A Big Picture Story in the Skagit Tidal Delta

September 15, 2010

Eric Beamer
A Big Picture Story in the Skagit Tidal Delta

A report by HWS committee:

How we are trying to measure progress of Skagit Chinook recovery, starting with projects occurring within the delta

Habitat Work Schedule (HWS) Committee
Mary Raines, Bob Warinner, Ed Conner, and Eric Beamer
What happens (or could happen) as delta restoration is implemented?

• Individual projects go through stages (concept to constructed and monitored)
• Individual projects can influence other projects (ecologically and socially)
• Restored habitat is not necessarily static after construction
• Planned v. actual restoration can differ
Why are these issues important?

- Individual projects lead to restoration objectives for the entire delta
- The delta restoration objective fits into a larger restoration objective for the entire Skagit
- All Skagit restoration objectives fit with all other H objectives. Together, they accomplish the recovery goal (Skagit Chinook Recovery, PS Chinook Recovery)
- Use HWS as a tool to track progress (monitor and adaptive management)
What is needed to understand the big picture?

• A system to tie individual actions together (monitoring and adaptive management)
  – A local (watershed) and regional (Puget Sound) framework to understand recovery progress
  – One of many tools that helps: HWS database

• The right data
  – Sensitive to actions/objectives/goals

• A commitment and capability to use both:
  – data
  – monitoring and adaptive management framework
Pie chart of selected “H’s” for meeting the Skagit Chinook Recovery Plan Goals

Contribution of General Actions to Achieve Skagit Chinook Recovery Goals

- Habitat Protection: 61%
- Upper watershed process restoration: 6%
- Freshwater Rearing Restoration: 7%
- Estuary Restoration: 23%
- Local Nearshore Restoration: 3%
Status of Skagit Delta Restoration compared to recovery objective in recovery plan

- Projects are “identified” that could reach 104.5% of the 1.35 million Chinook smolt restoration objective for the tidal delta.
- After 5-7 years, about 12% is done.

P pie chart showing:
- 88.2% Done in Future (or uncertain)
- 11.8% Done (or will be)
Real life examples

- **Focus on Swinomish Channel Corridor (and field trip site: Wiley)**
  - Good examples for points/lessons learned
  - Some monitoring data available
  - First hand knowledge
- **Wiley Slough**
  - Project stage transition
  - Not fully monitored
  - Monitoring needs to include more than just environment/ecology
- **Smokehouse**
  - Phases
  - Chinook benefits planned v actual based on model and monitoring
- **Swinomish Channel Fill Removal**
  - Taking advantage of an opportunity
  - Habitat sustainability (Rainbow Marsh)
- **McGlinn Island**
  - Synergy between projects
Wiley Slough Restoration Project

- A large, mostly natural process restoration project
- Currently viewed as highly successful (ecological) or not (drainage)
- Example of a project:
  - With very significant Chinook recovery benefits, yet it has complicated issues and design
  - That needs longterm commitment of sponsors, stakeholders, and funders to its total success
- Do the necessary monitoring in order to adaptively manage for total success
Smokehouse Restoration Project
Smokehouse Phase 1

- Completed in 2005/06
- Partial process restoration
- Replaced tidegate with SRT, added open screwgate
- Restored wetland with setback dikes
- Reconnected to tidal influence
  - channel (4.4 ha)
  - marsh (4.9 ha)
- Riparian planting along channels
- Culvert(s) replaced with bridge(s)
Smokehouse Restoration Phase 1

Juvenile Chinook salmon, 2004

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Juvenile Chinook salmon, 2005

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Smokehouse Phase 2

- Completed in 2008
- Partial process restoration
- Replaced 2 tidegates with SRTs
- Restored wetland with setback dikes
- Reconnected to tidal influence:
  - channel (6.4 ha)
  - marsh (1.8 ha)
- Riparian planting along channels
- Culvert(s) replaced with bridge(s)
- Potentially 2 areas yet to restore (no certainty)
- Managed setting (structures need maintenance)
- Needs additional monitoring (fish, vegetation, structures, hydrology, soils)
- SRTs likely have lower fish value than predicted by modeled Chinook carrying capacity
Swinomish Channel Fill Removal

Rainbow Marsh: a monitored example

Swinomish Channel Fill Removal
Tidal Area (in hectares) by Project Stage

- 2.7
- 2.0

- construction
- post project monitoring

Rainbow Marsh

Map showing locations such as Swadabs, Old Bridge N, Old Bridge S, Rainbow Marsh, and Dunlap.
Rainbow Marsh
Const. finished Oct. 2008
0.25 hectares of tidal habitat
Photo taken Apr. 14, 2009
Rainbow Marsh
Aug. 25, 2010
Natural vegetation
If you build it, they will come?

Wild juvenile Chinook density (fish/ha in channel)

- Reference (Old Bridge)
- Rainbow Marsh

Month in 2009:
- 2: 0
- 3: 0
- 4: 0
- 5: 2,345
- 6: 1,714
- 7: 17
- 8: 0
How well is it working?

- **Rainbow Marsh**
  - Juvenile Chinook Population in 2009: 39% of Capacity
  - Estimated Juvenile Chinook Carrying Capacity: 46% of Capacity

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  - Juvenile Chinook Population in 2009: 39% of Capacity
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- **Skagit Tidal Delta**
  - Juvenile Chinook Population in 2009: 39% of Capacity
  - Estimated Juvenile Chinook Carrying Capacity: 55% of Capacity
Restored habitat is not necessarily static

- We need to know the sustained benefit of restoration projects
Is Rainbow Marsh Sustainable?

Rainbow Marsh Channel Cross Section

X Section

Rainbow Marsh
Bankfull Tidal Channel Area

Square Meters

Predicted Sustainable  Oct 2008 (As-built)  Apr-10
McGlinn Island Connectivity Restoration Project

- Design report with two alternatives:
  - jetty
  - causeway
- Project products complete sufficient to begin process of "gaining permission"
- Predicted large Chinook recovery benefits
McGlinn Island Connectivity Restoration Project

Wild Chinook smolt carrying capacity (fish per year)

- Restored Habitat
- Existing Habitat

Comparison without and with McGlinn Island. The restored habitat shows a significant increase in carrying capacity compared to the existing habitat.
Are we headed the right way?
What is coming in the door?

- Cottonwood?
- McGlinn?
- Fir Island Farm?
- ??

Skagit Delta Restoration, September 2010

- 11.8% Done (or will be)
- 88.2% Done in Future (or uncertain)
Is going the right direction enough?
Will we achieve recovery?
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- **Consistency question**: Are the suites of actions and top priorities identified in the watershed’s three year work plan/program consistent with the hypotheses and strategies identified in the Recovery Plan (Volume I and II of the Recovery Plan, NOAA supplement)?

- **Pace/Status question**: Is implementation of the salmon recovery plan on-track for achieving the 10-year goal(s)?
Is going the right direction enough? Will we achieve recovery?

Chinook Recovery Over Time

- Percent of Goal vs. Years graph showing consistent progression over time.
Is going the right direction enough? Will we achieve recovery?

Chinook Recovery Over Time

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Chinook Recovery Over Time

- Percent of Goal
- Years

Is going the right direction enough? Will we achieve recovery?
• Strong at describing **what** needs to be done and **why**
• Not strong at describing **how** and **when** to do it.
• To date, implementation has been controlled by:
  – Opportunity
  – Funding
  – Capacity

• **Need to work on the How and When (implementation)**
  – **Decide when** (proactive v reactive)
  – **How to shape opportunities, build funding and capacity?**
Lessons

• When doing restoration – expect surprises both good and bad
  – Need for monitoring (not just ecology)
  – Adaptive management may be required

• All organization/ownerships have constraints (influence opportunity and ending results)
  – Public
  – Tribal
  – Private
Implementation and Adaptive Management

• Reporting of recovery progress (developing tools/products)
  – pie chart of SRP
  – pie chart of delta restoration
  – Implementation trajectory figure

• Use tools/products for future implementation
  – Are there enough projects to achieve objectives?
  – Are we doing them well?
  – Etc.

• Are we satisfied with this level of progress? If not, what changes would we make?
  – Need monitoring ($ and ability) to measure progress
  – What is good enough progress? Who decides?
  – What are the factors that shape our history of progress? ($/capacity, opportunity – are they running out/changing?).