has tried to work with United General Hospital, and S.W. sewer plant. Critical facilities such as hospitals, water/sewer plants need higher level of protection. Also, an overall system plan would mitigate impacts on downstream Districts from upstream projects and would provide a coordinated effort and beneficial project for flood control.
22. Cockerham Island	Should not remove levee segment that protects Hwy. 20.
23. Estuary Restoration	Not acceptable.

24. Riparian Restoration	Not acceptable.
25. Nonstructural Measures	This should be done anyway.
26. Hamilton Relocation	This is long overdue. It should finally be done.
27. Debris Management	This cannot effectively be done unless we do No. 28. Both measures should be done.
28. Sedro-Woolley Ring Dike	Sedro-Woolley needs a dike along the river in the low areas.
29. Sedro-Woolley Sewage Treatment Plant Ring Dike	This project should be done for the protection of life and property.
30. Sedro-Woolley Hospital Ring Dike	UGH needs to be done. Attempts were made to get the hospital to start this when building a new building. Even though hospital would have to be evacuated if flood was large enough, this was done in 2003 as a precaution with no problems.
31. Burlington Ring Dike	N/A. Also, an overall system plan would mitigate impacts on downstream Districts from upstream projects and would provide a coordinated effort and beneficial project for flood control. The District is concerned that any measures or projects upstream need to give consideration to possible increased river flows and velocity of flooding which may result in impacts to DD-1 and its levees.
32. North Mount Vernon Ring Dike	This project needs to be done. Also, an overall system plan would mitigate impacts on downstream Districts from upstream projects and would provide a coordinated effort and beneficial project for flood control.
33. West Mount Vernon	This measure would not be needed if a bypass is provided in West Mount Vernon, or setback levees in that area are constructed. Otherwise, this would be an acceptable proposal.
34. East Mount Vernon Ring Dike	An overall system plan would mitigate impacts on downstream Districts from upstream projects and would provide a coordinated effort and beneficial project for flood control.
35. LaConner Ring Dike	N/A
36. Clear Lake Ring Dike	N/A
37. Anacortes Water Treatment Ring Dike	This would be an acceptable measure.

Lorna Ellestad
September 22, 2008
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We would hope that the above information and comments will be useful and will assist you in your current G.I. Study process. Please contact our office, or the respective Commissioners of Skagit County Dike District No. 1 in reference to further information or questions regarding the above.

Very truly yours,

LAW OFFICE OF JOHN R. SHULTZ



John R. Shultz
JRS:maf
cc: clients

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SEP 26 2008
SKAGIT COUNTY
PUBLIC WORKS ADMIN

Rosario Geoscience Associates

13695
104 Harbor Lane • Anacortes, WA 98221 • (360) 293-7023
293-0572 FAX

9-25-08

TO: Lorna Ellestad
Skagit County Public Works
1800 Continental Place
Mount Vernon, WA 98273

FROM: Ross O. Barnes, Ph.D.

RE: COMMENTS ON CORPS OF ENGINEERS SKAGIT GI MEASURES - FLOOD HAZARD REDUCTION

The new policy restrictions on Corps of Engineers flood control projects are designed to restrict or prevent the types of "blindered vision" and negative consequences that characterize much of the historical flood control projects in this country, such as untrammelled development within floodplains. Thus, the new Corps policies move flood hazard reduction into new and potentially more productive directions. Historical thinking and ideas on flood control in the Skagit Valley need to be set aside so that a new and more creative comprehensive solution can be developed from the numerous options available, many of which were presented in the GI study.

SETBACK LEVEES IN GENERAL

Comment: A continuous levee setback program from Burlington to Skagit Bay appears cost prohibitive and would encourage floodplain development. However, levee setbacks targeted to specific locations might be useful in a comprehensive package of floodway improvements including urban ring dikes and bypass channels.

MEASURES 18 AND 20 - FIR ISLAND AND MOUNT VERNON BYPASSES

Comment: Adding additional flow channels to Skagit Bay would move the current one to two channel system more in the direction of the natural condition of multiple flood flow channels through the floodplain and delta and, if properly designed, would add additional "slough" wildlife habitat.

However, artificial flow channels will be subject to sedimentation and erosion as the flood flows seek to create their own channel that is in dynamic three dimensional balance with the new flow hydraulics. Channel instability in the bypass will be increased because the entry weir at the Skagit River blocks sediment bed load transport into the bypass.

Also, because water flow but not bed load is diverted out of the current Skagit River channel, the existing river channels

9-25-08

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will be subject to additional sedimentation from reduced sediment transport capacity--a potentially serious problem in maintaining total hydraulic capacity. In other words, you increase channel capacity with a bypass and find that increase is at least partially negated by additional sediment buildup in the original channel. It is difficult to defeat the river's natural balance between water flow, sediment transport, and channel capacity.

MEASURES 8, 38 and 39 - THREE BRIDGE CORRIDOR

Comment: Obviously, significantly increasing floodway capacity in the three bridge corridor cannot be implemented before flood protection is increased downstream because opening up the three bridge corridor will pour more and higher water downstream.

MEASURE 17 - NORTH SWINOMISH DIVERSION: AVON BYPASS

Comment: Sedimentation and erosion in the Swinomish Marine Navigation Channel could be catastrophic with every bypass flood, destroying the navigation function of this artificially maintained marine waterway for which the Corps assumes responsibility. A new artificial floodway channel passing through or over easily eroded floodplain silts would be dynamically unstable unless totally armored. An armored channel would defeat the environmental benefits proposed for this flood bypass area and greatly increase construction and maintenance costs.

Flood flows in the new diversion channel would develop their own three dimensional velocity structure and seek to carve through the floodway silts a natural channel in dynamic balance with the flow hydraulics and channel gradient. The weir structure at the Skagit River would block bed load transfer from the Skagit River to the bypass channel. Lack of a channel stabilizing bed load would lead to increased channel erosion and instability. The new channel might "try to create its own channel stabilizing bed load" by eroding buried channel gravels from the floodplain.

Because of floodway channel erosion and deposition discussed above, the sediment load reaching the Swinomish Channel would be very different in composition and volume from the suspended sediment load entering the bypass channel from the Skagit River.

Because the Swinomish Marine Navigation Channel has different hydraulic characteristics than the new flood bypass channel (including essentially zero channel gradient) and contains salt water, sediment bed and suspended loads would readjust when the flood flow reached the Swinomish Channel, leading to deposition and erosion in this artificially maintained navigation channel. The probable result would be the destruction of the navigability of the Swinomish Channel as it would now become part of a floodway system with totally different hydraulics than a dredged marine navigation channel.

9-25-08

(3)

There is major buried infrastructure in the bypass area that would need to be relocated or erosion proofed at great expense--three water transmission lines to Fidalgo Island, smaller water line to La Conner (and a gas pipeline?).

MEASURE 31 - BURLINGTON RING DIKE

Comment: The listed construction cost of \$10.9 million is absurdly low and the B/C ratio correspondingly too high.

The Burlington ring dike would block at least one major floodplain flow channel--Gage's Slough. The large floodplain obstruction of the ring dike itself and the blockage of Gage's Slough would raise flood elevations elsewhere in the floodplain. However, this floodplain obstruction might be mitigated by flow capacity improvements within the floodway.

A Burlington ring dike would need an evacuation plan and/or other public safety measures--for instance the substantial "Burlington Hill" would be accessible from within the ring dike. I believe that a creative solution can be found to the public safety issue, but this is not the time or place for that discussion.

A Burlington ring dike would have the effect of limiting the future expansion of Burlington in the rural floodplain area--a positive effect floodwise. Burlington's urban growth would not be stopped but just directed upward rather than outward which is the goal of the Growth Management Act. A Burlington ring dike could thus be a neat solution to two dilemmas: flood protection and limiting urban expansion in the floodplain.

MEASURES 32, 33 AND 34 - MOUNT VERNON RING DIKE

Comment: The Mount Vernon floodplain backs up against a hill (except for West Mount Vernon) so it would not be isolated in the floodplain like Burlington. West Mount Vernon might need an evacuation plan since the 536 bridge cannot be guaranteed safe or available in a major flood.

A Mount Vernon ring dike would limit the future expansion of Mount Vernon into the rural floodplain area--a positive effect floodwise.

URBAN RING DIKES IN GENERAL

The Burlington and Mount Vernon ring dikes have significant positive advantages in limiting or even prohibiting further urban expansion into the rural floodplain.

7-25-08

(4)

Perhaps the resulting elevation of flood levels in other areas could be mitigated through a comprehensive floodway improvement project that would increase floodway capacity in the three bridge corridor (MEASURES 7, 38, 39), the Mount Vernon and Fir Island bypasses (MEASURES 18 and 20), selective levee setbacks, etc.

Any areas of rural floodplain land that might be included within the ring dike because it is less expensive to put them inside than dike around them could be subject to inclusion in the "Farmland Legacy Program" or other permanent easement restricting urban development.

MEASURE 37 - ANACORTES WATER TREATMENT PLANT RING DIKE

Comment: A ring dike around the Anacortes water treatment plant would significantly block the floodway expansion area in any levee setback option for this area, thus reducing the effectiveness of the levee setback.

Ross O. Barnes.

Ph.D. Earth Science

September 24, 2008

Lorna Ellestad
1800 Continental Place
Mount Vernon, Wa 98273

Re: Public input on Flood Control

The long term solution for Skagit River flooding is to deepen and straighten same with Padilla Bay the ultimate confluence with salt water.

The Skagit County planning's ultimate goal is to flood the valley out, a permanent wetland if you will. The valley has enough grade to where if straightened and deepened to never flood again.



Homer Hughes
35023 Walders Road
Sedro-Woolley, Wa 98284
360-826-4526

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SEP 26 2008

SKAGIT COUNTY
PUBLIC WORKS ADMIN

Corps' Measures Workshop Public Comment Sheet

August 18th, 2008

Comments can be submitted in any of the following ways:

- 1) Mail written comments to Lorna Ellestad, 1800 Continental Place, Mount Vernon WA 98273.
- 2) Drop off written comments to Lorna Ellestad, 1800 Continental Place, Mount Vernon.
- 3) Email comments to: Lornae@co.skagit.wa.us
- 4) Email Lornae@co.skagit.wa.us, request an electronic comment form, complete the form and email it back.

Comments will be accepted until 4:00 pm September 30, 2008.

Name: <u>Ted Cook</u>	Phone: <u>336-2606</u>
Address: <u>314 E. Highland MV 98273</u>	
Email address:	

General comments are welcome. To direct a comment towards a specific measure, please identify the measure by the measure name and number as listed in Measure table 1.

Measure number and name from Table 1.	Comment:
	What is the economic value of keeping I-5 open during 100 yr. flood?
Option A:	Widen 3 bridges corridor
Option B:	Move water under I-5 to the North.
	I like looking at Joe Leary because (slough) it is deep in spots and already is contained by Bayview ridge on the left bank.

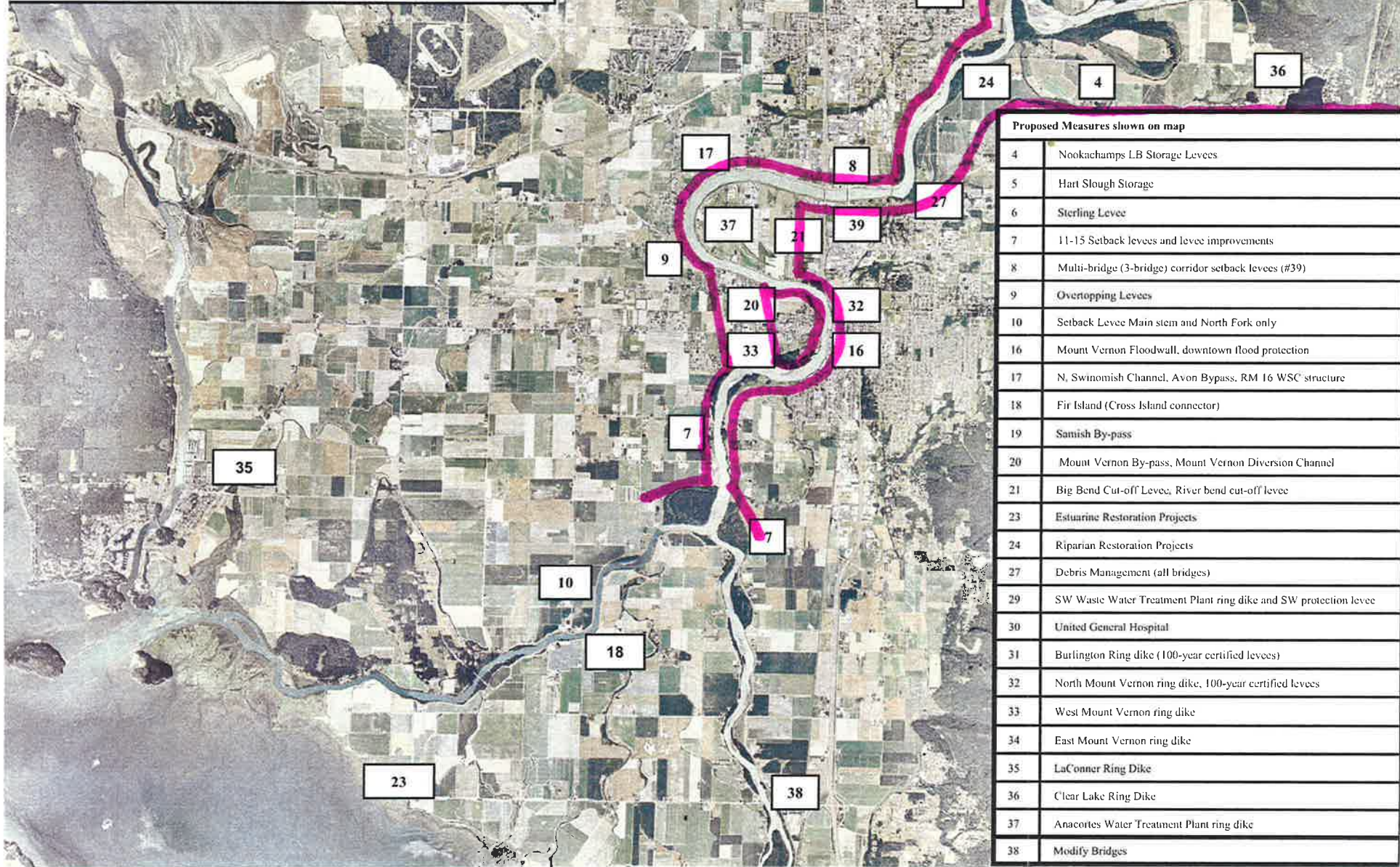
Skagit GI Measures

Lower Basin Site Map

(Complete list attached)

Joe Leary Bypass

**1,2& 3 Upriver Storage and
22, 25,& 26 Non-structural**



Corps' Measures Workshop Public Comment Sheet August 18th, 2008

Comments can be submitted in any of the following ways:

1) Mail written comments to Lorna Ellestad, 1800 Continental Place, Mount Vernon WA 98273.

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3) Email comments to:
Lornae@co.skagit.wa.us

4) Email Lornae@co.skagit.wa.us, request an electronic comment form, complete the form and email it back.

Comments will be accepted until 4:00 pm September 30, 2008.

Name: Robert A. Helton		
Address: 21032 Little Mountain Road Mount Vernon, WA 98274		
Email address: poetsmart@msn. com		
General comments are welcome. To direct a comment towards a specific measure, please identify the measure by the measure name and number as listed in Measure table 1.		

Measure number and name from Table 1.	Comment:	
Measure # 1 "Upper Baker Dam"	No realistic comments available to date on this BUT I'm sure politics will prevail.	
Measure # 2 "Lower Baker Dam"	See Measure #1 comments.	
Measure #3 "Ross Dam"	See Measure #1 comments	
Measure #4 "Nookachamps Storage"	<p>Larry Kunzler has reiterated many times, this works pretty well for a single flooding event BUT NOT FOR a so-called "Double Pumper". This is because you have to "drain the swamp" to have any effect on close time coupled follow on events.</p> <p>In addition I dispute the effectiveness of this proposal because of Global Warming and predicted local Climate Change effects. In all the PIE calculations and modeling they assumed that prior flooding peaks would resemble the historic ones. The latest Centralia flooding way exceeded all know prior flooding events and some considered it to maybe be a 500-yr event.</p> <p>The unregulated upper Cascade and Sauk-Suiattle River watersheds as well as the lower multitudinous creeks can supply a lot of flow during rainstorm events like in 2003. Much worse potentially; longer duration rainstorms and attendant flooding that I feel are sure to occur due to climate change will not be adequately "sopped up" by the proposed Nookachamps Basin storage - IT ISNT BIG ENOUGH" in my estimation.</p> <p>Several years ago in 2005 I gave an invited talk at the monthly meeting of the local Lions Club at the Cranberry Tree Restaurant. I'm attaching a copy of my presentation talk for</p>	

review as it still has an un-acted upon process to really understand what could happen in larger intensity/duration rainstorms.

Basically the model would provide a means to start at the Dalles and model the effects of various downstream conditional flows precipitated (pardon the pun) in upstream-unregulated watersheds.

The model even proposes in the extremes of various conditions that Lower Baker Dam and even Ross Dam get overtopped. Now these results get tied back to various rainfall intensities and durations of same to provide input to the hydrological models created by PIE and the ACOE to model what could happen downstream of Concrete.

Without consideration of these types of events, I believe the ACOE and others are on a "Fools' Mission" in not considering future climate change induced flooding conditions.

These climate change conditions are predicted to raise sea level (that's Puget Sound folks unless we provide dams and shipping locks across the Strait of Juan de Fuca and the Northern tip of Vancouver Island) and adversely changed rainfall patterns re flooding levels by 2070 or sooner. This severely begs the question of "What is the relevance of what we propose today for flood control going to be in terms of future protection say in 2070 - or potentially sooner?"

As I understand it right now, even the river mouths tidal effects aren't used for a flooding prediction because the predicted storm event temporal advances aren't known accurately enough.

If I were in charge of flooding mitigation and protection, I would want to know the answers to the following questions:

Measure #5 "Hart's Slough Storage"

1.
Under combinations of 2 feet higher static mean sea level/rise height and with current normal predicted Winter Season extreme tidal ranges and Dalles flows of 150,000, 200,000 250,000 and 300,000 cfs, what will it take to convey all that flow to Puget Sound without flooding any city primarily and secondarily current rural type areas in Skagit County?

2.
Backing away now from the potential selected "wish lists" of the measures, how well will the selected "Measure Set" perform under the above modeled conditions in terms of minimizing flooding hazard and resultant damages - and where in particular when the mitigation Measure ultimately fails?

3.
When can the USACOE perform the suggested simplified modeling and come down to the best (actually the worst flood flow0 conditions that can feasibly be built for flood protection (AND MAINTAINED forever or when sea level rise becomes too great and Burlington becomes a Dutch style low draft type seaport behind its' ring dike - in say possibly 200 to 500 years from now).

Of course I hope that sea level rate-of- rise tapers off and doesn't flood the current estuarine sea diked farmland to severely.

Since I don't currently believe that the Nookachamps storage is viable under projected Climate Change predicted events, this more limited storage is also deemed questionable in terms of

	<p>any "Just in Time" floodwater storage practicality.</p>
<p>Measure # 6 "Sterling Levee"</p>	<p>If this measure augments the total overall flooding mitigation solution problem effectiveness, I'm for it.</p>
<p>Measure # 7 "Levee Setback Downstream of 3-Bridge Corridor"</p>	<p>If the early settlers had had any unified sense of Hydrology they would have probably started their diking systems with more respect for the river flooding potential and originally constructed dikes in this manner "BUT THEY DIDN'T" and now we're back to the future.</p> <p>This unified/semi-integrated approach to conveyance has the best long-term approach and has the best utility in terms of Global Warming predicted attributes (rising sea level and more frequent intense rain storms and flooding - like what recently happened in the Centralia flooding).</p> <p>I have attached my comments on the topic of Sea Level Rise, which were originally provided to Mark Watkinson for the current County's "Natural Hazards Mitigation Plan" updating.</p> <p>When I raised the question about the effect of Global Warming and Climate change at the meeting, Linda Smith remarked that they were talking about this matter while driving up for the meeting. A member of her staff remarked that they "USACOE" were now working with the "U of W Climate Impacts Group. In their October 2005 report for the Puget Sound Action Team, the prediction of sea level rise on page 21 indicates a rise of roughly 0.5 meter by 2070 for the Seattle area.</p> <p>With this apparent knowledge a major question is "Since flood mitigation projects are to be</p>

designed for a 50-yr project life and construction work wont begin until 2012, how does the ACOE intend to originally design and then potentially construct the selected projects so as to maintain the 3-foot freeboard levee height throughout the ensuing 50 years?"

One obvious approach is to construct the setback levees with a wide enough base so that more height can be added as needed as sea level rises and still maintain stable frontal slopes as well as extended back slopes in case the setback levee is overtopped by an intense rainstorm event or combined snowmelt/rainstorm event.

This measure doesn't preclude the potential need for the Mount Vernon Bypass (Measure #20) nor the multi-bridge setback (Measure #8).

I have attached my suggestions to the City of Mount Vernon concerning the advantages of a West Mount Vernon bypass channel back on July 17, 2006 which was independent of any ACOE published comment at that time. The Final EIS noted that this suggestion wasn't all that fruitful re PI Engineering modeling basically due to current downstream conveyance constrictions.

A question here is would this proposed river reach section of levee setbacks constitute "The Floodway" and if so should it be even wider than 1000 feet plus the current river's breadth?

Measure # 8 "Levee Setback 3-Bridge Corridor Only"

Since 1) initial funding has become available to pursue this aspect of floodwater conveyance (and also "dynamic peak floodwater" storage) and 2) a probable phased plan has to start

	<p>somewhere; I don't understand the problem expressed in the ACOE Presentation "Likely worsens downstream flooding".</p> <p>Therefore I have some questions:</p> <ol style="list-style-type: none"> 1. What is the extent and base cause of the cited "worsens downstream flooding?" 2. When acting as a "full" dynamic storage pond and under potential adverse strong up valley Westerly wind conditions, it seems that this reach of the river could entertain a wind induced slope that would result in seiche conditions with a potential for dike overtopping conditions at the River Bend turn. If this is a credible condition, what needs to be done about it during the River bend 3-Bridge Corridor Setback Levee planning and construction? 3. Without solving the BNSF RR Bridge problem first, does corridor widening have much effect if serious debris management, as suggested in Measure #27 isn't achieved. Looking at the RR Bridge debris accumulation in Chal Martin's Sept. 15, 2008 presentation indicates the potential for more severe up-river flooding. I don't know if its been proposed yet, but and aerial cable supported "log picker/claw" could be installed along the river banks to start LWD removal during a flood with much minimized loss of life potential and real time conveyance restriction removal.
Measure #9 "Overtopping Levees"	I believe Linda Smith indicated that Corp Policy wouldn't support this measure so I guess its QED.

Measure # 10 "Levee Setback Mainstem and North Fork Only"	Why this instead of Measure #7 which has a predicted B/C of 1.0, which is much greater?
Measure # 11 "Improve Existing Levees"	<p>To get more safe floodwaters conveyance you can raise the dikes to increase channel depth or widen the effective channel width by setback existing height levees. From a pure levee stability viewpoint it takes more "dirt" to raise the dike than moving the same height dike back. However you have to take up some more land for the river to flow over. Under non-flooding conditions this riverward stream flow space could still be farmed for some crops with the proviso that the crops could get flooded out by inopportune rain/snowmelt.</p> <p>Since safety provided by the setback dike can be provided, the farmer needs compensation (flooding rights) for his increased risk of aerial flooding. My vote is for setback levees, which are safer in principle if properly maintained and NO on increasing levee height with its attendant wall of outward flowing water and perceived increased costs of maintenance and repair due to any levee section failures.</p>
Measure #12 "Setback Levees with Excavation"	I agree with Linda Smith that this isn't feasible.
Measure #13 ""Setback Levees - Entire System"	<p>We wouldn't need any levees if residential type people didn't want to live so close to the river in the first place. Going upstream/above Burlington with this process would cause more residential development and concurrent loss of floodable but viable farmland with its attendant home and outbuildings.</p> <p>Therefore NO or NO WAY on this measure.</p>

<p>Measure #14 "Improve Existing Levees -Right Bank"</p> <p style="text-align: center;">AND</p> <p>Measure #15 "Improve Existing levees - Left Bank"</p>	<p>Raising the levee heights decreases their stability re planned ahead broader based setback levees which could be potentially raised within future decades to counter the effects of climate change (higher sea level and larger and longer duration rainstorm effects).</p>
<p>Measure #16 "Mount Vernon Floodwall"</p> <p>Measure #17 "Swinomish Bypass"</p>	<p>As part of a total ring dike solution this might have some validity. Only the Corp and potentially the Courts can decide on this approach/measure.</p> <p>This measure has 1) all the same flood control advantages as it did 70 years ago when voters turned down a miniscule cost project compared to the current \$328 million plus cost and 2) "new age" environmental concerns.</p> <p>The decision to go with this measure will eventually revolve around values and negative environmental aspects versus the value of people and their properties that populated the floodplain thinking that they could suitably defeat the actions of nature.</p> <p>With climate change, this unforeseen problem back then now comes home in an amplified manner as to how to defeat sea level rise and more intense rainstorms that are predicted to evolve. From cursory thinking it would appear that this course of action/measure would provide the best single measure flood protection in terms of longer-term effectiveness say past 2070.</p>
<p>Measure # 18 "Fir Island Bypass"</p>	<p>I don't think this measure improves upon Measure #7 except possibly a lower cost to implement.</p>

<p>Measure # 19 "Samish Bypass"</p>	<p>Only modeling can show the long-term incremental floodwater conveyance improvement of this Measure over Measure 7 in combination with Measure 17 wherein the Mount Vernon Bypass (Measure # 20) possibly wouldn't be needed after all due to upriver floodwater diversion.</p> <p>Due to the "0" B/C ratio this measure probably isn't feasible due to its' projected cost of >\$363 million and many higher B/C Ratios measures that can do more.</p>
<p>Measure #20 "Mount Vernon Bypass"</p>	<p>May not be needed ever if Measures #7 and #17 are sufficient to reduce the flooding hazards that occur downstream.</p> <p>Also to be considered is the repositioning of the current West Mount Vernon Bridge with a new (at least 4 lane bridge) downstream not necessarily on Kincaid Street. In this narrow reach of the river it should be possible to have an I-5 structured type bridge which has no river piers to catch LWD and constrict conveyance - the all important parameter.</p>
<p>Measure #21 "River Bend Cut-off Levee"</p>	<p>I assume this measure has been superseded by the more inclusive Measure # 32 or "North Mount Vernon Ring Dike". Is this assumption correct?</p>
<p>Measure # 22 "Cockreham Island"</p>	<p>I don't have any comments on this as its been very confusing concerning the property owner's "change of heart" concerning an earlier requested buyout and the County's cost feasibility study on same.</p>

<p>Measure #23 "Estuarine Restoration"</p>	<p>This is an admirable ideal as long as the affected property owners agree to it at whatever financial cost/price the action bears.</p> <p>Also the loss of viable farmland in the short term (next 50 years) is a personal concern. In the long term (after 200 years or) so this indicated land may be partially under seawater if it rises as predicted and the practicality of increased sea dike levels is then logically diminished or overtaken by events.</p>
<p>Measure #24 "Riparian Restoration"</p>	<p>Nice to have if it doesn't impact existing farmland acreage.</p>
<p>Measure # 25 "Nonstructural Measures"</p>	<p>This is very important; especially the flood warning and evacuation systems and/or funded planning for same to accomplish the work at the fastest tenable pace.</p>
<p>Measure #26 "Hamilton Relocation"</p>	<p>No ideas about what to do here, as it's a local decision problem with lots of "tentacles" to grab the unwary.</p>
<p>Measure #27 "Debris Management"</p>	<p>This is absolutely required but it has to be done in real time with a system that protects the personnel involved with the riverine tasks at the various bridges. I suggested an aerial logging approach with a river crossing cable system to maneuver the "log/LWD plucker" and bring the LWD pieces to a distribution or storage point/location like used for a "Critter Pad".</p>
<p>Measure #s 28, 31, 32, 33, 34, 35, and 36</p> <p>"City Ring Dikes"</p>	<p>Only after it's been determined that: 1) no combinations of all the above cited measures can sufficiently lower the floodwater</p>

effects or desired probabilities of occurrence (up to the 100-yr flooding event as the USACOE wont go beyond that at present) for the cities and 2) that Flood Evacuation Plans are tenable for each city in combination with all the others (due to road car/truck carrying capacities) should any ring dikes be built so as to avoid a Katrina New Orleans fiasco with certainty. How much certainty is a big question as even 95% might not be acceptable to the inhabitants on the 100-yr floodplain.

I don't know if even a first draft of an "evacuation plan" exists yet and that's an important accomplishment for even the current state of the levees.

I have three flood planning type questions:

- 1) Who's watching the progress of a/the "ongoing Flood Evacuation Planning"?,
- 2) What are the USACOE requirements for a flooding evacuation plan for a ring-diked municipality? , and three
- 3) Could the proposed municipalities meet the Corp's Flood Evacuation Plan requirements for the various flood plane-situated cities under Ring Diked conditions?

Another question concerns the high B/C ratio for Measure #31 versus and the much lower cited B/C ratios for Measures #32, 33, 34, and 35. Is this solely due to perceived/assigned property values or is something else involved. Also as time goes by the properties can be assumed to increase in value so is this ever taken into account?

	<p>To Be Specifically NOTED for Measure 33 "West Mount Vernon Ring Dike"</p> <p>If the Corp provides a ring dike around West Mount Vernon then the addition of one other 1-mile or so dike section could also probably implement Measure 20 or the "Mount Vernon Bypass"</p>
<p>Measure #s 29, 30, and 37</p> <p>Other Ring Dikes</p>	<p>Ring dikes for critical infrastructure which seems to apply for all these measures/elements are certainly required - IF NEEDED per the results of competent hydrological modeling, dike stability studies, and maintenance and/or dike height improvements due to climate change attributes.</p>

Robert A. Helton's 9/27/08 Flood Mitigation Measures Comment Sheet

Lions Club Talk (Talking Point Materials)

For presentation on 4/21/05 at the Cranberry Tree monthly meeting

THEME: A perceived (by me) conflicting challenge between locating a flood of 50,000 new people arriving in Skagit County by 2025 and their ability to both select homes and needed connective road infrastructure that lie sufficiently above (i.e. meets the consumers' preferred statistical flooding risk exposure) predicted and/or experienced stream and river high water periods and/or severe flooding events anytime between now and the year 2025. Are there any rational partial or total solutions to the perceived conflict?

A LITTLE HISTORY

For over 100 years and/or from the time of our earliest settlers and farmers, the goal has been to control water on our farmlands via sea dikes; river levees and water drainage ditch systems.

Instead of placing the river levees back from the rivers' edges, the farm levee systems were built to protect as much of the fertile available soils as possible. This action led to 1) our current system of a maintained defense against a 25-year to 35-year and possibly even a 50-year flood event in some levee sections due to more recent levee work since the Skagit County Natural Hazards Mitigation Plan was published in September 2003 (i.e. a flood stage or river flood flow condition that has a 4%, approximately 3% and 2% chance of happening every year) for flooding control and 2) subsequent manmade hazards (i.e. an initial localized water surge if a levee section fails and a full channel of water is released during a flooding event).

As Skagit County population increased from 35,142 in 1930 to 102,979 in 2000 (now estimated in 2004 to be over 106,000), peoples confidence in A) dike efficiency, and B) the strategy of filling lowland spaces and the raising of buildings (homes and businesses) above a certain anticipated floodwater level apparently increased. This conjecture is based on the observed continuation of placing/building homes, businesses, and infrastructure behind levees.

As a teenager I crossed the Columbia River, on or shortly after May 31, 1948, via the old HW99 Bridge and observed the many WW II built defense industry houses flooded behind a failed dike due to excessive stream flow. Vanport Oregon was then the second largest city (comprised of roughly 20,000 people) in the state and was never rebuilt due to obvious reasons. I think the expediency of quick war effort building of defense worker housing must have precipitated that urban planning decision to place housing on agricultural land behind a levee.

THE PRESENT

Well here we are today contemplating the safe placement of 50,000 new people by 2025, which statistically requires 17,000 + additional new or renovated homes plus the required

infrastructure support. The recent Sedro-Woolley home building moratorium, caused by insufficient sewer line capacity for additional homes/more population growth, points to another potential challenge. More people implies more household sewer flow as well as increased surface water runoff which can sully the waters of the Skagit River with only secondary sewerage treatment. Mount Vernon has already increased storm water storage protection for it's current and future expanded capacity sewer plant to accommodate its' anticipated share of the Office of Financial Managements' agreed upon number of new people moving into the entire State and ultimately into Skagit County. This population influx has been apportioned as 80% urban and 20% rural placement via the County's Comprehensive Plan that is now undergoing scheduled revision as mandated by the Growth Management Act. In addition to this County division of population growth, the County and the Cities/Towns have agreements as to how the internal County's urban growth will be apportioned amongst them.

Flood storage behind the Lower Baker Dam to help "shave off" the floodwater flow peak at Burlington, Mount Vernon and other river communities is under examination as is planning for the placement of other additional temporary flood storage areas. All of these ideas work great for fighting sufficiently short duration rainstorm induced flooding events (The "Pineapple Expresses" we have experienced this Winter and higher temperature induced snowmelts have created disappointments for our skiing industry and sport enthusiasts and raised concerns about flooding by contiguous stream and river residents). If we get enough rain, and "enough" still needs to be determined for the upriver watersheds, but lets postulate for example an excess of 10 inches or more over a 4 day time period, our current levee system and dam reservoir storage locations (Ross Dam and the Upper and Lower Baker River Dam reservoirs) could eventually fill to the limits of their holding capacities. Now the full brunt of continued rainfall in the river watersheds will seek a lower downstream level that possibly includes the lowland sides of parts of our flood protection levee system.

The County has overseen the current development of a computer model of the Skagit River's flow characteristics (based on watershed rainfall, snowmelt inputs and topography) in order to determine and plan for the most effective floodwater containment/conveyance measures. The model has apparently validated the effectiveness of the use of storage at Lower Baker Dam during the October 2003 flood period. Although this is all very laudable, I think there's even more typical flooding model data to develop and reasonable county land use planning actions to be initiated.

SOME REASONABLE ACTIONS/STEPS TO TAKE IN PREPARATION FOR THE PREDICTED SKAGIT COUNTY POPULATION-FLOOD-EVENT (Hopefully cresting before the year 2025)

1. Exercise the County's current river flow model to develop a 3-Dimensional surface function of floodwater height and river gage flows (two Z-axis dependant functions plotted against the X and Y axes of rain rate (inches per day) and days of rain (at that rate) respectively). Many sets of these basic data are needed as follows:

- A. The Seattle City Light Ross Lake and the PSE Baker River Project dam reservoirs are at their minimum elevations (maximum flood water storage capability) and then have separate rainfall, test function events in the Baker, Upper Skagit and the Sauk/Cascade Rivers (which aren't and probably never will be dammed/controlled by man) watersheds.
- B. Repeat above test functions using combinations of same rainfall event/inputs in the river watersheds (Ross Lake and Baker River, Baker and Sauk/Cascade, Ross Lake and Sauk/Cascade, Ross Lake, Baker River and Sauk/Cascade River watersheds simultaneously and so on)
- C. Repeat B. above with either the Baker River Project or the Ross Lake reservoirs being at maximum mandated floodwater storage capacities.
- D. Repeat B. above when all currently dammed reservoirs are already filled to capacity and the continued reservoir watershed rain/snowmelt input goes downstream as if no dams were present (i.e. dam overtopping).
- E. Repeat model tests B., C. and D. above with appropriate Nookachamps Basin estimated floodwater storage capacities under dry/absorbent and wet/saturated starting conditions and with or without the potential floodwater just-in-time additional storage areas (when planned temporary river-level flood peak reduction basins are utilized).

NOTE:

Some of the above model test runs may have been done already, but in talking with County Flood Fighting personnel such as Dave Brookings; such data if it exists hasn't been published for wide public consumption and/or discussion yet (2/17/05).

- 2. With the above rough and/or approximate sets of model data, the frequency of various flooded lands and their modeled floodwater depths can be determined and/or estimated from best-known frequency-of event precipitation records and flood stage records. We could now better predict what lands/lots can be flooded and to what depth of water assuming non-erosion of dike top surface layers where the water just flows over the top of same or through future planned spillway sections onto adjoining lands to reduce downstream flows through any overly constrictive levee sections.
- 3. At this point of the flood modeling, we still have to consider the possibility of levee failures due to their saturation and subsequent soil liquefaction and river water pressure destruction in addition to under levee aquifer creation (floodwater tunneling/underground leakage and fountaining). As mentioned above, there may be the possibility of future controlled-levee flood-water-

overtopping through gated structures in areas granted by the Dike Districts and adjacent property owners who would be paid to allow some inundation to help prevent worse downstream dike failures (in terms of property damage and human danger). Such planned flow relief and river stage/height reduction, in the event of a greater than 50 Year flood event, could be beneficial as the present levee system is described or specified as only being a 50 Year flood event protection system.

SOME PERSONAL OBSERVATIONS & TENTATIVE IDEAS

1. It is advantageous to the County Commissioners, flood fighters, and the home and business owning public when all those to be affected by predicted excessive stream/river flow events know in advance where potentially excessive flow events would be naturally directed, safely contained and/or conveyed or whether the event can be considered to be a minor problem overall due to high ground building sites or areas where homes are constructed so as to be totally elevated above a given floodplain river stage.
2. Unfortunately to date, in my opinion, a lot of historical words have been expended to little avail –YET, excluding County Commissioner Dahlstedts' current efforts on flood control since assuming office over four years ago.
3. It's obvious to most everyone that living in a flood prone area is risky and that's why there's flood insurance to minimize the pain of sporadic (five or more years between high water) river flooding or near flooding events, a yearly Flood Awareness Week publication and other information to increase general public understanding of moving water caused bank erosion possibilities (read that as possibly occurring near or at your home lot or acreage).
4. Depending upon the rate of rainfall, concurrent snowmelt and rainfall duration, even the latest proposed additional flood storage at the Lower Baker Dam reservoir may not prevent extensive floodwater damage above and below the Dalles.
5. I think we've experienced a lack of what I call historical flood prevention planning in the first place entailing "extra strong" discouragement by County Officials of continued housing development in the floodplain in the first place. In a 1973 County-wide survey, published by the Skagit Valley Herald and tabulated by County Planning Department Staff, 62.7% of the respondents (entailing more than 350 replies) indicated that no more residential development should occur on the floodplain (13.5% approved of more development, 17.7% were unsure and 3.4% had no opinion yielding a total reply percentage of 97.3%).
6. Re the latter point, some people will accept a reasonable flooding or near-flooding risk and cry that their property rights assure they can do so. Other people buy property and hope that that as long as they live there the river wont consume their

property due to river course changes and subsequent bank erosion (As recently happened in St. George Utah where some fifty homes have been swept away and other locations right here near Concrete).

7. I recently talked with a developer about a potential house to be built upon one of his still vacant sites and he assured me that all his house sites were above the 100-year floodplain. When I inquired about having a basement constructed under my potential house he replied that 8 feet down the basement would probably flood, as it would be in the 100-year floodplain. Needless to say, I wasn't then even potentially interested in that development, as I like a dry basement storage area or well-drained crawl space to avoid moisture problems.

SO WHAT MUST the COUNTY COMMISSIONERS and CITY PLANNERS DO to MINIMIZE FLOOD RISKS and RELATED INCONVENIENCES for the NEXT 50,000 PEOPLE that are EXPECTED to FLOOD our LANDSCAPES BETWEEN NOW and 2025?

1. Insist upon the completion of flood modeling as described above (ASAP) by locally allocating part of the needed modeling funding if that's a problem.
2. Erect flooding signs, like the Tsunami warning signs near our coastal regions, to show how high the floodwater along roads and byways is predicted to get for the benefit of the interested lot/acreage buying public.
3. From the proposed modeling effort, develop and provide maps not only of 100 year flood event ravaged areas and the corresponding expected floodwater levels, but also for the 200 and 300 year flood events: which entail a 0.5% and 0.333% chance of occurring every year respectively. Next create ordinances that make these maps part of the required closing papers for interested new buyers of land and/or lots in any new development that the county and/or cities approve in their current or proposed to be expanded or any other future delineated urban growth areas.
4. Don't promote any more non-farm related residential development in at least the 100year flood plain. This proviso should also extend to sloping areas at higher elevations than the 100year flood plain where storm water can be distributed over/through grassy areas via sheet flows. This can result in heavy-rain drainage routes creating undesirable storm water puddles in lot/land topographical low spots or in the crawl spaces under homes and buildings. This potentiality needs to be avoided through conservative construction codes, which can accommodate 100-year rainstorm events.
5. Continue to plan future roads or reconstruct current roads, that are raised to minimize flooding closures and which sufficiently minimize floodwater damming effects, to also minimize or preclude road surface water drainage,

with its' attendant automobile source pollutants, from entering pristine county wetlands.

I would now like to leave you this evening with a few probable not so original thoughts but ones that need airing for the benefit of our current residents and the predicted future 50,000 arrivals by the year 2025

1. There are only four reasons for residential building or living on floodplain created farmland:
 - 1) You're a farmer and that's where the good soil was infrequently deposited by volcanic action and frequently deposited over thousands of years by flooding when levees weren't present or,
 - 2) You're a risk taker who doesn't mind the inconveniences of cleaning up after a flood event with of course the National Flood Insurance Program's (NFIP) financial help or,
 - 3) You have a false sense of security in something that will protect you from the recurring ravages of nature or,
 - 4) With all its' problems, you still prefer living next to a creek or river for it's ambiance and mostly stress relieving attributes (water sounds, nature & fishing),
2. The big floods (larger than 100-year and less than a 1% chance of happening every year type events) that will eventually arrive due to the Pineapple Express effect or the currently undecipherable Southern California rain events will unnecessarily impact quite a few people and could 1) create property damage (estimated to be One Billion dollars or more) and 2) create fast flowing water inundations similar in effect to the recent Indian Ocean Tsunami event should a levee section give way. We'll know well in advance (say 12 to 14 hours) when to leave the flood prone area(s) and later know what our NFIP flood insurance repair/rebuilding financial aide will be. The question is "will we have learned something new about the natural flooding risks and how to avoid them? As observant residents of Skagit County, we owe it to the new 50,000 arrivals coming between now and the year 2025 to at least minimize their avoidable flooding grief's through 1) intelligent land use planning and 2) lots of warnings to people wishing to dare NATURE to do it's worst which none of us sitting here tonight have personally seen to date.
3. I think there's a major problem with the Growth Management Act (which more properly should have been called the Population Growth Management Act) that was passed in 1990. The current (it started out with just 13) 14 non-prioritized goals are all good in themselves but a problem arises in the Acts'

neglect to define when enough growth/people in any given area/county is enough. I think Skagit County will have reached enough people with say another 20,000 souls or less instead of the 50,000 projected increase due to the problem of where to safely, and/or intelligently site their homes and new needed infrastructure. Some would say and perhaps rightfully so that were already close enough to a logical county population saturation point. This debate will undoubtedly continue far beyond the time when it's abundantly clear that summertime, drought based, water use restrictions are a highly probable way of life in Skagit County when the population approaches say 200,000.

SUMMARY

In summary, I think the expected new-arrival, residential building areas, should all be sited out of the 100year floodplain hazard region and allow safe ingress and egress during such a flooding event. This creates the planning tasks of 1) selecting/defining new urban areas out of flooding harms way not unlike the process that the town of Hamilton is now experiencing and 2) increasing urban living/housing densities in existing city and town areas not subject to floodwater inundation following levee overtopping or levee failures caused by 100 and possibly even 200-year flood events. I've seen enough and read enough about floods to have made the personal choice to retire at 309 ft elevation and logically avoid the natural flooding-caused home site risk.

Thanks for listening and now it's time for Questions, Answers and Discussions.

Lions Club Talk: Draft C3

Draft C3 has now benefited from reviews by the following people:

- 1) Larry Kunzler, the flood historian for Skagit County
- 2) Gary Jones, the Dike Districts lawyer
- 3) Connie Freeland, PSE Program Manager for the Baker River Project Relicensing effort
- 4) Bob Barnes, PSE Hydrologist for optimizing the Upper and Lower Baker Reservoir levels for power generation and compliance with Operating License provisions in the Settlement Agreement.

Acronym List:

1. HEC-RAS Hydrologic Engineering Centers River Analysis System
- 2.

Sea Level Rise (SLR): An unavoidable consequence of Global Warming
by
Robert A. Helton, Interested Skagit County Citizen

Introduction

Global sea level changes can be attributed to 1) thermal expansion of sea water due to increased global temperature, and 2) land/continental Greenland and Antarctic glacial melting. If the Greenland and Antarctic ice all melted it is estimated that over a 200 feet rise in global sea level would result. Sea level rise attributable to just the Greenland Ice Cap melting would be around 20 feet.

Local (Puget Sound) sea levels can also be affected by land subsidence or rebounding as the land slowly rises due to removal of the last Ice Age weight of ice covering. Another sea level effect can be where seasonal and/or prevailing wind patterns drive in excess or drive out water in our estuary.

Two concerns in Skagit County over sea level changes are that 1) it will effect the required height of dikes to contain a 100-year flood due to expected more intense rainstorms in our various unregulated watersheds or possible overtopping of dams storing floodwaters in regulated watersheds, and 2) the required sea dike heights to keep sea water from drowning existing farmlands under storm surge conditions created by adverse Easterly sustained wind conditions driving water into the Strait of Juan de Fuca or Northerly winds driving water South into Puget Sound.

A. Sea Level Rise just due to the Thermal Expansion of Sea Water (Reference D)

Per Table 2 (Properties of Sea Water and Ordinary Water) in Reference D, the density of sea water "rho" at 15 degs. C and 20 degs. C is 1.02599 and 1.02478 grams/cubic centimeter respectively at a Salinity of 35 parts per thousand (ppt) and atmospheric pressure. The density of seawater is a function of temperature, contained salts (Salinity) and water depth as seawater is slightly compressible under the pressure of large water depths combined even with the atmospheric pressure.

To a first approximation we can ignore the compressibility of seawater and its slight variation even with temperature at constant pressure and Salinity. Therefore imagine a water column with a 1 square centimeter area and 100,000 centimeters (1,000 meters) tall. Warming this imagined seawater column by 5 degs. Centigrade will increase its height by around 1.2 meters (see below calculation).

Since the masses of the water columns at 15 degs. C and 20 degs. C are equal (one column has only expanded) we can say:

$$(\rho_1 = 1.02599)(100,000 \text{ cm}) = (\rho_2 = 1.02478) (h)$$

Solving for $h = (1.02599/1.02477)(100,000) = 100,120 \text{ cm} = 1,001.2 \text{ m}$ for a 5 deg. C temperature increase. This would approximately be a 24 cm (9.45 inches) per deg. C increase in sea level height (for a 1000 meter height water column) just due to uniform thermal expansion of the warmer seawater column.

Note: In the May 1, 2008 meeting at Burlington City Hall I recalled incorrectly that a 1 deg. Centigrade uniformly heated 1000m height of water would expand by 1 m.

B. Overall Estimated and/or Expected Sea Level Rise by the year 2070

Predicting the future sea level rise from the past sea level heights measured over a short validated time record is like trying to predict inflation in 2070 from the previous 100-year or so record wherein the inflation rate has also varied with time. Keep in mind that the Intergovernmental Panel on Climate Change (IPCC) 2007 Report scientific contributors have a range of sea level rise (SLR) opinions based on their analyses of data sets and that the IPCC report supporting data is then used in the following cited references/reports by others.

Reference A Estimates:

1. In Table 4.2 on page 125, the observed Average Annual sea-level rise in millimeters (mm)/year was $1.8 \pm 0.5 \text{ mm/year}$ and $3.1 \pm 0.7 \text{ mm/year}$ respectively over the time periods of 1961 to 2003 and 1993 to 2003 time periods.

Note that the Average rate of SLR over the latest analyzed decade (1993-2003) is 72% greater than earlier rate of SLR. Also note that prior to 1993, the global sea level was measured by tide gauges and that from 1993 forward that sea level was measured by satellite altimetry.

2. In Figure 9.16 on page 418, the modeled sea level rise due to climate change since the pre-industrial period (1820/Start of Steam Age?) is estimated to be around 30 centimeters (11.8 inches). The increases from 2000 (starting at about 7.5 cm in 2000 to 30 cm or so in 2050) are modeled for 4 different world operational type scenarios: Markets First, Policy First, Security First and Sustainability First (which tops out at about 29 cm).

3. Another as yet not estimated contributor to SLR is the increased/accelerated rate of ice sheet flow off of the Greenland Ice Cap and Antarctic Continent. (See page 417). Also see Reference H for a detailed explanation and illustrations of ice sheet flows.

Reference B Estimates

1. In the figure on page 21, titled "Sea Level Rise Scenarios", wherein the reference point for the estimated sea level rise is zero at the start of 1990, the ensuing estimated SLR amounts to approximately a scaled value of 0.47m (18.5 inches) at Seattle by 2070.

2 As discussed on page 20, the net local SLR in North Puget Sound is expected to be close to the world/global average.

Note: This doesn't include any wind driven storm surge effects.

Reference C Estimates

1 On page 68 of this delayed publication Government report, the reviewers conclude (most likely from using IPCC 2007 Reported values) that tide gauge monitored sea level rise increases were 1.8+- 0.5 mm per year.

2. For the entire 20th century (1900 to 1999), the average rate of SLR was 1.7+- 0.5mm/year.

3 "It is unclear whether the faster rate (3.1 +- 0.7 mm per year) for 1993 to 2003 is a reflection of short-term variability or an increase in the longer-term trend".

Note 1: The reviewers in this reference ABSOLUTELY don't assume that any rate of increase in SLR is exhibited by just this sudden increase in sea level rise in the 1993 to 2003 re earlier decades of observations.

Note 2: This is a very important lacking piece of information that can only be solved by future observations. The rate of increased SLR information will primarily dictate what we plan for in terms of accumulated SLR.

References E and response to comments on same (Reference F)

1. Rahmstorf contends that the rate of SLR in the 20th century could be 3.4 mm/year per deg. Centigrade rise for anthropogenic global warming past the start of the pre-industrial age.

2. For the various projected climate change scenarios postulated in IPCC 2007 this would result in a SLR of anywhere from 0.5 to 1.4 m above the 1990 levels by 2100.

Note: A SLR of more than 1m (39.37 inches) by 2100 is the largest estimate of SLR that I've come across to date.

C. SO WHAT SHOULD WE PREPARE FOR SLR WISE?

References B and G adopt a value of 0.48 to 0.5 m for the respective rise of sea level between 1990 or say 2007 (present day levels) and 2070. On page 47 of Reference G, the

authors explain the rationality of a 0.5 m SLR as being representative for the melt waters from ice sheets that "have been proved to be important over recent decades".

The big critical unknown is whether the rate of SLR is increasing. From Reference A we learn that the rate of SLR increased by 72% during the decade of 1993 to 2003 re the average rate of rise during the four plus prior decades from 1961 to 2003.

To account for a potential increasing rate of SLR, it is interesting to compute what compounded decadal (ten year time period) rate of rise would be required to result in say a 0.61m (24 inches) SLR between 2011 and 2070 (a six decade time span). A 0.61m SLR is approximately 2/3 of the average of the 0.5 to 1.4m (0.95m) rise estimated to occur between 1990 and 2100 by Rahmstorf in Reference E. It is to be noted that a steady rise of sea level at 3.1mm/year (3.1cm/ decade) for 60 years (2011 to 2070) only amounts to a SLR of 18.6 cm (7.32 inches).

For a constant decadal % increase in the rate of SLR over 6 decades we can determine what that % rate of increase is by the following formula (same process as for simple interest compounding to determine the final value of a starting sum of money)

$$h = 3.1 \text{ cm} [(1+X) \text{ exponent } 6] = 61 \text{ cm or } (1 + X) \text{ exp. } 6 = 61/3.1 = 19.6774$$

3.1 cm = the rise beginning at the start of decade # 1 and 6 = the number of decades

Solving for X yields, X = 0.6431 or a decadal increase in the rate of SLR of 64.31%

Note: The rate of rise increase in the decade from 1993 to 2003 was 72% of the average SLR over the time period of 1961 to 2003 (over 4 decades) per Reference A).

$(1+ .6431) \text{ exp } 6 = 19.6781$ which is close enough for this estimated SLR example computation and for which the SLR increments over the 6 decades is shown in the table below.

Table 1. Example of Proposed Possible Global SLR Over Six Decades
(Note: Assumes a 3.1 cm rise by year 2011 and a 64.31% increased rate of SLR/decade)

Decade #	Decade Span	Decade		SLR/Decade (cm)
		Sea Level Start (cm)	Sea level End (cm)	
1	2011 to 2020	3.100	5.0936	1.99
2	2021 to 2030	5.0936	8.3693	3.28
3	2031 to 2040	8.3693	13.7516	5.38
4	2041 to 2050	13.7516	22.5953	8.84

5	2051 to 2060	22.5953	37.1263	14.53
6	2061 to 2070	37.1263	61.0022	23.88
			plus starting value of	3.10 cm
			Sum =	<u>61.00 cm</u>

Now one can logically argue that nobody can accurately predict the actual SLR 70 years from now because the measured effects (thermal expansion of sea water and glacial melting as well as the potential for accelerated flow of now positioned continental ice into the sea) of global warming on SLR are yet to be observed and/or more accurately determined.

Per Reference H, it is estimated that when the continental land-based ice melts both in Greenland and Antarctica that global sea level will rise more than 200 feet. I've read somewhere that when all the ice melts that sea level will rise 70m (roughly 229 feet) and that that could probably take a thousand years or more to happen. However if significant ice masses slip off the continents into the oceans that will instantly increase global sea levels.

From Table 1 it can be readily appreciated that any increased rate of decadal sea level rise of any magnitude will exacerbate the problem of finding enough material to raise the levels of both sea dikes and river dikes to "keep the water out" whether or not any serious rain water induced flooding occurs in the future. Fortunately, unless some massive amounts of continental ice slide into the ocean, we have time to prepare for some sea level rise and to decide whether or not it's financially feasible to continue the required "fight" to successfully mitigate against natural and potentially disastrous events.

SO WHAT'S THE ANSWER?

One answer to the question I posed as the title of this Section C, I believe, is for now to assume that an additional SLR of around 0.5m to 0.61m (2 feet) could occur by 2070. As we obtain additional SLR information, the above assumed (possibly now indicated by the data) SLR rate of rise per decade of roughly 64% can only be verified and/or improved upon. It's important to keep in mind though that a lot of researchers believe that an additional SLR of at least a 0.5m is likely by 2070.

D. Acronyms, Constants and Definitions

1. IPCC: acronym for the Intergovernmental Panel on Climate Change
2. IPCC 2007 is the Fourth Assessment Report or the FAR on Climate Change

3. Specific Volume (cubic centimeters/ gram) is the reciprocal of density grams/cubic centimeter.
4. 1 meter equals 39.37 inches
5. SLR: acronym for sea level rise

E. References Cited

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Submitted to Mark W. on June 2, 2008 along with loaned copies of cited references by,

Robert A. Helton
360-848-5625

Sea Level Rise Comments -1

To:
Jana Hanson
Director, Community and Economic Development
P. O. Box 809
Mount Vernon, WA 98273

July 17, 2006

From:
Robert A. Helton
21032 Little Mountain Road
Mount Vernon, WA 98274

Subject:
An Additional EIS Alternative to consider for Mount Vernon Flood Protection

A Little Background

Per Ref. 1, the peak flow at the Mount Vernon gage was 129,000 cfs on October 21, 2003. With a) Federally mandated flood water storage at both the Ross and Upper Baker dams as well as the cooperative flood storage at the Lower Baker dam and b) downtown sand bagging efforts atop the revetment, Mount Vernon escaped flood water intrusion. This escape was also aided by the short duration flood peak resulting from the benevolent cessation of the second rainstorm in a short time period (a so-called "double pumper").

The ideas presented on 7/11/06 of a combination increased average height certified levee and flood wall system as the major alternative in addition to the "do nothing alternative" as a deterrent to just a so called 100-year flood event has a serious shortcoming as follows:

- 1) The historic flooding data and resultant statistical flooding frequency relationship is only partly based on more recently observed climate change induced rainfall time periods. In 9 of the last 10 year time periods, the world average temperature is the highest ever recorded. As a consequence, the rainfall and/or storm intensities are expected to increase in the Northwest. Some researchers extrapolate that the current described 100-year flood event will eventually become a 50-year flood event in some flood prone regions.
- 2) Recent or the last 10-year period single storm events have been over a few days at most with storm relief between encountered "double pumper events". With a sharp peak flood stage event, the current uncertified dikes don't get saturated and possibly fail due to a continued (say 4 to 5 days or more) high flood stage water pressure situation. Longer duration and/or more intense rainstorms will produce increased, never before experienced, flood flow conveyance conditions through Mount Vernon.

An Additionally Proposed Flood Prevention Alternative/Solution

An Alternative floodwater conveyance approach, for the as yet to be experienced increased; due to climate change, storm water induced river flows through one of the narrowest reaches in the Lower Skagit River basin, is to construct a river bypass channel in the westernmost portion of West Mount Vernon or in the immediately adjacent farmland if it's economically feasible as well as socially acceptable. The suggested channel would be straight/prismatic extending southward from the lower Riverbend reach of the river to the top reach of the next Skagit River meander as shown in Figure 1.

The Eastern and Western channel boundaries would be newly constructed dike channel walls atop existing topography each about 1.2 miles or less in length which would connect the existing right side of the river dike systems maintained by Dike Districts 1 and 12. Assuming a mean channel floodwater velocity of > 2 ft/sec and a bypass channel floodwater conveyance capability of 45,000 cfs, and further assuming an approximate trapezoidal channel (due to levees cross sectional shape) the flow area of the channel per Equation 6.1 wherein $Q = VA$:

Where Q = flow in cfs, V = mean channel water velocity, and A = channel cross sectional area is $A = 45,000 \text{ cubic ft/sec} / >2 \text{ ft/sec} \leq 22,500 \text{ square ft}$.

Approximating the trapezoidal channel shape created by the parallel levee walls with just a rectangular channel shape and assuming an effective free flow "channel depth" of 15 feet then;

Free Flow Channel Width = $W = \text{Area/channel depth} \leq 22,500 \text{ square ft.} / 15 \text{ feet} \leq 1,500 \text{ ft}$.

This channel width affords useable space for farming most of the land that the parallel dike walls and bypass channel would occupy.

Assuming that open farmland and/or some sparsely occupied residential West Mount Vernon properties could be purchased from willing sellers and then dedicated to the proposed Alternative Bypass Channel; this flood protection alternative offers several advantages over the major one proposed at the EIS Scoping Meeting on 7/11/06 at 1805 Continental Place, Mount Vernon, WA, 98273.

Advantages of a 45,000 cfs Bypass Channel for Mount Vernon Flood Control/Protection

1. Downtown development could basically occur unobstructed by the proposed combination levee/floodwall process after the bypass channel is completed more rapidly with no immediately required downtown modifications to buildings or infrastructure.

2. No current Skagit River channel fish hazards or other environmental problems that would need to be mitigated are created.
3. It's intuitively less complicated and subsequently less costly to construct whole new certifiable bypass channel levee walls than to extensively modify or reconstruct existing right and left side Skagit River levees to handle a 100-year flood stage or even a higher estimated stage caused by climate change induced flooding (read that as an extended duration >100-year to maybe even a 200-year rainstorm induced flood event or similar to those rainstorms that have recently occurred in both the Northeast and Northern California).

As to the bypass channel levee construction costs, the implied average estimated costs to construct the Sedro Woolley Waste Water Treatment Plant and Sterling Levees were \$711 and \$464 per foot respectively per Ref. 2. I therefore wouldn't expect the two channel forming parallel bypass levees, with a top elevation of 32 ft each, to cost more than \$700/ft thus resulting in a cost $C \leq (\text{two levees}) * (<1.2 \text{ miles length each}) * (5,280 \text{ ft/mile}) * (\$700/\text{ft}) \leq \$8.9 \text{ million}$. This cost, as in Ref. 2 estimates, excludes any property acquisition or land/flood easement costs. It also excludes cost of any road modifications such as ramps to the top of the two levees and bridging across the bypass channel width.

4. The construction of the bypass channel wouldn't conflict with lessened downtown flood-control construction activities and the downtown river views and riverfront access with allowably lower than possibly currently planned levees and floodwalls would be improved
5. Existing low income downtown housing or other historic commercial structures wouldn't be impacted at all as nothing now existent would probably need to be demolished/removed or relocated from its' current location.
6. The dual bypass 1.2 mile or less in length channel levees would also provide redundant flooding protection to West Mount Vernon for some Riverbend and lower Skagit River reach dike failures which of course could add to the flooding woes of other unprotected floodplain victims.
7. The proposed alternative bypass channel will increase conveyance through the Riverbend meander and reduce flood stage there while of course not alleviating flood stage above Fir Island as the same proposed amount of increased climate change induced flow is just being displaced downstream from Mount Vernon and West Mount Vernon.
8. Increased river flow conveyance through the combined proposed bypass channel and the narrow Mount Vernon Skagit River reach will better convey

the water between the widened 3-Bridge Corridor that is planned. This will provide better flood protection for both Burlington and Mount Vernon

9. With the exception of property acquisition, many of the issues and impacts outlined in Table 1; a copy of which that you provided me, either mostly or wholly either disappear or become added quality of life enhancements for both the citizens of Mount Vernon and the County at large.

The bypass channel would entail a center concrete lined trench and flood level sills at each end to respectively allow pumping out the channel when needed after a high flood river stage and to determine when to allow bypass flow to occur (just in time or ahead of time before the arrival of the projected 100-year "plus" flood wave for example).

The major negatives I foresee other than removal of productive farmland under the levee structures themselves and possibly condemnation proceedings of some farmland and residential properties (permitted under eminent domain for flood control) are as follows:

1. Large dirt fill for highway ramps up to the bypass dike levels,
2. Dry bridging over the 1,500 ft. or so of the bypass channel itself.

The two simplistic flow equations noted above are just the very basics for mostly sub critical slope uniform flow criteria for the envisioned bypass channel. Actual design of the proposed bypass channel will be minimally determined by the information contained in a) the first seven chapters of Reference 3 and b) potentially scaled up design (depending on the actual stable mean-channel gravity flow) of the large storm water conveyance channels in the Los Angeles California basin.

Respectfully submitted,

Robert A. Helton

List of Table/Figure and References

Table 1 City of Mount Vernon Downtown Flood Control EIS Issues & Impacts Sheets

Figure. 1 General Location of Proposed Alternative Mount Vernon Flood Protection Bypass Channel

Ref. (1) "DRAFT Skagit River Basin, Washington - Revised Flood Insurance Study-Hydrology Summary- Skagit County, WA", U. S. Army Corps of Engineers, Seattle District, November 10, 2005

Ref. (2) "Skagit River Flood Reduction Feasibility Study - Interim Evaluation of Measures", Pacific International Engineering (PLLC), April 2006

Ref. (3) Ven Te Chow, "Open-Channel Hydraulics" McGraw-Hill, New York, 1959

Table 1

City of Mount Vernon

Downtown Flood control EIS

Issues & Impacts Sheets

Natural Environmental Issues & Impacts

- o Fish habitat
- Threatened and endangered species
- Shoreline modifications
- _____

Built Environment Issues & Impacts

- Parking
- Building demolition
- Utilities
- Storm drainage
- West side levee
- Temporary construction impacts (noise, air quality, etc.)
- _____

Community Issues & Impacts

- Business relocation
- Riverfront access
- Business access
- Property acquisition
- Redevelopment potential
- Recreation
- Farmer's Market
- Historic preservation
- _____

Corps' Measures Workshop Public Comment Sheet
August 18th, 2008

Lorna Ellestad

No.	Measure Name	Comment:
19	1	Add'l. storage at Upper Baker Dam PSE is to operate Upper Baker as directed by the district Engineer, Seattle District, COE. The Corps original authorization language states that Baker River flood control operations are to follow the recommended plan in the 1975 "Upper Baker Project, Skagit River Basin, WA" Chief's report and that the Corps is authorized to utilize the full 100,000 AF of storage as directed by the Seattle District Engineer. Furthermore, the Baker River Water Control manual, page 3-3 states that the project for flood control at Upper Baker was approved and should be operated in accordance with the recommendations of the Secretary of the Army and The Chief of Engineers in House Document No. 95-149. This document recommended the Upper Baker Project be operated to provide additional flood control storage space according to the recommended plan and that PSE should be compensated for power losses. The recommended plan included the following features: a) Drawdown of Baker Lake from 1 October to 1 November to provide 16,000 AF of storage as replacement for valley storage lost when the project was constructed, b) Additional drawdown of Baker Lake from 1 November to 15 November to reach a level at which a total of 74,000 AF of storage capacity would be available for flood control.
19	1	Add'l. storage at Upper Baker Dam Con't. C) Storage capacity of 74,000 AF would be reserved for flood control until the first of March, except when regulating for flood control. Puget Power could still draw the reservoir below elevation 707.8 during this period for power production purposes. The required flood control storage capacity would be gradually reduced during March to permit PSE to refill to full pool by 1 April. D) The Baker River's discharge into the Skagit River at Concrete would be regulated to a maximum of 5,000 cfs. (present power generation capacity) whenever the Skagit River is forecast to reach 90,000 cfs near Concrete. E) Flood plain management by Skagit County and communities of Burlington, Mount Vernon, etc., consistent with the State of Washington Flood Control Zone Act of 1935 and the State of Washington Shoreline Management Act of 1971, as well as requirements of the Department of Housing and Urban Development, Flood Insurance Administration. The 1975 report included "Technical Criteria", page 35, that was adopted for use in <i>developing</i> the recommended plan and
19	1	Add'l. storage at Upper Baker Dam Con't. part c. states, "When operating Upper Baker project for flood control, the Baker River discharges into the Skagit River at Concrete would not be reduced below the 5,000 cfs power generation capacity of the Upper Baker project". The 1975 report then goes on to recommend the 5 part operations plan above. Therefore, between when the additional storage was evaluated and authorized in 1975 and when the Baker River Water Control Manual was written, part d. of the recommended plan was changed from a "maximum discharge of 5,000 cfs to a mandatory minimum discharge of 5,000 cfs. The 1997 Baker River Water Control manual, page 7-5, states a mandatory minimum discharge of (5,000 cfs) is required at Upper Baker during designated flood control events whenever Baker Lake is above EL (707.9 ft.). The (5,000cfs) is provided to continue hydropower generation during flood events; but, if no hydropower generation is required, the (5,000 cfs) must still be released through the dam during the entire regulation period when Baker Lake is above (707.9 ft.). In the 2000 Baker River Water Control manual, page 7-8, says a mandatory minimum discharge at Upper Baker of (5,000 cfs) is required to help extend the available flood control storage in Baker Lake....
19	1	Add'l. storage at Upper Baker Dam Con't. If the powerhouse is unable to release the entire minimum discharge, the remaining amount must be release through the spillways. The Corps documents contradict each other and or are none supportive of what is stated in each of the separate documents. Could the Corps please provide the documentation supporting the part d. change in discharge from Upper Baker from a "MAXIMUM" of 5,000 cfs during flood operations to a "MINIMUM" of 5,000 cfs? Allowing all inflow to pass through reservoir (run of river operation) until later during event would reserve flood storage to reduce peak flows. Recent studies have shown that there is more than \$6,000,000 in reduced annual flood damages when the discharge from Upper Baker is reduced to 0 cfs which more than justifies implementing the operations as the 1975 Chief's report intended.
19	2	Add'l. storage at Lower Baker Dam Federal law has joined the Upper and Lower Baker facilities as one project and added "flood control" as a project purpose. The Baker River Water Control manual allows for coordination of the operations of Upper and Lower Baker Dams and says that "Although Lower Baker contains no flood control storage and no specific flood control requirements, the operation of both Upper and Lower Baker must be coordinated to achieve the optimum flood control regulation for the Skagit river. All spillway gates should be fully opened in addition to capacity generation to pass as much flow as possible from Baker system in advance of peak Skagit River flows.
19	2	Add'l. storage at Lower Baker Dam Combined Baker Dam operations during recent events like 2003 have demonstrated the ability of the facilities to reduce peak flood flows on the Skagit River, conversely, operations of these same facilities during the 1990 and 1995 flood events demonstrated the devastating effect of releasing significant flows from the Baker during peak Skagit River flows. In addition, recent Corps economic analysis also supports Lower Baker flood control storage and estimates that more than \$17,000,000 in expected annual flood induced damages could be prevented by implementing flood control storage at Lower Baker dam; almost three times the economic benefit of additional storage at Upper Baker and should be immediately implemented by the USACE. Don't ignore the peak reduction benefits of the additional storage that can be available when full capacity discharge is implemented in advance of the flood peak. It doesn't take a perfect warning system to know a storm is coming in advance of the peak. Even 24 hours @ 10,000 cfs discharge can create much needed storage (19,000 AF) and in most cases, 20,000 cfs can be released doubling that with zero environmental impacts, only benefits to fish by reducing extremely high flows. In 2003, 21,000 cfs was released when the Skagit was only 21,000 cfs.
19	4	Nookachamps storage Over topping weirs, like Sacramento CA area bypass weirs, should be constructed to delay the availability of storage in the Nookachamps and to improve the timing of the attenuation of peak flows on the Skagit River. Current the Nookachamps basin starts to fill when flows on the Skagit can be as low as 20,000 cfs and are over topping local roads at 50,000 cfs. This can occur more than one or two times annually as spring freshets often reach 50,000 cfs and can stay there for days flooding out spring crops and closing local access. The elevation of the weirs could be set to the same WSE as current flooding conditions so as not to increase localized flooding in the Nookachamps basin. These weir would actually reduce by more than 10 fold the number of times the Nookachamps basin would be inundated by high Skagit River flows. Another benefit of overflow weirs in the Nookachamps would be to keep higher flows in the channel which would help to maintain channel capacity and work to reduce current aggradation of the channel bottom between Hwy 9 Bridge and BNSF. Option would include installing "Flood gate doors" similar to the new Fisher Slough tide gate on Nookachamps creek to eliminate the back water effect of the Skagit River. (see attached photos).
19	4	Nookachamps storage Con't. Overtopping weirs at the east end of the basin should be combined with 1,000 to 1,500' of gated outlet structures, similar to what the Corps designed for Sacramento area, that would be located on the left bank down stream just above the three-bridge corridor. These structures could be operated to both control addition water into the basin as well as to improve the current evacuation of the basin. Again, these could be designed so that the WSE of the Nookachamps storage was the same level as current conditions except for significantly improved conditions during less than 20 year events. By replacing the existing "Spring" dike with a bank of multiple water control gates, water could be evacuated naturally as the Skagit River level receded or controlled in the event there was a significant break or threat of levee failures down stream. Interior off channel habitat within the Nookachamps basin could be improved for both fish habitat as well as improved evacuation of flood waters. The results would be increased Coho habitat and reduced loss of fish stranded by receding Skagit flows. If properly implemented, both fish and residents, in and out of the Nookachamps basin would benefit. Why the Corps considers this a "Dam" is beyond me. (see attached photos of Corps design in CA).
19	5	Hart's Slough Storage Great opportunity for restoration if combined with overflow weirs on left and right bank. Flows would be directed into Hart Slough more frequently and improve habitat and fish access. Same with DeBay Slough on left bank of Skagit.
19	6	Sterling Levee Only as an overflow weir to prevent scouring a new channel "out" and should be constructed in combination with a "training" levees to direct flow away from urban areas (SW & Burlington)

No.	Measure Name	Comment:
19	7	Setback levees downstream of 3-br. Corridor In select locations in combination with restoration projects. Priorities should be directed towards flow constrictions and locations without infrastructure.
19	8	Three bridge corridor – Setback levees Only after conveyance has been accounted for "downstream". This is NOT a stand alone project, nor an "early action" project.
19	9	Overtopping Levees Overland conveyance and flow paths need to be identified and evaluated not just for this measure but for potential flood events that will exceed the financial ability of the community to protect itself. This information will be critical to protect the integrity of the levee system and to plan evacuation routes.
19	10	Setback Main stem and North fork Select locations with setback varying from bank to bank, could provide significant conveyance improvements and restoration opportunities. This is probably the most cost effective setback proposal when combined with existing levee improvements where existing alignment is utilized.
19	11	Raise and strengthen existing levees Good idea, certifying levees along Urban areas
19	12	Setback Levees with Excavation Not realistic but maybe feasible in conjunction with restoration of off channel habitat
19	13	Setback Levees w/o excavation Not much conveyance gain unless setback distance is significant. Hard to do in most locations
19	14	Improve levee system – Left bank Good idea
19	15	Improve levee system – Right bank Good idea
19	16	Mount Vernon Floodwall This is a no-brainer and should not wait for GI. Modeling should demonstrate that the impact to WSE elsewhere will be minimal. Combine with training levee downstream.
19	17	North Swinomish Diversion, Avon bypass Possibly a dry, farmable "floodway" type concept. Flow pathways and conveyance all the way to the bay needs to be analyzed and outlet structures put in place.
19	18	Fir Island Bypass, Cross-island connect Could be combined with Nookachamps storage to dramatically improve capacity of existing levee alignment. Widening North Fork is another option that would have the additional benefit of improving habitat on the North fork as well providing similar restoration benefits year round.
19	19	Samish Bypass The No-action, existing conditions alternative needs to be evaluated and documented similar to # 5 and # 9 above.
19	20	Mount Vernon Bypass Should compare to NAPA CA project. This really depends on capacity needed to make this feasible
19	22	Cockreham Island Yes in conjunction with restoration project
19	23	Estuarine Restoration projects (misc) Probably stand alone restoration projects. Includes potential sites on the North Fork
19	24	Riparian Restoration projects (misc.) Should be worked into projects where ever adequate conveyance allows. Good idea.
19	25	Non-structural measures Cost benefit will increase if completed in conjunction with restoration projects
19	26	City of Hamilton Yes.
19	27	Debris Management Please disregard completed WSDOT study and work with DD # 12, # 17 and the cities of Burlington and MV to improve debris management at BNSF bridge before there is a disaster. Need a system wide long term plan to reduce impacts of LWD removal and protect safety of workers.
19	28	Sedro Woolley Sedro Woolley has a natural river terrace and could implement flood plain management restriction on building. This is a potential "Buy-out area" similar to other non-structural measures. The area could also require a minimal berm if necessary for 100-year certification if affordable.
19	29	Sedro Woolley STP Should be constructed as part of City of Sedro Woolley infrastructure improvements and not wait for GI.
19	30	Sedro Woolley Hospital If needed
19	31	Burlington Hopefully the Burlington urban area can be protected with a combination of levees and release areas so as not to create a greater flood risk than current conditions. The key will be conveyance of any overtopping flows. See # 5,9 and 24 above.
19	32	North Mount. Vernon Tetra Tech modeled this years ago and this could be the only way to protect farmland and provide I-5 with 100-year protection.
19	33	West Mount Vernon Makes no sense. It makes more sense to spend the effort on a bypass and accomplish something instead of creating potential problems with no flow reduction.
19	34	East Mount Vernon Could be a minimal effort in combination with Floodwall.
19	35	La Conner Could be combined with north access road to port district property and not wait for GI.
19	36	Clear Lake 2001 design is probably adequate. WCS needed at outlet to Beaver Lake.
19	37	Anacortes Water Treatment Plant Ring dike should be acceptable here. Other option is relocation.
19	General	Skagit GI The Public deserves a lot more detail on all of the measures before the Corps moves on to the next step. It is interesting to listen to the various ways individual members of the Corps team perceive the same measure. We have to make sure that we have the facts right before comparing and then combining proposed measures into alternatives; there is still a lot of work to do in order to produce an accurate cost to benefit evaluation of the measures.

Measure 4 – Nookachamps Storage. Structures are part of Sacramento area river system.



Two styles of passive overtopping weirs which have been used in California for years.
Top: Fremont weir is 1.9 miles long and functions in a 340,000 cfs river system.
Bottom: Tisdale weir capacity is 38,000 cfs. Flow is limited by length/elevation and could be designed to provide 2 to 10 year flood protection for Nookachamps basin.



Measure 4 – Nookachamps Storage. Structures are part of Sacramento area river system.



2,500' Corps designed gated outlet structure, capacity 110,000 cfs, on Sacramento River. 25 individual gates can be operated independently for flow control. Could control filling/evacuating of Nookachamps storage when located directly upstream of BNSF Bridge. Existing levee would be removed and basin flood water evacuation improved.



Corps' Measures Workshop Public Comment Sheet

August 18th, 2008

This is the electronic version of the public comment form. Thank you for providing your comments electronically.

To submit comments, reply to: Lornae@co.skagit.wa.us

Hard copies can be mailed to Lorna Ellestad 1800 Continental Place, Mount Vernon WA 98237 or dropped off at the same address.

Comments will be accepted until **4:00 pm September 30, 2008**.

Name: Hamilton Public Development Authority Phone: (360)755-9717

Address: 833 South 12th Street, Burlington, WA 98233

Email: margaretf@ci.burlington.wa.us

General comments are welcome. To direct a comment towards a specific measure, please identify the measure by the measure name and number as listed in Measure Table 1 (attached).

Comment #	Measure number and name from Table 1.	Comment:
1	25 - Non-structural measures and 26 -Town of Hamilton Relocation	The Corps is to be applauded for including non-structural flood mitigation measures and Town of Hamilton relocation in the Skagit County Flood Damage Reduction Study. Hamilton relocation, in tandem with the removal of floodway structures within the town and surrounding floodway areas, is the most appropriate and cost effective flood mitigation solution for eastern Skagit River reaches. Engineered measures, such as dike, levee, bypass, or flood wall systems are unsuitable for this area because low population densities and high project costs render these not cost effective. Further, the permanent removal of floodway structures and restoration of floodway critical areas to open space would significantly improve natural river processes and reestablish important salmon and wildlife habitats, thus increasing the resource value of this Congressionally designated Wild and Scenic River.
		The Town of Hamilton established the Hamilton Public Development Authority (PDA) four years ago to develop and implement a permanent flood mitigation solution that restores this historic town as a viable and desirable municipality in and around which to live and work, reduces repetitive losses from flood-prone areas of Skagit County, and enhances riparian natural resources. Current PDA representation includes the Town of Hamilton, Skagit County, tribal government interests, The Nature Conservancy, and Skagit County Community Action Agency. Since PDA inception, significant progress has been made toward these flood mitigation and town/environmental revitalization goals, including:
		<ul style="list-style-type: none"> · Expansion of the Hamilton Urban Growth Area outside of the flood plain for the construction of affordable housing and to enable the commercial/industrial development necessary for town revitalization.
		<ul style="list-style-type: none"> · Completion of a benefit cost analysis that demonstrates the cost effectiveness of town relocation and the associated removal of floodway residences.
		<ul style="list-style-type: none"> · Establishment of a Floodway Relocation and Mitigation Credit Program that ties Urban Growth Area development with floodway structure removal and provides floodway residents with funds to assist with relocation costs.
		<ul style="list-style-type: none"> · Water system infrastructure enhancements have been completed in preparation for expanded service with town relocation. Project funds were invested by local, state and federal grants and from private sources.
		<ul style="list-style-type: none"> · Acquisition and removal of floodway structures from within the town and surrounding areas of unincorporated Skagit County. With PDA facilitation, the Town and Skagit County have begun to collaborate on FEMA-funded acquisition projects in order to address this multi-jurisdictional problem more effectively and efficiently. For example, the Town has been awarded FEMA PreDisaster Mitigation program funds to acquire and remove homes located both within town boundaries and areas of unincorporated Skagit County. This collaborative approach is also being used with a FEMA Hazard Mitigation Grant Program application that is pending award determination.
		Although we understand that the U.S. Army Corps of Engineers conducted a study pursuant to Section 205 of the 1948 Flood Control Act (the "205 study"), we question the continued validity of that study. Both the physical and economic data utilized in that 1982 study is dated. The risk of flood hazard to the Town of Hamilton and the surrounding area is likely much greater than that assumed in the 1982 study. Construction costs have increased significantly in the Skagit Valley over the past 25+ years. As such, the conclusions reached in the 205 Study cannot be relied upon as being an accurate predictor of the Benefit to Cost ratio.
		The PDA seeks to partner with the Corps to promote the timely implementation of non-structural mitigation measures that will promote Hamilton relocation. In particular, significant funds are required to undertake large-scale floodway acquisition/restoration projects; including property purchase, structure removal, and reestablishment of natural river processes and salmon and wildlife habitats. Partnerships with the Corps and others are crucial because FEMA grant program funding limitations and program restrictions threaten town relocation success. Town relocation, and non-structural measures in general, are more cost effective than structural measures for low-population eastern Skagit County areas.

From: DON MOE [moe@sos.net]

Sent: Tuesday, September 30, 2008 1:22 AM

To: LornaEllestad

Subject: Public comments: ACOE measures workshop, Skagit River GI

Follow Up Flag: Follow up

Flag Status: Purple

A few other other comments I would like to add, to go with the comments written by our atty. John Shultz for Dike District No.1.

1. The benefit-cost ratio would be greatest for "that project" that maintains the integrity of the levee during any flood event regardless of the size. For example , if we can send 165,000 cf/s down the main channel of the river during a 150 to 200 yr. event, we have probably done the greatest service to the community. I find little comfort preparing for the "benchmark" 100 year event, knowing that we didn't prepare the levees for a greater flood event. The most valuable measure to this community would be that measure that could possibly prevent a devastating collapse of the levee system.
2. Would we have increased sedimentation with the setback proposals, and would this eventually offset any short term advantage? The scouring created by the velocity of the water in a narrow channel keeps the sediment moving.
3. Could interlocking sheet pile driven into the levee [40 to 50 ft] be used as a measure to protect some areas, especially densely populated areas. Purchasing property for levee setbacks can be cost prohibitive.

Respectfully, Donald Moe
Commissioner DD1

Corps' Measures Workshop Public Comment Sheet

August 18th, 2008

This is the electronic version of the public comment form. Thank you for providing your comments electronically.

To submit comments, reply to: Lornae@co.skagit.wa.us

Hard copies can be mailed to Lorna Ellestad 1800 Continental Place, Mount Vernon WA 98237 or dropped off at the same address.

Comments will be accepted until **4:00 pm September 30, 2008.**

Name: Todd Carlson

Phone: (360) 757-5980

Address:

email: carlsot@wsdot.wa.gov

General comments are welcome. To direct a comment towards a specific measure, please identify the measure by the measure name and number as listed in Measure Table 1 (attached). Example below:

Measure number and name from Table 1.	Comment:
Add'l. storage at Upper Baker Dam	Generally speaking, using existing infrastructure as intelligently as possible seems to be the highest priority. Ultimately the cost/effectiveness of these "storage" measures need to be weighed against other build or non-structural measures.
Add'l. storage at Lower Baker Dam	
Add'l. storage at Ross Dam	
Three bridge corridor – Setback levees	Although we at WSDOT have made accommodations for these dike set backs (in the I-5, Conway to Cook Interstate Master Plan) it is unclear how effective this strategy is as compared to other measures. If the dikes were not set back, the replacement cost of the Interstate 5 Skagit River Bridge would be significantly lower.
Overtopping levees	WSDOT concern would be what state highways would be under water and for how long.
Debris Management	Very critical to the preservation of the existing bridges.

Corps' Measures Workshop Public Comment Sheet

August 18th, 2008

Name: Curt Miller

Measure Number	Measure Name	Comment:
1	Add'l. storage at Upper Baker Dam	Non-structural solutions need to be emphasized. These include whatever storage is available behind existing dams (measures 1, 2, 3) and focusing on the middle Skagit. This focus includes providing assistance to move residences out of the floodway, moving the Town of Hamilton (#26), buying out or leasing or getting a conservation easement on Cockreham Island (and removing the dike) (#22) and making the floodplain available to the river and its processes and ability to store water. These actions need to be supported by regulations (many of which are in place) and enforcement and addresses many goals (reduces recurring losses, improves habitat, provides floodwater storage).
2	Add'l. storage at Lower Baker Dam	Non-structural solutions need to be emphasized. These include whatever storage is available behind existing dams (measures 1, 2, 3) and focusing on the middle Skagit. This focus includes providing assistance to move residences out of the floodway, moving the Town of Hamilton (#26), buying out or leasing or getting a conservation easement on Cockreham Island (and removing the dike) (#22) and making the floodplain available to the river and its processes and ability to store water. These actions need to be supported by regulations (many of which are in place) and enforcement and addresses many goals (reduces recurring losses, improves habitat, provides floodwater storage).
3	Add'l storage at Ross Dam	Non-structural solutions need to be emphasized. These include whatever storage is available behind existing dams (measures 1, 2, 3) and focusing on the middle Skagit. This focus includes providing assistance to move residences out of the floodway, moving the Town of Hamilton (#26), buying out or leasing or getting a conservation easement on Cockreham Island (and removing the dike) (#22) and making the floodplain available to the river and its processes and ability to store water. These actions need to be supported by regulations (many of which are in place) and enforcement and addresses many goals (reduces recurring losses, improves habitat, provides floodwater storage).
4	Nookachamps storage	Do NOT mess with the Nookachamps. It currently provides a needed function by storing water as needed. Adding additional dikes in this area should be a non-starter.
7	Setback levees	This should be emphasized. Increase capacity of the river to handle more water and provide additional habitat along the river. Improvements to bridges and other infrastructure should be held to a minimum (increases costs and puts the limited moneys into the wrong things). A cross Fir Island channel would reduce the need to make modifications to the North and South Fork bridges. These measures need to be in place before upriver modifications are made in the Three Bridge Corridor.
8	Three Bridge Corridor	Leave the BN bridge in place until downriver measures are in place.
10	Setback levees	This should be emphasized. Increase capacity of the river to handle more water and provide additional habitat along the river. Improvements to bridges and other infrastructure should be held to a minimum (increases costs and puts the limited moneys into the wrong things). A cross Fir Island channel would reduce the need to make modifications to the North and South Fork bridges. These measures need to be in place before upriver modifications are made in the Three Bridge Corridor.
18	Fir Island Cross Connector	In concert with Measures 7, 10, this measure would do much to handle the additional water coming downriver from measures implemented in the urban areas upriver. In addition, it would address the conservation of agriculture lands (after the initial take for the channel) and provide needed sediment to the estuarine area in the middle of Fir Island (this would protect the current levee and add estuarine habitat).
20	Mount Vernon Bypass	A containment levee across River Bend was presented in the "Skagit River Big Bend Reach Habitat Resaturation Feasibility Study", Miller Consulting, 2004 as a means for additional water storage, protecting commercially zoned land in Mount Vernon and incorporating a scarce resource in the lower Skagit - a riverine wetland. This would work in conjunction with the Big Bend cut-off levee (#21)
21	Riverbend Cut-off Levee, Big Bend	A containment levee across River Bend was presented in the "Skagit River Big Bend Reach Habitat Resaturation Feasibility Study", Miller Consulting, 2004 as a means for additional water storage, protecting commercially zoned land in Mount Vernon and incorporating a scarce resource in the lower Skagit - a riverine wetland. This would work in conjunction with the west Mount Vernon bypass (#20)
22		Non-structural solutions need to be emphasized. These include whatever storage is available behind existing dams (measures 1, 2, 3) and focusing on the middle Skagit. This focus includes providing assistance to move residences out of the floodway, moving the Town of Hamilton (#26), buying out or leasing or getting a conservation easement on Cockreham Island (and removing the dike) (#22) and making the floodplain available to the river and its processes and ability to store water. These actions need to be supported by regulations (many of which are in place) and enforcement and addresses many goals (reduces recurring losses, improves habitat, provides floodwater storage).
25	Mount Vernon Bypass	Non-structural solutions need to be emphasized. These include whatever storage is available behind existing dams (measures 1, 2, 3) and focusing on the middle Skagit. This focus includes providing assistance to move residences out of the floodway, moving the Town of Hamilton (#26), buying out or leasing or getting a conservation easement on Cockreham Island (and removing the dike) (#22) and making the floodplain available to the river and its processes and ability to store water. These actions need to be supported by regulations (many of which are in place) and enforcement and addresses many goals (reduces recurring losses, improves habitat, provides floodwater storage).
26	City of Hamilton	Non-structural solutions need to be emphasized. These include whatever storage is available behind existing dams (measures 1, 2, 3) and focusing on the middle Skagit. This focus includes providing assistance to move residences out of the floodway, moving the Town of Hamilton (#26), buying out or leasing or getting a conservation easement on Cockreham Island (and removing the dike) (#22) and making the floodplain available to the river and its processes and ability to store water. These actions need to be supported by regulations (many of which are in place) and enforcement and addresses many goals (reduces recurring losses, improves habitat, provides floodwater storage).
29	Sedro-Woolley STP	Ring dikes appear to be costly to construct and are of dubious merit - so should be considered only for singular infrastructure elements (Anacortes Treatment Plant #37 and/or S.W treatment plant #29) and NOT for larger commercial and residential areas.
37	Anacortes Water Treatment Plant	Ring dikes appear to be costly to construct and are of dubious merit - so should be considered only for singular infrastructure elements (Anacortes Treatment Plant #37 and/or S.W treatment plant #29) and NOT for larger commercial and residential areas.
39	Setback levees	No Descriptor for this number
General	General Comment	A project of this magnitude will have to be implemented over time and incrementally. As this occurs, upriver changes that affect hydrology and water quantity need to be off-set by actions down river that will be able to accommodate those changes. Intuitively, it makes sense to start work downriver and work upriver.
General	General Comment	Emphasis should be placed on measures that provide multiple benefits, not just flood protection. Benefits need to include reduction of recurring losses, reestablishment of floodplain function, increased habitat, public access.



September 30, 2008

Linda Smith, Project Manager
U.S. Army Corps of Engineers, Seattle District
PO Box 3755
Seattle, WA 98124-3755

RE: City of Burlington Review Comments, Seattle District of the U.S. Army Corps of Engineers
Flood Measure Presentation to the Skagit County Flood Control Zone District Advisory Committee,
18 August 2008

Dear Ms Smith,

Thank you for your presentation on August 18th. The following are the City's review comments:

1. In general, the presentation lacked substance and detail we consider essential to any serious evaluation of flood measures in the complex Skagit River system. Furthermore, the Powerpoint summary shown at the meeting was not the same version that is available from the Corps on the County web page. The posted version includes no benefit/cost information. We are disappointed that the version containing the benefit/cost information was not made available to the general public. Overall, the Powerpoint presentation is only an empty shell without any published source reports – including draft reports. The lack of substance significantly detracts from the credibility of the presentation. We would like to review the source reports and we request these reports be made available to the public, if they exist.
2. A review of previous correspondence (October 11, 2007 Executive Committee Meeting and Project Management Plan dated October 12, 2007) seems to indicate a total monetary effort in FY2007 and FY2008 of \$2.215 million (from table 12)¹. To our knowledge, the only General Investigation work products produced by the Corps in that time frame (October 2006 to present) consist of 1) this recent presentation, and 2) a Powerpoint presentation entitled, "Analysis of Proposed Flood Damage Reduction Measures" in January 2007. We are not sure whether the Corps received the \$685,000 of funding for FY2008 that was expected at the time of the October 11, 2007 meeting. We recognize that recent funding provided by the Federal government has not been adequate to meet the level of effort anticipated in the October Executive Committee meeting. Nevertheless, we are puzzled why the GI process, even at the current funding level, is not generating significant new work products that add value and substance to the study effort, are made available for public review and comment, and revised and finalized based on that input. It appears the Project Management Plan calls for at least 13 major reports, some of which may be published in

¹ A different Table 12 was apparently handed out at the Executive Committee meeting which indicated a County contribution of \$1,585,000 for both FY07 and FY08. This note is not included in the project management plan and it is uncertain when or how much of this County funding component was directed to the overall effort.

parts. Other than the hydrology and hydraulic evaluation work that was completed for FEMA and presumably could be modified reasonably simply to comply with GI format requirements, we have seen no draft reports in FY2007 or FY2008. We want to see the work products, if they exist. However, if they do exist, they are not available on either the County or the Corps web page.

3. Recently, we have heard that the likely funding level from the Federal government in FY2009 is between \$250,000 and \$375,000. Given the best case of \$375,000 in FY2009, it would appear this is less than 1/3rd of the funding envisioned for FY2009 in order to keep the GI process on schedule, which has presumably already slipped in FY2008 due to less funding received than projected. Assuming that the study is already a year behind what was envisioned one year ago, and anticipating a federal funding level of about \$375,000 per year from this point on, it looks to us like the completion date envisioned in the Project Management Plan must slip to at least 2015, not 2010 as currently shown. But we have also noticed there appears to be very little productivity from the Corps at the current funding levels. We are not sure, for example, how much of the possible \$375,000 (and presumably, a County match of \$375,000) is actually put to use to accomplish new work products, as opposed to paying administrative overhead. We are interested in the Corps' assessment of staff efficiency at various funding levels. It appears to us that even a projected completion date of 2015 is optimistic.

4. We are disappointed to note the dearth of work product produced regarding the Baker Hydroelectric project, additional flood storage. This item was emphasized by the Community as being a high priority, and we were assured it would be. Again, there are apparently no work products produced that would provide information to move this important component forward.

5. We do not understand why the Corps will not address the issue of overstated and incorrect hydrology, and we request the Corps do so. In the last two years, the Cities, Dike Districts, and the County have produced substantive original research and analysis which, taken as a whole, clearly indicates the historic flood events are still significantly overstated, despite the 2007 USGS updated figures. This is a matter of importance to key stakeholders in the process and we believe further evaluation of measures, including design to the 35% stage, is a waste of time until this foundational issue is resolved. Addressing this issue and resolving it carries with it the possibility of turning Burlington's strong opposition to the GI study, into enthusiastic support. But until the foundational hydrology issue is addressed and resolved, it is not reasonable and inefficient for the study to proceed. On its current path, with the hydrology issue unresolved, we believe the study is fatally flawed. According to Colonel McCormick in October 2007, it apparently is the Corps' position that hydrology will be addressed "at the end." This does not make sense to us.

To summarize, the City of Burlington has major concerns about the lack of work product being produced in this effort; the "real" timeline to produce a final outcome; the lack of progress that was promised on a range of deliverables, most particularly the Baker storage issue; and the Corps' intransigence in addressing the underlying hydrology, which is clearly wrong and must be corrected for flood measures to be properly evaluated.

Thank you for the opportunity to comment.

Chal A. Martin, P.E.
Public Works Director / City Engineer

Corps' Measures Workshop Public Comment Sheet August 18th, 2008

Comments by Leonard Eliason, Dike District 17 Commissioner, Submitted Sept 30, 2008

Measure Number	Measure Name	Comment:
7	Setback levees downstream of 3-br. Corridor	Good idea
8	Three bridge corridor -- Setback levees	Good idea
9	Overtopping levees	Bad Idea
10	Setback Main stem and North fork	Good idea
11	Raise and strengthen existing levees	Good idea
12	Setback Levees with Excavation	Good idea
13	Setback Levees w/o excavation	Good idea
14	Improve levee system -- Left bank	Good idea
15	Improve levee system -- Right bank	Good idea
16	Mount Vernon Floodwall	Good idea
17	North Swinomish Diversion, Avon bypass	Good idea, but not worth much if the water is held up by the 3 bridge corridor.
19	Samish Bypass	Good idea to divert water prior to the 3 bridge corridor

The Nature Conservancy of Washington (TNC)

Comments to Skagit County re: Corps Measures presented on 8/18/2008

The Nature Conservancy of Washington (TNC) appreciates the opportunity to provide public comment on the Army Corps of Engineers' Measures Presentation held at the PUD #1 building on Monday, August 18th, 2008. TNC is actively engaged in the County's Comprehensive Flood Hazard Management Program (CFHMP) and will continue to provide input to the process through its position at the Environmental Technical Committee and at the Advisory Committee. While we are encouraged by the process convened by the Skagit County Commissioners, TNC would like to take this opportunity to provide the following comments on the process and Measures to date.

- 1) The opportunity is before us to integrate the General Investigation (GI) work done by the Army Corps and the CFHMP process being developed by Skagit County. TNC encourages continued collaboration and cooperation between both parties so that the acceptable result can be achieved for all concerned. Requesting this public presentation of the Army Corps' measures was a good start toward sharing information and connecting these processes. TNC encourages the County and the Corps to consider referencing other existing planning processes (e.g. salmon recovery plans, local comprehensive plans, etc) for potential projects in addition to the Measures identified in the GI.

- 2) TNC is concerned that the Army Corps has not performed any environmental review of the 37 Measures proposed in the GI. Yet, during the presentation, Corps leadership commented on the viability of several projects in relation to others. Without a review of environmental costs and benefits, Measures should not be considered as likely, probable, or even viable. Environmental review of the Measures is an important step in the selection process and TNC encourages the Corps to expedite the environmental review process to catch up to the preliminary cost benefit analyses being performed.

- 3) The identification and development of non-structural Measures lags far behind the lengthy list of potential dike, levee, and dam projects. TNC believes that non-structural approaches to flood hazard management are a critical piece of a successful CFHMP and GI effort. TNC recommends that specific time and effort be dedicated to brainstorming, identifying and developing non-structural measures. It is often these “outside of the box” efforts that result in the projects with multiple benefits and broad-based community support. Since broad community support will be required for implementation of costly flood control projects, we encourage the consideration and development of Measures that will encourage multiple community benefits and positively affect multiple user groups. For example, Measures that have a strong flood control component, but also include salmon recovery, clean water, and/or recreational benefits to the community. While we realize the GI Measures have not been developed to contribute more than enhanced flood hazard management to the community, we believe the opportunity exists to either adapt or redesign some of these measures so they provide multiple benefits.

- 4) In general, TNC encourages a more holistic approach to flood hazard management than the list of engineered Measures provided by the Corps. While these Measures will likely provide valuable analysis, we are hopeful that the CFHMP will be more than just a list of disparate structural projects, and rather, will take a comprehensive approach to addressing the many needs and concerns of Skagit County residents, including:
 - a. Continued agricultural viability
 - b. Progress toward salmon recovery
 - c. Sustained economic viability
 - d. Enhanced tourism
 - e. Increased recreation opportunities

The Nature Conservancy appreciates the opportunity to remain engaged in developing an effective flood hazard management program for Skagit County. It is our belief that the list of Measures provided by the Corps from their GI analysis provides a good starting point for the County to expand its vision of what can be achieved through a Comprehensive Flood Hazard Management Plan. We will remain active and involved in the process and we will propose other Measures and process-related comments, as possible. While the task ahead is significant, the opportunity exists to develop a program that assists the people of Skagit County, as well as the natural environment and local economy. Our vision and our goal should be larger than a list of new dikes and levees.



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Padilla Bay National Estuarine Research Reserve • Breazeale-Padilla Bay Interpretive Center
10441 BayView Edison Rd • Mount Vernon, WA 98273-9668 • (360) 428-1558

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SKAGIT COUNTY
PUBLIC WORKS ADMIN

September 30, 2008

TO: **Lorna Ellestad, Skagit County Public Works**
Linda Smith, ACOE, Skagit Project Manager

FROM: Terence Stevens, Director *TS*
Padilla Bay National Estuarine Research Reserve

SUBJECT: Comments on Skagit River Flood Management Plan Update and ACOE
Flood Reduction Study Preliminary Measures Document (8/18/08)

As a long-standing participant in the Skagit River flood management planning effort, and most recently an appointee to the project's Environmental Technical Committee, I greatly appreciate the opportunity to provide comments. Please be aware that over the past dozen or more years we have provided substantive comment at many previous opportunities related to the Skagit River project, including applicable letters from our state (Department of Ecology) and federal (NOAA) offices and the Governor. The items of discussion in those letters are still pertinent to the Skagit River project and your internal review of those communications, as well as selected ACOE legal opinions, may be advantageous to your current process.

In reviewing the many flood control options presented and recent materials distributed, the following comments are offered:

1. We are a National Estuarine Research Reserve, not a "Sanctuary". The National Estuarine Reserve System was created by federal legislation in 1972 (Section 315 of the Coastal Zone Management Act).
2. There is a federal-state agreement regarding the long-term protection of the environmental integrity of Padilla Bay.
3. We are supportive and appreciative of the ACOE policy that flood control measures cannot encourage development in the rural areas.
4. The transport of toxic materials, animal waste and human sewage during floods is a major concern. Flood control options need to include an evaluation of the location of these material sources and include prevention and protection measures.



5. Control Measure 9--(ACOE Preliminary Measures Presentation Handout, 8/18/08, pp. 26-27):
 - a. Depending on where the levees are overtopped, the flow and destination (receiving waters) need to be reviewed and evaluated for impacts. Where would bay-front dikes be opened to release flood waters?

6. Control Measure 17--Swinomish Bypass, pp. 41-42:
 - a. The description (p. 41) of this flood control option states that it "diverts water out of the Swinomish Channel to Padilla Bay". I believe it should read, "diverts water out of the Skagit River near Avon and carries it to the Swinomish Channel just south of Padilla Bay".

 - b. P. 42," Potential Disadvantages"
 - i. Note that we are not a Marine Sanctuary but a National Estuarine Research Reserve.
 - ii. It is correct to state that impacts to the Swinomish Slough are unknown. Also unknown are impacts to the Town of LaConner, Highway 20 bridge structures, land and drainage system along the Channel, and impacts to lands across the Channel (the site of a planned tribal marina).
 - iii. Annual, five year and ten year flooding into the Swinomish Bypass need to be evaluated.
 - iv. A major and highly significant unknown is the potential damage to the eelgrass beds in Padilla Bay caused by the addition of flood sediment and other materials. Padilla Bay eelgrasses are a highly-productive nursery for several commercially-valuable species and constitute one of the largest eelgrass meadows on the west coast.
 - v. If the bypass area between the containment berms were to be used for agriculture and/or recreation, how does a flood impact the sustainability of these uses; what would the cost be to repair these damages?

The Reserve will continue its collaboration with county and ACOE staff on Skagit River Flood Management Planning and would be happy to meet to discuss potential impacts to Padilla Bay and identify methods to address the key issues. We have done this several times in past years and could provide all historic and current materials you feel are relevant and necessary to the on-going process.

Corps' Measures Workshop Public Comment Sheet

August 18th, 2008

This is the electronic version of the public comment form. Thank you for providing your comments electronically.

To submit comments, reply to: Lornae@co.skagit.wa.us

Hard copies can be mailed to Lorna Ellestad 1800 Continental Place, Mount Vernon WA 98237 or dropped off at the same address.

Comments will be accepted until **4:00 pm September 30, 2008.**

Name: Michael See

Phone: (360) 848-6282

Address: 4694 Skagit River Place, Mount Vernon WA

email

Skagit991@yahoo.com

General comments are welcome. To direct a comment towards a specific measure, please identify the measure by the measure name and number as listed in Measure Table 1 (attached). Example below:

Comment #	Measure number and name from Table 1.	Comment:
1	Measure 1,2,3 - Increased Dam Storage	The limited amount of benefit towards flood risk management does not justify pursuing these measures.
2	Measure 4- Nookachamps Storage	The impact on the communities in the Nookachamps Watershed should be considered.
3	Measure 7- Levee Setbacks- 3 Bridge Corridor	The project design of this measure will be critical in the evaluation of measures above and below the project since the flow through this reach will be limited by the design.
4	Measure 17, 18, 19, 20- Bypass Channels	It is important to consider bypass channels in conjunction with other measures.
5	Measure 23, 24- Restoration	These measures will be important to incorporate into any selected measures so as to gain public support and support of the environmental community.

From: TomKarsh
Sent: Wednesday, October 01, 2008 11:56 AM
To: LornaEllestad
Subject: Skagit GI preliminary measures comment

Follow Up Flag: Follow up
Flag Status: Purple
Lorna,

I believe the Skagit GI needs to have a more thorough explanation on why dredging has been screened out as a viable measure. I can't recall a public meeting/hearing on the topic of flood risk reduction in which dredging is not advocated by someone from the public. Is the bed of the river filling in? If so, what will be the consequences in 100 years? Will dredging be required at some point in time? The measures presentation slide on dredging indicates that 60 million cubic yards would need to be dredged every three years from the mouth of the river to Sedro Woolley. However the draft (10 Nov. 2005) hydrology report indicates (2.3 Sediment) that the river moves about 100 million tons annually, but only 4 feet is expected to accumulate at the mouth (2 feet at Mount Vernon) over the next 100 years. This information needs to be correlated in some way. For example, at Mount Vernon, if only (on the average) one quarter of an inch of sediment accumulates per year (24"/100 years) then why do we need to dredge every three years? If the reason for not dredging is due to environmental damage, what damage? Ideally the explanation should present a compelling rationale for discarding dredging as a viable flood risk reduction option.

Cheers

Tom Karsh, Special Projects
Skagit County Department of Public Works
1800 Continental Place
Mount Vernon, WA 98273
(360) 419-3373

-----Original Message-----

From: Tom [<mailto:tom@skagitcd.org>]

Sent: Friday, October 10, 2008 8:32 AM

To: LornaEllestad

Subject: Re: Comments on Corps flood control measures presentation

Skagit Conservation District (SCD) reviewed the presentation on proposed Skagit County Flood Control Measures, which the US Army Corp's of Engineers made on August 18, 2008 and wishes to make the following comments.

Of the various measures described, SCD favors Measure No. 9 "Overtopping Levees" and Measure No. 18 "Fir Island Bypass." Measure No. 9 is consistent with the WRDA principle of discouraging development in floodplains and favoring non-structural methods. Areas where overtopping could occur without causing unreasonable damage to property should be identified and the county should develop a program for purchasing flood easements on those sites. For example, fallow agricultural areas could be allowed to flood, provided that provisions are made to allow the water to return to the river after the flood stage drops (e.g. by a system of floodgates located below the crest of the spillways) and to pay to clean up flood debris from the fields prior to the next season's planting.

Measure No. 18 seems promising, particularly if it could allow continued agricultural use and/or restore estuary habitat conditions for salmon along some or all of the flood bypass route. This measure could be expanded to reconnect flood flows from the Skagit River to relic sloughs and side channels throughout the river basin that currently have no or only marginal connection to the river. For example, Dry Slough, the upper reaches of the Sullivan's Slough system, Fisher Slough, Hart Slough, Skiyou, Gilligans, Etach, and others. Each project would need some kind of minimal overflow structure to regulate flood flows from the river, and some kind of outlet structure for return flows when the river stage drops. Each individual project may not in itself provide much flood storage capacity, but taken together, several such projects probably could account for a worthwhile quantity of storage capacity.

Tom Slocum, PE
Washington Conservation Districts Northwest Region Engineer
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Mount Vernon, WA 98273
Tel. (360) 428-4313
Fax (360) 424-6172