Ebey Island Restoration Feasibility Study
Advisory Committee Meeting #4
November 16, 2010

Submitted to:
Washington Department of Fish and Wildlife
16018 Mill Creek Boulevard
Mill Creek, WA 98012-1541

Submitted by:
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Bothell, Washington 98011

December 10, 2010

AMEC Project No. 0-915-16971-0

The following notes were recorded at the November 16, 2010, meeting of the Stakeholder Advisory Committee (AdCom) for the Ebey Island Restoration Project (EIRP) Feasibility Study. A list of meeting attendees and their affiliations is included. The committee met from 3:00 to 5:30 PM in the conference room at the Washington Department of Fish and Wildlife's (WDFW) offices in Mill Creek, Washington. Questions regarding these notes should be directed to Cleve Steward, Consultant Project Manager, tel. 206.719.1260, cleve.steward@amec.com.

Project Goal

The goal of this project is to evaluate the technical and social feasibility of restoring high quality, tidally-influenced aquatic habitat on 1,237 acres of WDFW-owned land on Ebey Island, and, in consultation with the project Advisory Committee, to select a preferred alternative that would generate the greatest biological and social benefits.

Attendees

AMEC Consultant Team:
Cleve Steward
Ryan Bartelheimer
Dan Evans (Dan Evans Consulting)
Walker Stanovsky
Tad Schwager
Matt Brennan (ESA PWA, formerly Philip Williams & Associates)
Bob Battalio (ESA PWA, formerly Philip Williams & Associates)

WDFW:
Richard Tveten, Project Director
Doug Hennick, Fish and Wildlife Biologist
Russell Link, Program Manager
Ruth Millner, District Wildlife Biologist
Kye Iris, Property Acquisitions
John Garrett, Wildlife Area Manager
Belinda Schuster, Assistant Wildlife Area Manager

Advisory Committee:
Everett Alexander, Diking District (DD) 1 Commissioner
Phil Cunningham, Diking District 1 Commissioner
Kate Halstead, Sno-Valley Tilth
Kurt Nelson, Tulalip Tribes
Maria Calvi, Tulalip Tribes
Mike Blackbird, Pilchuck Audubon
Monte Marti, Snohomish Conservation District
Sharon Swan, Snohomish County Parks and Recreation
John Engel, Snohomish County Public Works, Surface Water Management
Chuck Lobdell, Ducks Unlimited
Graeme Peters, Ducks Unlimited
Micah Wait, Wild Fish Conservancy

Casey Rice, NOAA fisheries

Meeting Notes

I. Introduction
   A. Cleve: Welcome
   B. Roll call
   C. Richard: Restatement of WDFW mission / dual mandate
      1. Protect fish & wildlife habitat
      2. Provide sustainable fish & wildlife related recreation
   D. Cleve: State of the project
      1. About 75% complete
      2. Today's meeting presents modeling results
      3. Structure for this meeting
         a. Technical presentation of modeling
         b. Breakout discussion groups
      4. Future steps
         a. After AdCom meeting #4, incorporate feedback into draft report
         b. Send to AdCom members 1-2 weeks before last AdCom meeting
         c. Incorporate further comments into final report
         d. Discuss if/how this group will persist
         e. Open public meeting at end of project
      5. Request for advice or suggestions of other future directions
      6. May seek further funding
         a. Could seek to evaluate EIRP more broadly
         b. As model project within framework of larger land strategy
II. Ryan: Review of restoration alternatives
   A. Near-term alternative (originally Alternative M)
      1. Where does restoration make most sense with current ownerships?
      2. Difficulty of dikes in Ebey Island interior?
         a. DD #1 not comfortable with any full-height interior dikes
         b. Geotech analysis sees possibilities to design around the challenges
      3. Interior dike, full height at SE corner of island
         a. Located immediately east of the petroleum pipeline corridor
         b. Results separable from other components for modeling
         c. DD still not in favor
      4. Yellow area (on slide) – Partial-height dike with muted tidal exchange
         a. Self-regulating tide gate
         b. In some locations, theoretical dike height is barely higher than ground
      5. Length of accessibility to fish
         a. Can be improved to long periods
         b. Uses low flow-rate control structures for longer duration of access
   B. Long-term alternative (originally Alternative C)
      1. Full tidal restoration across entire island center, splitting the DD
      2. New water-control structures are required to maintain DD functions outside of the project area
      3. This is different than in near-term alternative in that the water control structures are to provide the muted tide conditions in the restoration area
   C. 1938 aerial photo shows historic channels
      1. Not exactly followed in proposed alternatives
      2. But were used to suggest effective areas

D. Conceptual cross-sections for full and muted dikes
    1. Gives sense of different volumes:
        a. Water in tidal areas
        b. Fill in dikes
E. Next steps
    1. Adjust modeling results
    2. Start thinking about engineering solutions
F. John Garrett: Estimated acreages?
    1. Ryan: Don't have it now, but was presented in earlier AdComs
    2. Matt: Ballpark numbers from memory:
        a. Near term alternative muted areas about 100 acres each
        b. Near term full tidal area about 500 acres
        c. Full restoration about 1200 to 1500 acres

III. Matt: Presentation of modeling results from ESA PWA
A. Slide 1 – Hydraulic Modeling Assessment
    1. Reintroduce himself in person, after participation by phone in AdComs 2 and 3
    2. Reintroduce Bob Battalio
B. Slide 2 – Hydraulic modeling objectives
    1. Focus has been on hydraulic modeling assessment
    2. How could restoration affect "plumbing" of the system?
        a. Habitat conditions – primary focus
            i. Hydraulic structure design
            ii. Interior dike design
        b. Potential impacts (to neighbors, etc.)
            i. Tidal water levels in island areas not regularly inundated now
            ii. Scour and geomorphic change as channels readjust
            iii. Flooding
C. Slide 3 – Modeling tools
    1. UNET, developed by FEMA in late 1990s to early 2000s
        a. Used for flood mapping
        b. Benchmark for comparison of restoration to existing
        c. Consists of 1-dimensional network of channels
        d. Also uses reservoir / storage areas
        e. Problem: Doesn't represent sophisticated structures, as in muted tidal
    2. HEC-RAS
        a. Developed by Army Corps of Engineers
        b. Incorporates UNET, which is now outdated
        c. Allows for more sophisticated structure operations
D. Slide 4 – Near Term Alternative
    1. No new flow pathways
    2. Appendages to sloughs in muted tidal
    3. Expanded floodplain of Ebey Slough
E. Slide 5 – Long Term Alternative: by contrast, creates new flow connectivity between Ebey Slough and Snohomish River
F. Slide 6 – Full tidal habitats, Ebey Slough water levels, August 2002
    1. What kind of tides in fully restored areas?
    2. Shows 3 scenarios in Ebey Slough
    3. Almost same as existing; slight decrease in range
    4. Chose 2002 as characteristic year
        a. Flood peak close to 2-year return event
        b. Dry season fell in typical time band

G. Slide 7 – Existing ground surface elevation
    1. Current bathymetry (LiDAR)
    2. Color-coded relative to tide elevations
    3. Micah: How accurate are data within forested area?
        a. Matt: Will get back to that.
        b. Additional day of foot-based survey
            i. Made a loop down pipeline
            ii. And a few transects across the forest
        c. Elevation under canopy is similar to surrounding clear area, above MTL
    4. Casey: Estimate of how far LiDAR is off?
        a. Data are recent, bare-earth model
        b. Matt: Maybe 10 to 20 feet off in high trees
            i. LiDAR shows highest elevation equal to levee crest
            ii. This is very unlikely to be accurate
        c. Casey: LiDAR people said it should be good
            i. Accuracy of these data is an important question
            ii. Survey downstream in forest seems to be much closer to correct
        d. Bob: Invested some budget in new field data, which support the concern
        e. Matt: Survey crew said interior is visually dense, with visibility of about 20 feet
    5. Full tidal restoration would inundate ground about 50% of the time
    6. Muted areas
        a. Would be inundated most of the time if subjected to full tide range
        b. According to biologists, this wouldn't be consistent with habitat objectives
H. Slide 8 – Near Term Alternative, Muted areas (HEC-RAS)
    1. Next slides focus on NE muted area
    2. Made iterations toward initial optimization of design elements
    3. Summary of initial culvert / tide gate specifications
I. Slide 9 – Muted tidal area habitat, WY 2002 water levels
    1. Full year of data
    2. Slough has about a 10- to 11-foot tide range
    3. Muted areas have a typical water depth of 6 inches
J. Slide 10 – Muted tidal area habitat, Water levels for 'typical' (~Q2) winter discharge
    1. Zooms in on January
    2. High flow of about 50% probability in any given year
    3. Slough flow is controlled by discharge, rather than tides as normally
    4. No drainage in muted area
    5. Flat water surface elevation throughout this period
    6. Stationary pond for about 6 days
    7. In wet season, corresponds to lowest tide range of the year
K. Slide 11 – Muted tidal area habitat, Dry season water levels
    1. Zooms in on August
    2. Inflow through culvert barely keeps up at lowest tides
    3. Gives a ballpark for culvert sizing
    4. Kurt: Tide gate appears to be open about 25% of the time?
        a. Matt: Yes, see next slide
    5. Russell: How are muted tidal areas designed?
        a. To fulfill some limiting factor on Chinook in the system?
        b. Matt: Designed to mimic intertidal habitat with subtidal channels
        c. Russell: Designed to mimic that?
        d. Matt: Today's presentation is initial estimat looking for input from biologists on how to optimize.

6. Chuck: 2 concerns
    a. Does muting compromise vegetation by allowing undesirable species?
    b. Where does 6-inch inundation as optimal come from?
    c. Matt: Tad and biologists will keep working on this
    d. Chuck: 6 to 8 hours of 6-inch water will allow canary grass, for example
    e. Tad: Matt modeled based on current land elevation
        i. Land has subsided
        ii. Modeled to allow full area to be covered and drained with each tide cycle
    f. Chuck: Just suggesting it as a consideration
    g. Cleve: We're trying to determine optimal parameters from the literature
    h. Any addition to our sources is helpful
7. John Engel: What is typical elevation in this area?
    a. Matt: About 2 feet NAVD in NE muted area, about 1.5 ft higher in NW muted area
    b. Low tide is deeper than this in channels within each area

L. Slide 12 – Muted tidal area habitat, Hydraulic structure flow conditions
1. Shows flow velocities
2. Width of bands indicates how often tide gate is open
3. Closed period occurs with water *in*, so it stands in the area
4. First indication of duration of fish access
    a. Alternative is several smaller structures
    b. They would allow fish access but no significant hydraulic flows

M. Slide 13 – Total discharge in Ebey Slough, Downstream of restoration
1. Kurt Nelson: This is with existing ground elevation.
    a. Does interior dike add additional tidal prism?
    b. Ryan: Fish are surface and edge oriented
        i. Small orifices at various elevations give fish best chance to find passages
        ii. As used, for example, at Cherry Creek
2. Cleve: Do we know anything about interior dike height yet?
    a. Ryan: Will come with upcoming engineering
        i. Currently thinking about 2 to 3 feet of freeboard
        ii. Depends on many engineering constraints
    b. Everett: DD will want internal dikes at full height
        i. Cleve: Why?
        ii. Everett: If anything goes wrong, it won't flood the island.
        iii. Ryan: There are other engineering solutions to mitigate those risks
            (a) Details may be outside scope of feasibility study
            (b) Need to provide assurances to DD
3. Russell: Draft report should include examples of existing structures
    a. Like those proposed for EIRP
    b. Pictures, descriptions, and locations for visiting and consideration
4. Matt: Back to the slide
    a. Shows August. Positive direction is outflow / ebb tide
    b. Both alternatives increase discharge by similar amounts

N. Slide 14 – Tidal discharge in Snohomish River, Downstream of restoration
1. Very small change between existing and near-term alternative
2. Long-term increases discharge by 2 to 2.5 times
3. Location is main stem along the N of Ebey Island, by outlet of Deadwater Slough
4. Maria: Did model include flow pathways?
    a. Matt: These are all from UNET model
5. John Engel: Where are velocities measured?

    a. Matt: Main stem, just N of US 2 bridge.
        i. River discharge is about 1,000 or 2,000 cfs
        ii. Discharge is therefore dominated by tidal flows
        iii. This is August, which has lowest flow level
        iv. Q2 event is about 62,000 cfs
        v. Q100 event is about 204,000 cfs

O. Slide 15 – Peak water levels – Ebey Slough, 'Typical' (~Q2) winter discharge
    1. Note: Slide displayed had project area added along x-axis; not present in printout
    2. Mileage is measured upstream from the mouth of Ebey Slough
    3. How do restoration scenarios change peak water levels?
    4. Significant drop along project area and upstream
    5. Larger drop with long-term than with near-term alternative
    6. Not totally confident that existing model represents actual conditions – lack of data, limitations of 1D model

P. Slide 16 – Peak water levels – Snohomish River, 'Typical' (~Q2) winter discharge
    1. Note: Slide displayed had project area added along x-axis; not present in printout
    2. Mileage is measured upstream from river mouth
    3. Kurt: At RM 11, upstream of project area, surface elevation drops by ½ foot
        a. Would this potentially relieve dike pressure there?
        b. Matt: Yes.
    4. John Engel: What point in the tide sequence does this occur?
        a. Matt: Looking back at previous slide
        b. May be a relatively high neap tide, but difficult to tell

Q. Slide 17 – Peak water levels – Ebey Slough, 100-year discharge
    1. Drop in water levels along most of project area in both scenarios
    2. Near-term alternative shows somewhat higher level just at the US 2 bridge

R. Slide 18 – Peak water levels – Snohomish River, 100-year discharge
    1. Near-term alternative drops water level along length
    2. Long-term alternative shows increase below US 2 and beyond
    3. These results for the 100-year event call the modeling into question
        a. For example, model predicts more flow down Ebey Slough than main stem
        b. Could be that levees are lower on that side
        c. So slough becomes preferential pathway through "storage" area
        d. This is an oversimplified representation of Ebey Island
    4. 2 questions that need to be answered
        a. Does the model accurately represent the flow split in the Q100 event?
            i. Possibly not due to 1-dimensional nature of model
        b. If a real concern, how can restoration design provide assurances?
            i. So that pathway doesn't unbalance flows
            ii. To keep peak flood elevations as they currently are

S. Slide 19 – Model's flood pathways – 100-year event
    1. Micah: Why use 1-D and not 2-D model?
        a. Matt: Given level of effort, 2-D would have taken a lot of calibration
        b. 1-D is sufficient to weed out "deal-killers"
        c. Bob: Institutionally, it's good to use same model as for FEMA flood maps
    2. Kurt: Could we support modeling results by talking with residents?
        a. To see if model accurately predicts what has actually happened
        b. Matt: Had that conversation with DD, but don't have real data for 1990 event
            i. In 10-year case, model overpredicts flooding within Ebey Island
            ii. Shows whole island filling up
            iii. According to Everett, the model wasn't accurate for small-scale event

        c. Everett: At big scale, the model doesn't mean anything
            i. At small scale, small elevation differences affect flow location & direction
        d. Matt: Model doesn't represent the island well
            i. It's represented as having a flat bottom
            ii. Unlike in real life, in which water overtops levee along Ebey Slough, then flows northward in drainage ditch to west of levee, then drains back to Ebey Slough just south of Hwy 2
    T. Slide 20 – Conclusions
        1. Casey: Have you modeled temperature effects?
            a. Matt: No, but HEC-RAS may be able to
            b. Cleve: Thinking about long periods disconnected from flows?
                i. They occur in high-flow periods in winter
                ii. Water is probably colder during those times
                iii. Don't have resources to analyze at this stage
        2. John Engel: Have asked similar questions for locations downstream
            a. About effects of discharge changes
            b. Need to consider that tides may not be the channel-forming regime
            c. Rather, high river discharges in winter may be

IV. Breakout sessions: Introduced by Dan Evans. See notes below.
V. Cleve: Conclusion:
    A. Project team will come up with a working draft for collaboration
    B. Considering the possibility of something like a Wiki
    C. After postponing last two meetings, not setting date yet for next meeting
    D. We'll schedule later, as we see how the work advances
VI. Report of breakout session facilitators to the full Advisory Committee
    A. Asked participants if facilitators "got it right"
    B. Further discussion
VII. Adjourned at 5:10 PM

<u>Breakout Session Notes</u>

Three interdisciplinary groups of 8-9 participants, each with a facilitator (Dan, Cleve, or Walker), engineer (Ryan, Bob, or Matt), fish biologist, wildlife expert, ag rep, agency staff, recreation rep, etc. Breakout questions included:

- What does the hydro modeling tell us about the feasibility of alternatives?
- How can we optimize fish and other values in this restoration project?
- What are the key questions and next steps in the process?

Group #1

- Dan Evans, facilitator
- Ryan Bartelheimer, engineer
- Kate Halstead
- Doug Hennick
- John Garrett
- Monte Marti
- Casey Rice

QUESTION 1: FEASIBILITY OF ALTERNATIVES

- Principal question is whether muted tidal restoration provides much value for fish – little evidence it does. Fish performance is the key, not “feel good” engineered solutions that may not result in improved performance.
- Water control structures are the central issue – will fish access the area? Will sedimentation or debris jam tidegates?
- Muted tidal restoration works for wildlife, such as migratory waterfowl, and provides management flexibility to meet seasonal and other needs.

QUESTION 2: OPTIMIZE FOR MULTIPLE VALUES

- Design and management of restored areas can potentially address multiple needs:
    - Chinook salmon most need off-channel habitat April-Aug;
    - Waterfowl: overwintering Sept-March; nesting April-Aug;
    - Ag productivity can be enhanced by selective muted tidal restoration (i.e., during dry periods for sub-irrigation) or creating dendritic channels for fish/wildlife within farming areas.
- Need to consider Ebey in larger context – basin- or county-wide – to determine its highest benefit. How does it compare with other restoration options? Where do we get the greatest bang for the buck (benefit/cost)?

QUESTION 3: CRITICAL ISSUES AND NEXT STEPS

- Determine whether muted tidal restoration works for fish?
- Balance resource management values on Ebey, and in broader context.
- Make fish & wildlife value case:
    - Literature review is a must
    - Be realistic about uncertainty (inevitable)
    - Restore natural processes
- Evaluate value of forested (spruce) wetland on East Ebey
- Factor in value of pedestrian wildlife recreational opportunities near urban Puget Sound population centers

Group #2

- Cleve Steward, facilitator
- Bob Battalio, engineer
- Ruth Millner
- Russell Link
- Micah Wait
- Everett Alexander
- Phil Cunningham
- John Engel

Notes:

- Relation (sequencing?) of near- and long-term options. How named?
- Downstream effects
    - Will increased discharge affect channel structure downstream?
    - Long-term channel adjustment
    - Potential for scour?

- Will muted system work?
    - Can we create desired conditions?
    - Will they be beneficial for fish?
        - Water depth
        - Temperature
        - Interior channels
- Diking District Commissioner concerns:
    - Don't endorse either option
    - Don't want to modify existing dikes
- Best (most acceptable) aspect of near-term alternative is full tidal restoration on east (forested) side of gas pipeline
- What to do with forest (trees) under both alternatives? Downstream effect on other restoration projects; risk to bridge
- Question about accuracy of elevations used in modeling analysis
- 30-40 acres existing at north end of WDFW property that isn't diked. Look at it – brush, not fish habitat
- Recreation
    - Opportunity for both upland bird (pheasant) and waterfowl hunting – possibility for multiple recreational activities
    - Where would kayakers put in?
        - Underneath bridge?
        - Don't prevent access
- Next steps, needed info
    - Range of conditions (e.g., depth) possible under muted tidal option
    - Evolution of site following implementation
    - More info on fish-friendly tide gates
    - Agricultural improvements, mitigation required
- More ag issues
    - Bad economy has increased demand for ag land located near population and water supply
    - Concern about saltwater intrusion; effect on water quality

Group #3

- Walker Stanovsky, facilitator
- Matt Brennan, engineer
- Sharon Swan
- Mike Blackbird
- Kye Iris
- Richard Tveten
- Phil Cunningham
- Maria Calvi
- Tad Schwager
- Belinda Schuster

QUESTIONS:

- How beneficial is muted tidal? Under what conditions?
- What effect do restoration scenarios have on flow conditions and water level behind dike?
- How can we design to minimize or mitigate seepage / drainage impacts to DD #1?

    - Belinda: We need to measure and define metric for existing conditions before construction to have a baseline for comparison.
    - Matt: We would also want to translate these into design criteria. Seepage will depend on head difference and soil conditions.

NEXT STEPS:

- Some concrete estimate of fish benefits
    - Need more examples of muted tidal systems for comparison
- How do we improve conditions for recreations and for other wildlife? And how do we build support for them?
- Structure and costs of future studies? And of actual implementation / construction?
    - This will inform cost / benefit analysis relative to other projects
- Determine habitat conditions for desired vegetation vs. invasive weeds, under both full tidal and muted conditions
- Examine long-term sedimentation effect of restoration