# Skokomish River Basin, Washington
## Ecosystem Restoration Feasibility Study

**Civil Works Review Board**
**25 August 2015**

COL John Buck
Commander, Seattle District

US Army Corps of Engineers
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# District Recommendation

- Release the proposed Chief's Report for State and Agency Review
  - Chief's Report to be accompanied by and consistent with the District Commander's Final Integrated Feasibility Report / Environmental Impact Statement



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# Project Briefing Outline

- Overview
- Alternatives Considered
- Recommended Plan
- Compliance
- Proposed Implementation Schedule
- Conclusion and Recommendation

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# Significance – SO WHAT?

| Institutional Significance | Technical Significance | Public Significance |
|---|---|---|
| ✓ Puget Sound – estuary of national significance (EPA)<br><br>✓ Four ESA-listed salmon species represented in six unique populations<br><br>✓ 2 runs of salmon are already extirpated from the system<br><br>✓ Skokomish Tribe U&A Fishing Areas<br><br>✓ NMFS Essential Fish Habitat | ✓ Skokomish River is largest source of freshwater to Hood Canal<br><br>✓ Salmon – keystone species; indicators of overall ecosystem health<br><br>✓ Wetlands – support unique flora and fauna; base of food chain habitat<br><br>✓ USFWS Biological Sampling Report – critical limiting factors in the Skokomish River Basin | ✓ Skokomish Watershed Action Team (SWAT)<br><br>✓ Puget Sound Partnership / Puget Sound Action Agenda |

# Study Authority

- Section 209 of the River and Harbor Act of 1962 (Public Law 87-874)
  - "…Puget Sound, Washington, and adjacent waters, including tributaries, in the interest of flood control, navigation, and other water uses and related land resources."

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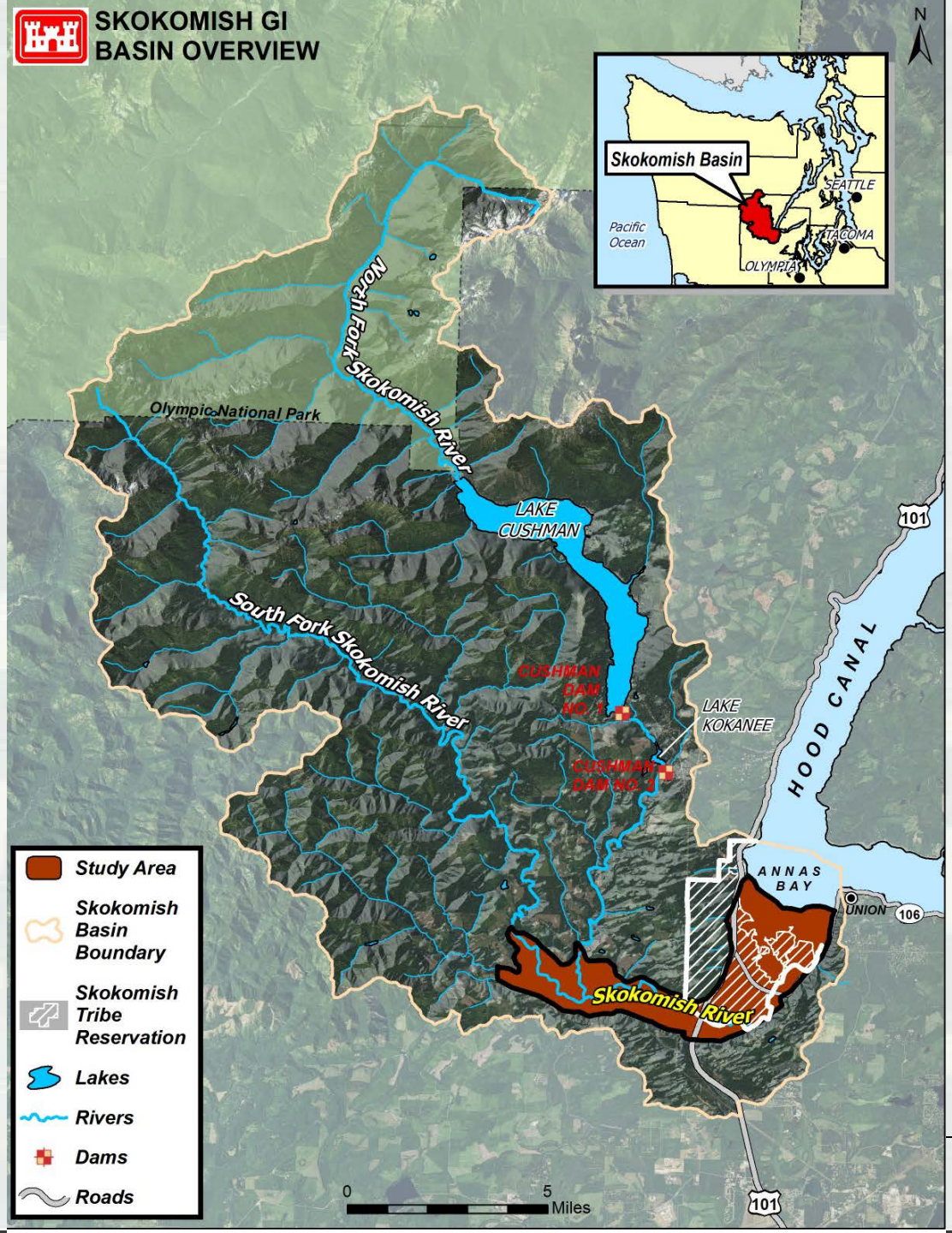
# Study History

| Milestone | Date |
|---|---|
| Reconnaissance Report 905(b) | 2000 |
| FCSA Signed | 2006 |
| Transition to SMART Planning - Charette | October 2012 |
| Alternatives Milestone | March 2013 |
| TSP Milestone | November 2013 |
| Agency Decision Milestone | June 2014 |
| Feasibility-Level Design & Environmental Coordination | June 2014 – May 2015 |
| Civil Works Review Board | August 2015 |

Total study cost: $6.8 million / approx. $2.8 million since rescoping




# Video



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# BLUF

*The Corps' recommended plan is a critical element of an integrated restoration effort in the entire Skokomish River watershed.*

# The Critical Problem

# The Critical Problem

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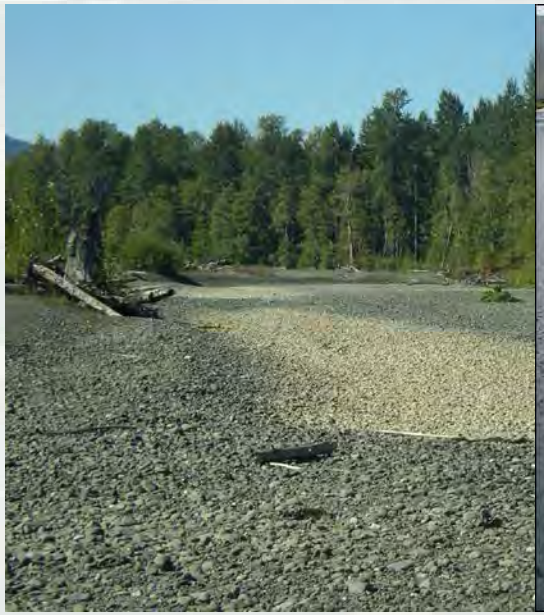
# Problems

- Modified ecosystem conditions
- Loss of natural floodplain functions & processes
- Loss of habitat quantity and quality
  - Barriers to fish passage
  - Lack of habitat complexity
  - Lack of pools
  - Degraded wetland & floodplain habitats
  - Lack of woody debris
  - Lack of riparian cover & vegetation



# Goal & Objectives

Goal

- Restore degraded ecosystem structures, functions, and dynamic processes to a less degraded, more natural condition

Objectives

- Provide year-round passage for fish species
- Reconnect and restore the spawning, rearing, and refuge habitats in the study area's side channel and tributary networks
- Improve the quantity, quality, and complexity of native riparian and floodplain habitats
- Improve the quantity, quality, and complexity of pools

# Planning Considerations

- **Cushman Dam Settlement**:
  - The Corps, through implementation of this GI, is not undertaking any actions that legally belong to other entities under the terms of this agreement.
  - The settlement will not affect the benefits of the recommended plan.
- **Skokomish Indian Tribe**: Avoid negative effects to tribal interests, including treaty-reserved fishing, hunting, and gathering rights.
- **Mason County Flood Ordinance**: Includes restrictions on new structures, existing structures, water flow modification structures, bridges, and roadways.



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# Plan Formulation Process

| | |
|---|---|
| **Management Measures (25)** | **June 2012** |
| **Restoration Sites (40 after screening)** | **June 2012** |
| **Initial Array of Alternatives**<br>Includes five "bases" that address critical study needs | **October 2012** |
| **Focused Array of Alternatives** | **November 2012** |
| **Final Array of Alternatives (6)** | **July 2013** |
| **Recommended Plan (1)** | **November 2013** |

# Alternatives Considered

- "Base" Measures*:
  - ▶ River Dredging
  - ▶ Levee Removal at North Fork/South Fork Confluence
- Increments:
  - ▶ Large Woody Debris Installation
  - ▶ Side Channel & Tributary Reconnections
  - ▶ Wetland Restoration

***Alternatives formulated with "base" measures to address critical needs of study area (provide year-round channel for fish passage)**

# Cost Effectiveness & Incremental Cost Analysis (CE/ICA)

**Inputs**

Costs & Benefits by Plan

**Outputs**

**60** Cost Effective Plans

**9** Best Buy Plans

**6** Plans in Final Array



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# Final Array of Alternatives

- No Action Alternative
- Confluence Levee Removal
  - 3 alternatives
- Riverbed Excavation Alternative
  - 2 alternatives

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# Evaluation of Final Array

| Evaluation Criteria | Alternative #11 | Alternative #18 (NER Plan) | Alternative #60 (Dredging) |
|---|---|---|---|
| Total First Cost | $11 million | $19 million | $256 million |
| Total Habitat Units | 155 AAHUs | 187 AAHUs | 588 AAHUs |
| Acres Restored | 158 acres | 277 acres | 1,342 acres |
| Construction Impacts (Environmental) | Low | Low | High |
| OMRR&R | Minimal | Minimal | High ($40 million for re-dredging) |



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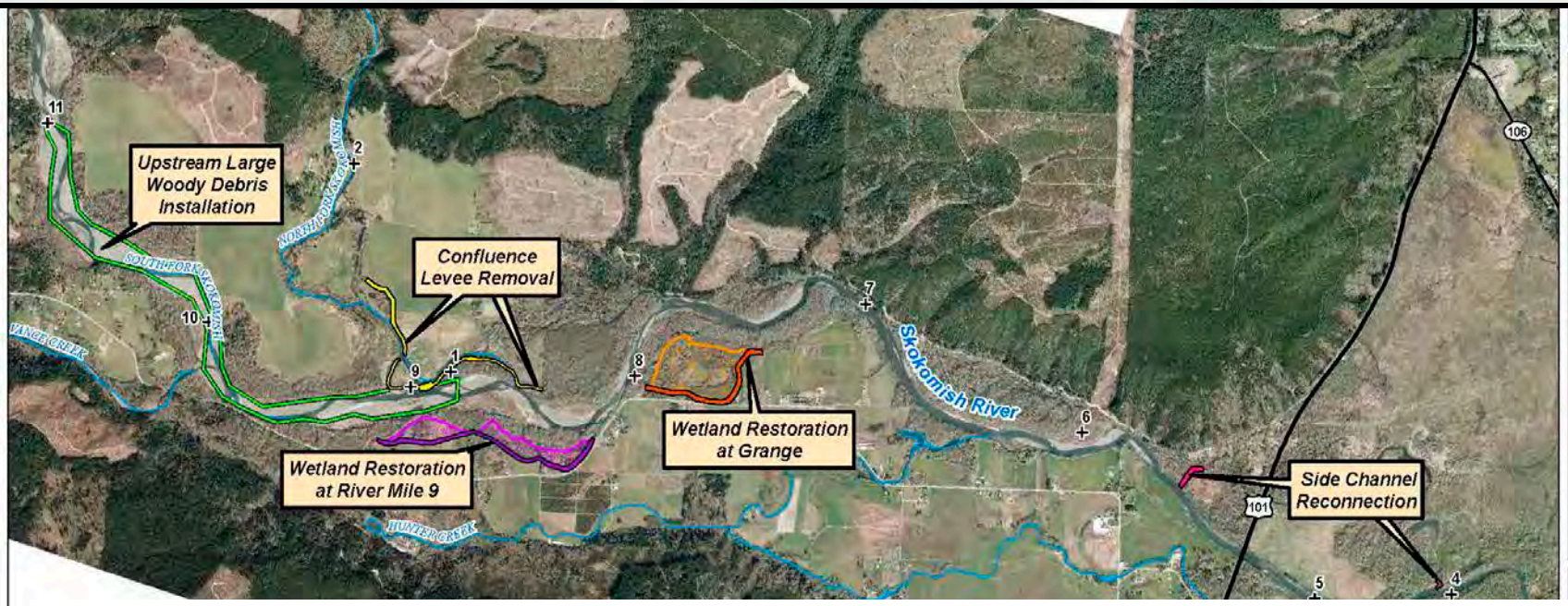
# National Ecosystem Restoration Plan




Legend

Sites

- Confluence Levee Removal
- Wetland Restoration at River Mile 9
- Wetland Restoration at Grange
- Side Channel Reconnection
- Upstream Large Woody Debris Installation
- River Miles

Orthophoto: 4/23/2011

Location Map

**Recommended Plan:**

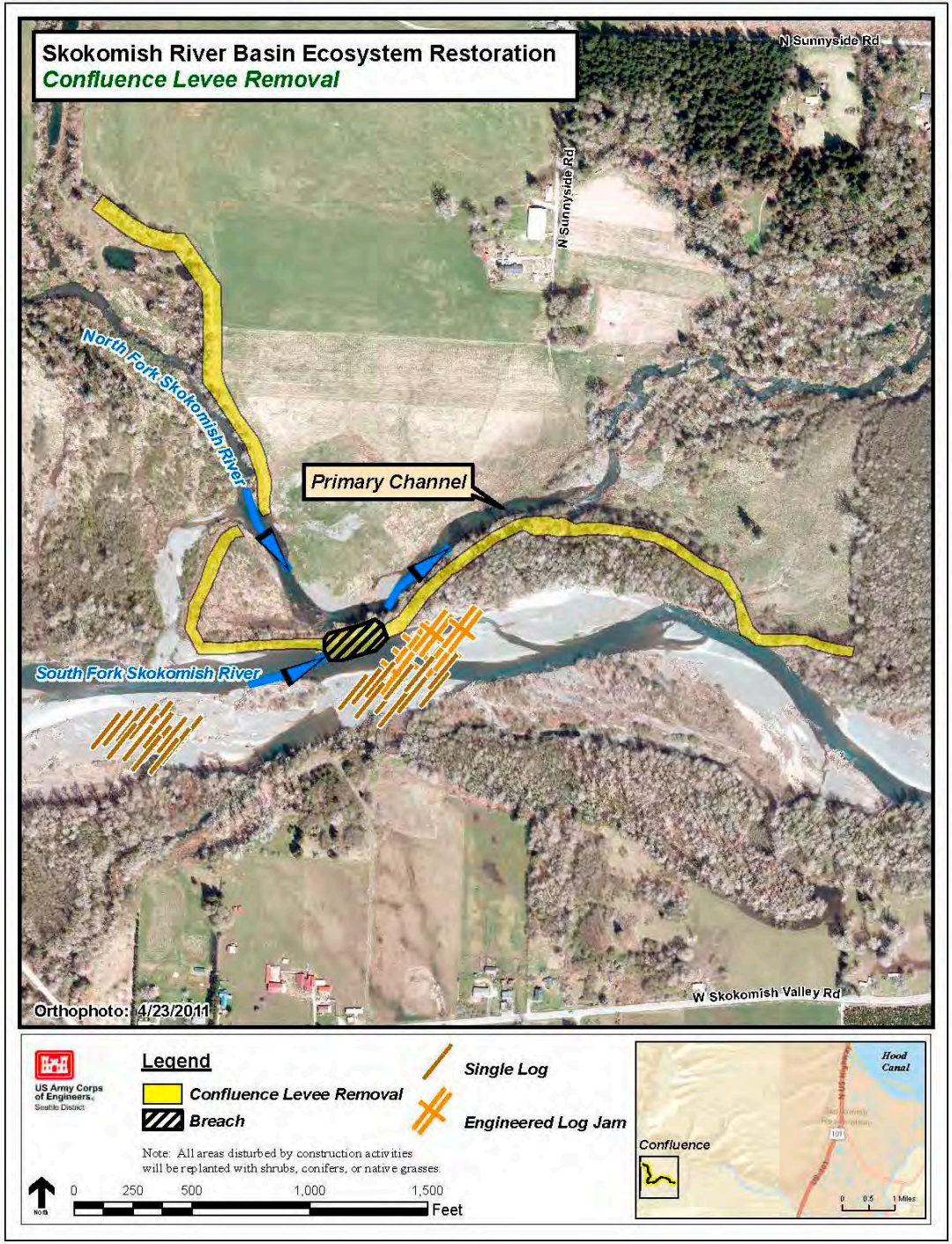
- Directly restores habitat for Federally listed salmonid species
- Improves quantity, quality, and complexity of habitat for multiple species
- Acres restored: 277
- Average annual habitat units: 187
- Total project first cost: $19.3 million (October 2014 price level)
  - Federal share: $12.5 million
  - Non-Federal share: $6.8 million + $10k annual OMRR&R

# Recommended Plan Features

# Confluence Levee Removal

## Benefits

- Restores year-round fish passage for ESA-listed species
- Alleviates a mile-long channel constriction
- Allows fish access to spawning grounds

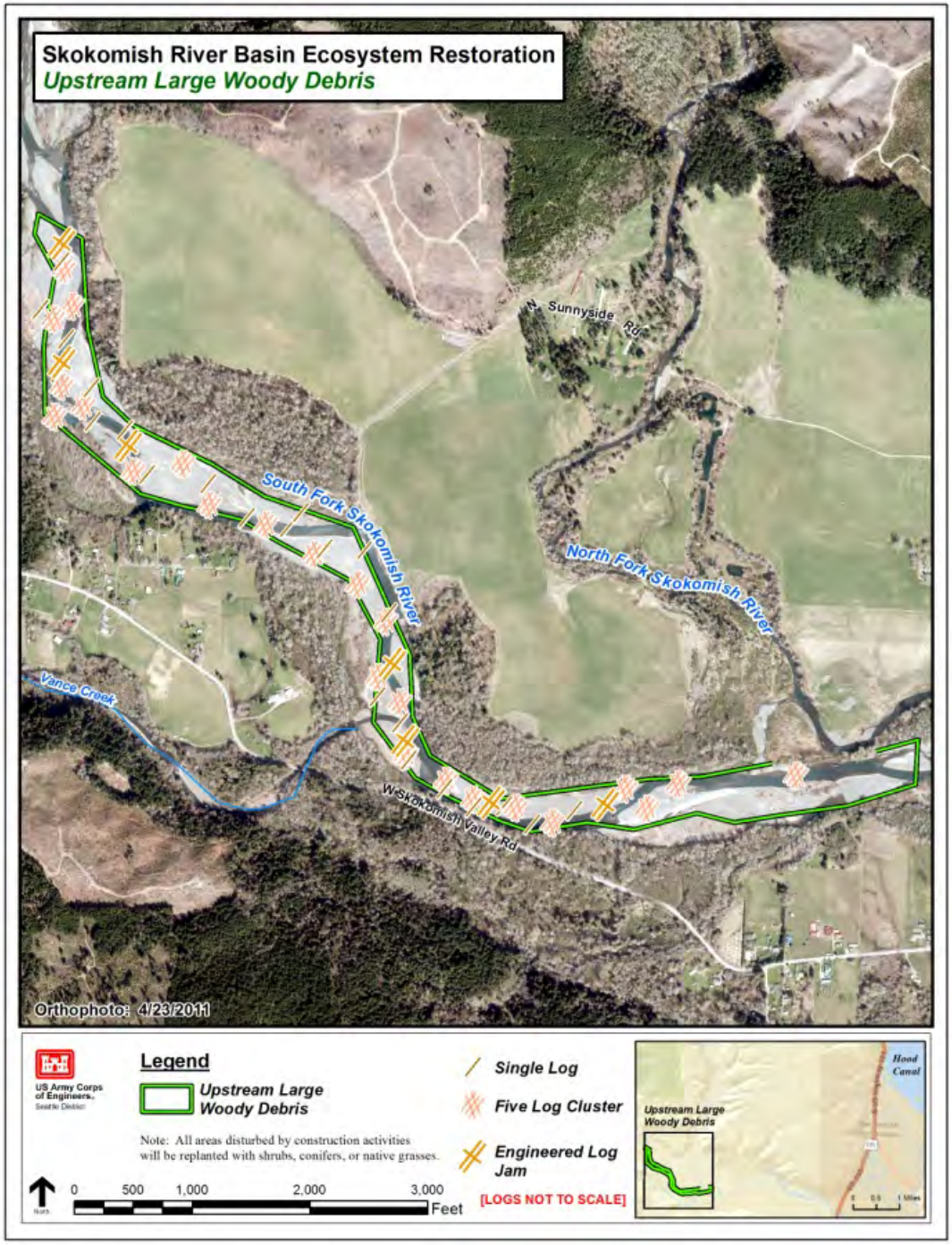


# Recommended Plan Features

# Upstream Large Woody Debris

## Benefits

- More frequent and deeper pools for spawning, rearing, and refuge habitat for juvenile and adult salmon
- Improves habitat complexity in the channel

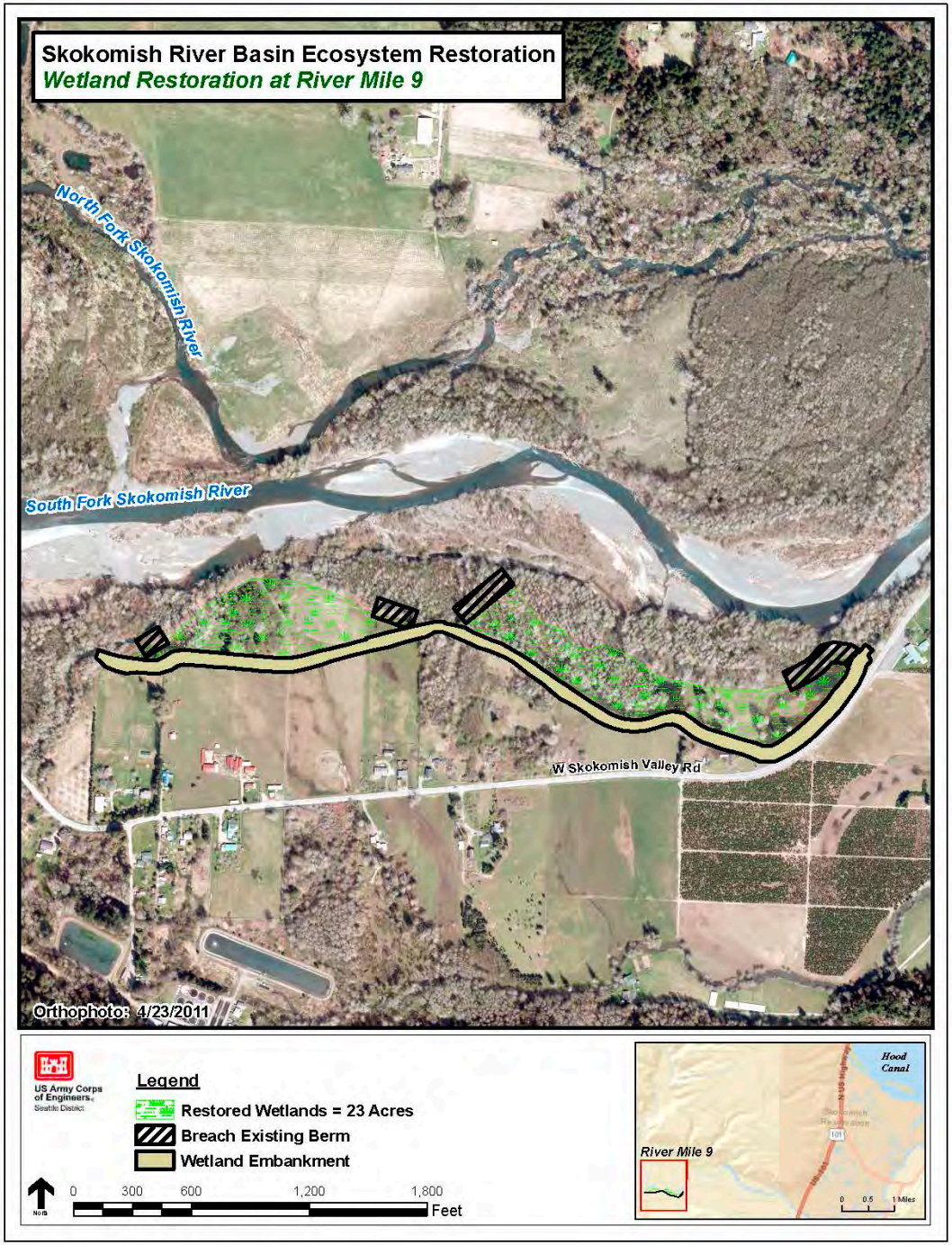


# Recommended Plan Features

## Wetland Restoration at River Mile 9

**Benefits**

- Reconnection and restoration of high-value forested wetland
- Provides spawning, incubation, rearing, and over-wintering habitats

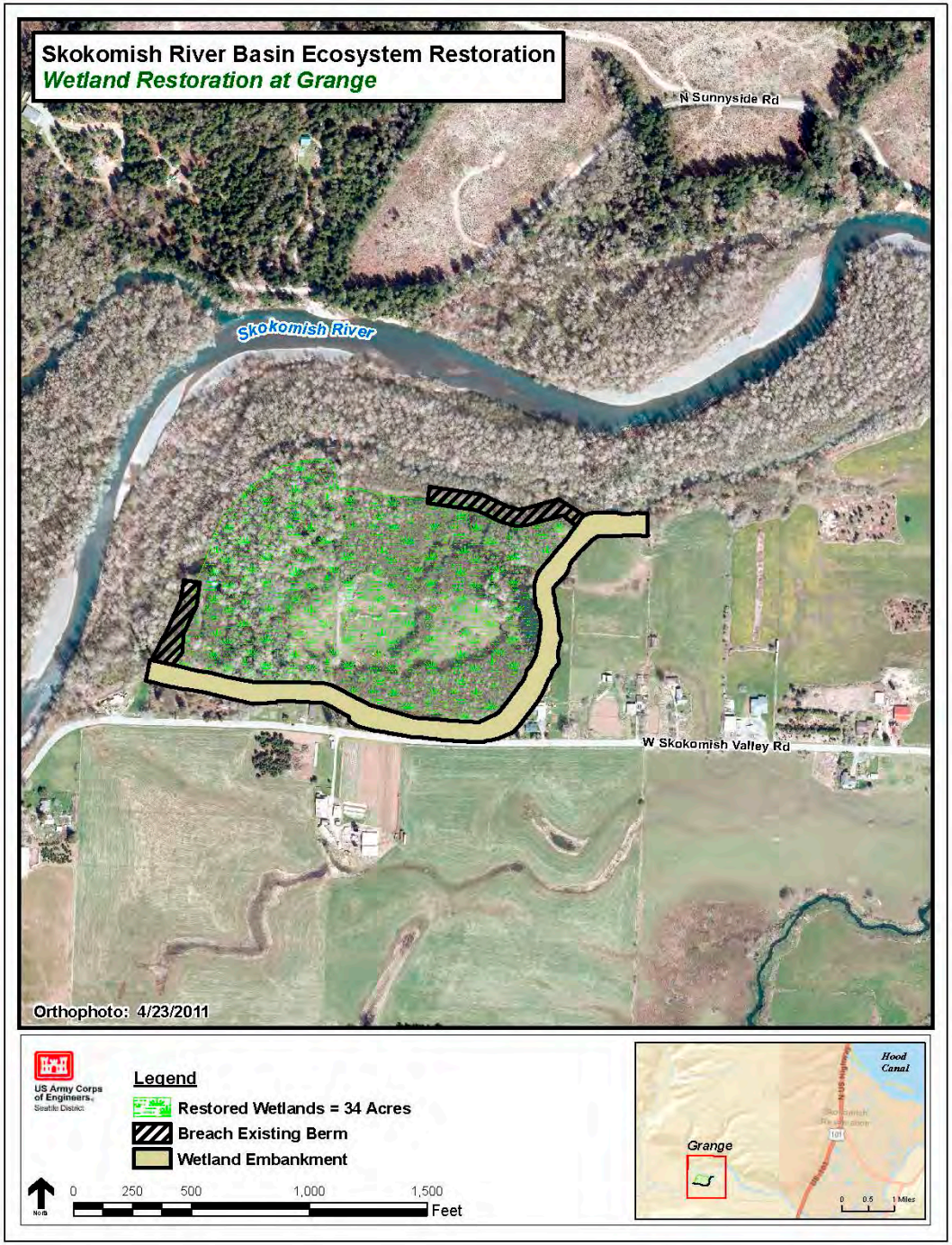


# Recommended Plan Features

## Wetland Restoration at Grange

**Benefits**

- Reconnection and restoration of high-value forested wetland
- Provides spawning, incubation, rearing, and over-wintering habitats

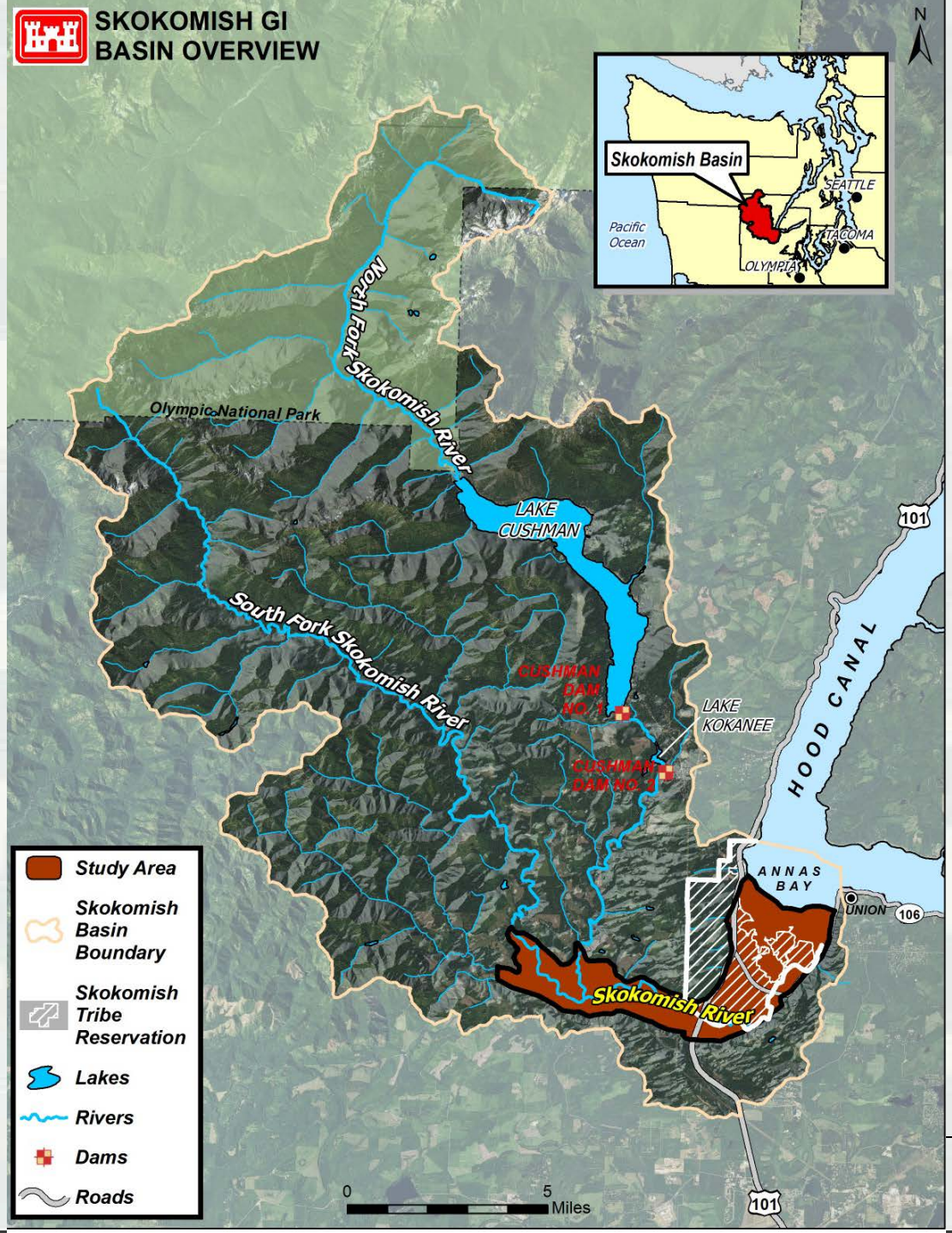


# Recommended Plan Features

# Side Channel Reconnection

## Benefits

- Provide refuge and rearing habitat for fish during high flows
- Expand the prey base for birds and mammals




# Flyover of Recommended Plan



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# Economic Summary

- Total project cost: $19,343,000
- Average annual cost: $842,000
- OMRR&R: $10,000 / year
- Average annual benefits: 187 AAHUs (non-monetary)

October 2014 price level

3 ⅜ percent discount rate



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# Monitoring & Adaptive Management

| Monitoring Metric | Performance Target | Adaptive Management |
|---|---|---|
| Year-round flow | 0.8-foot water depth over 25% of channel | Additional removal of ground surface or additional large woody debris to divert flows |
| Depth & width of opened channels | Maintenance of at least 80% of design width & depth | Add large woody debris |
| Riparian canopy coverage | 70-80% survival of planted species; 80% ground coverage of native species | Additional plantings |



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# Compliance:
## *USACE Campaign Plan & Environmental Operating Principles*

**USACE Campaign Plan**

- Transform Civil Works
- Prepare for Tomorrow

**Environmental Operating Principles**

- Foster sustainability
- Consider environmental consequences
- Create economic and environmentally sustainable solutions
- Consider the environment in a risk management and systems approach
- Leverage knowledge to understand the environmental context and effects

# Environmental Compliance

- Environmental Impact Statement integrated into Feasibility Report
- No significant environmental compliance issues
  - ✓ Endangered Species Act compliant
  - ✓ Fish & Wildlife Coordination Act compliant
  - ✓ Clean Water Act compliant
  - ✓ National Historic Preservation Act compliant

# NWS Compliance of PGM

- HQUSACE Policy Review Complete
  - ► All policy issues have been resolved
  - ► Most significant comments pertained to justification of wetland embankments and optimization of height for these features



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# Technical Reviews

- Agency Technical Review
  - Review managed by ECO-PCX, New Orleans District led effort
  - All ATR comments resolved
  - Final certification completed August 2015
  - Final Cost DX certification received August 2015
- Independent External Peer Review
  - Review managed by ECO-PCX, Battelle
  - Panel concurred with all PDT responses
  - Final evaluator and backcheck responses received June 2014
- Ecosystem Outputs Model Review and Approval
  - Model approved by the HQ Model Certification Panel in November 2013



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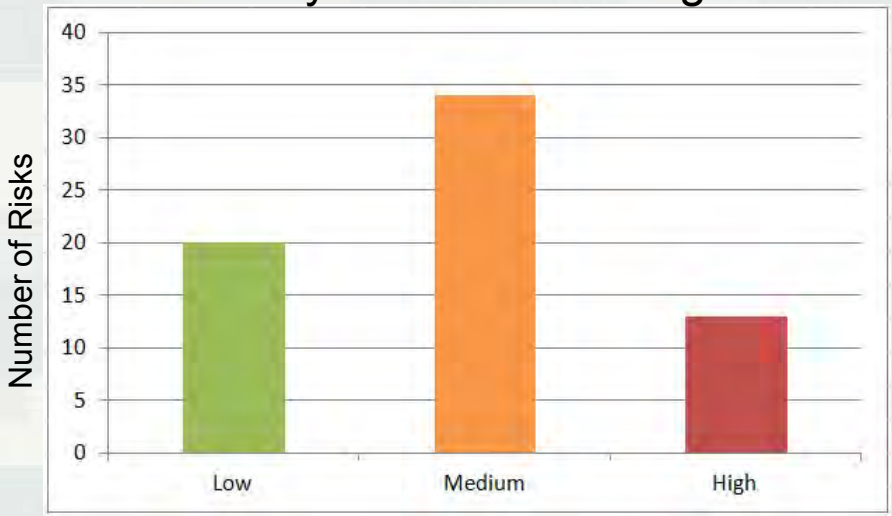
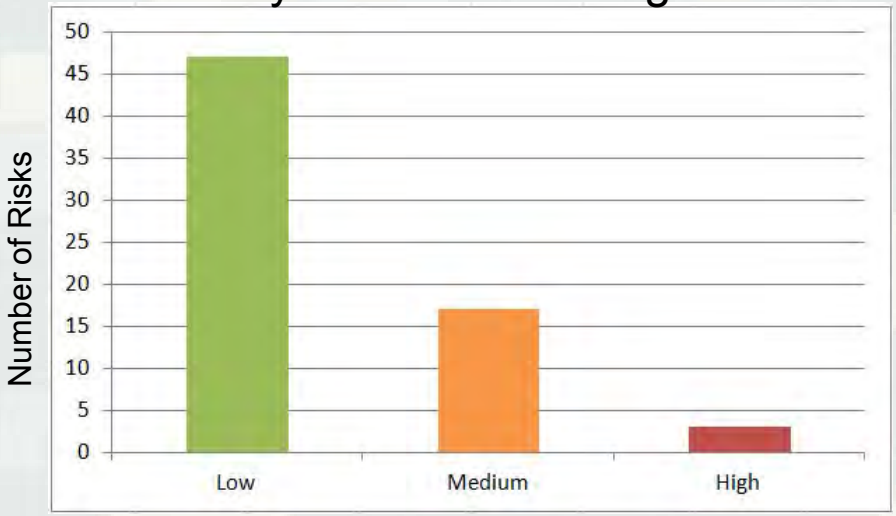
# Risk Register Highlights

January 2013 Risk Ratings




July 2015 Risk Ratings




| Risk Management Example | | |
|---|---|---|
| Risk Rating | Jan 2013 | July 2015 |
| Cultural resources may be adversely impacted | High | Low |



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# Residual Risk - Overall Assessment

- Recommended plan is “low risk”
  - Restoration measures proven practice
  - No induced flood risk
  - No impact from climate change and sea level change
- Primary Residual Risk
  - Variability in quantities (topo/LIDAR/survey data and H&H modeling to be updated in PED)
  - This residual risk is addressed in the 45% contingency developed through the Cost and Schedule Risk Assessment



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# Public Involvement

- Wide variety of stakeholders involved throughout study
  - Skokomish Watershed Action Team (SWAT)
- A series of public meetings held during plan formulation and evaluation
- NEPA public review of draft report in February-April 2014



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# Implementation Schedule

## *Remaining Milestones & Construction*

| Milestone | Date |
|---|---|
| Civil Works Review Board | 25 August 2015 |
| Release of letters for State & Agency review | 3 September 2015 |
| Initiate State & Agency review | 4 September 2015 |
| Complete State & Agency review | 5 October 2015 |
| Issuance of Final Chief's Report | 25 November 2015 |

**"Efficient" Construction Schedule:**

✓Pre-Construction, Engineering & Design Phase: 2 years (FY17-18)

✓Construction: 2-3 years (2 phases; FY19-21)

# District Recommendation

- Release the proposed Chief's Report for State and Agency Review
  - Chief's Report to be accompanied by and consistent with the District Commander's Final Integrated Feasibility Report / Environmental Impact Statement



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# Skokomish Indian Tribe

- Joseph Pavel
  - Vice Chairman, Skokomish Indian Tribe; Director of Natural Resources



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# Skokomish Ecosystem Restoration
# USACE & Local Agency Restoration Plan

Mason County and Skokomish Tribe

Civil Works Review Board

August 25th, 2015

# Previous Local Actions

- Historically, focus on flooding and river migration…

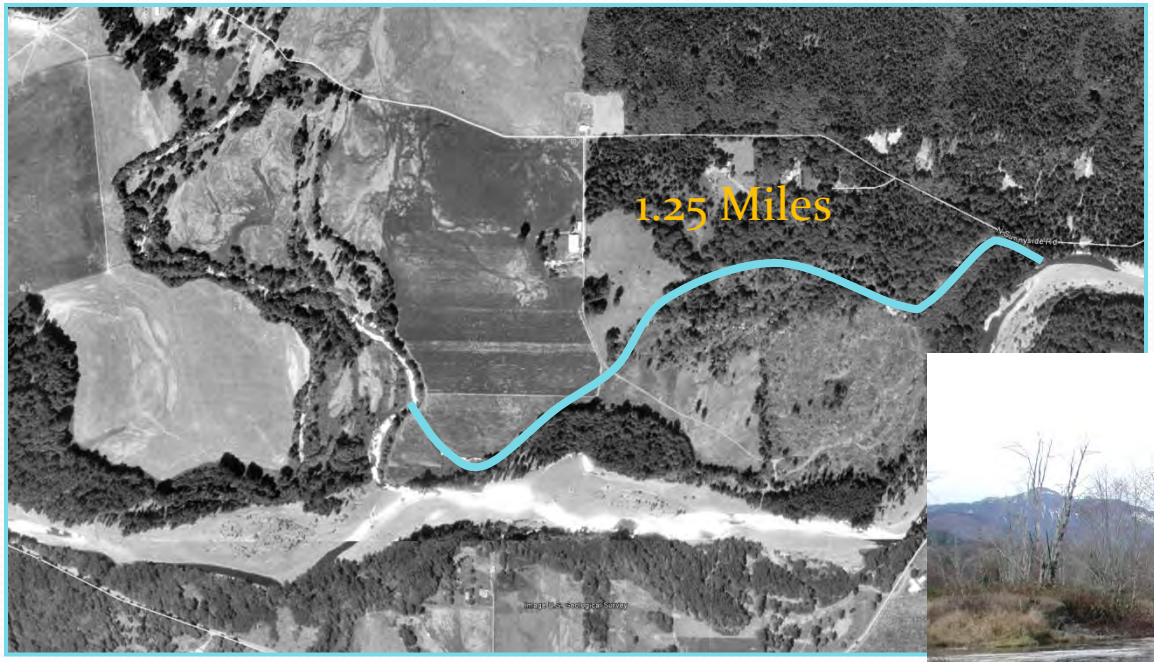
# Significant changes after 1975…

Federal Listing of Endangered Fish Species

FERC Relicensing of Cushman Dam

And increasing flood frequency and severity…

# 2003 – North Fork Avulsion




Dike Breach and Channel Change in single flood event…

Need USACE expertise to Develop action plan.

# Skokomish Recovery affects all of Puget Sound

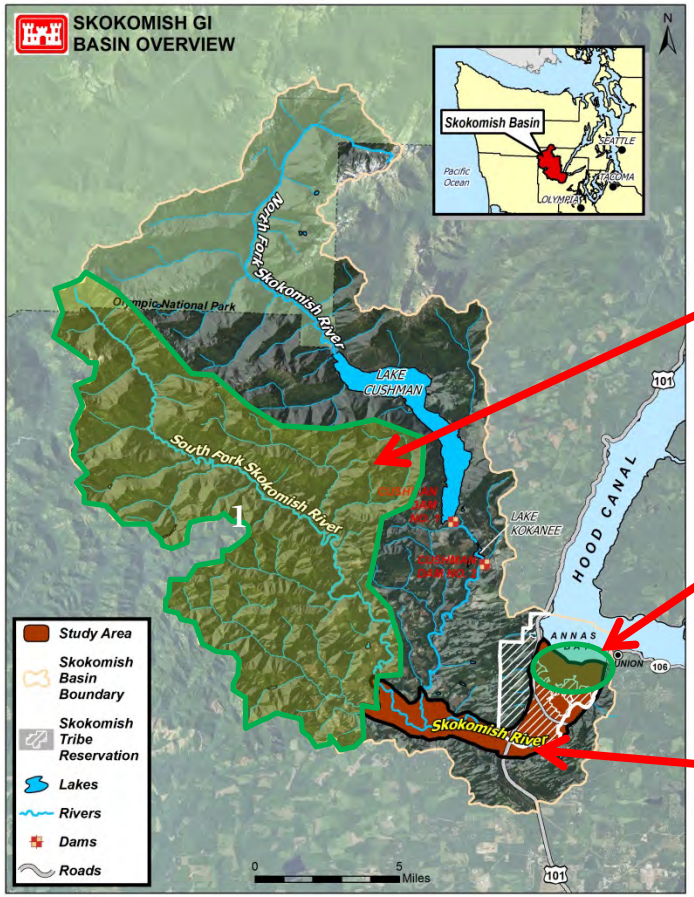
## Puget Sound Chinook Recovery per Endangered Species Act

Population: 4,500,000

We must restore the Skokomish!

Per NMFS-approved restoration plan

# Recommended Projects are Critical to Overall Watershed Restoration




Overall Restoration will require Upper Watershed Restoration by USFS and Local Agencies – Ongoing

Estuary Restoration by Skokomish Tribe – Near Completion

Valley Restoration:
Key Projects by USACE
Supporting Projects by Local Agencies

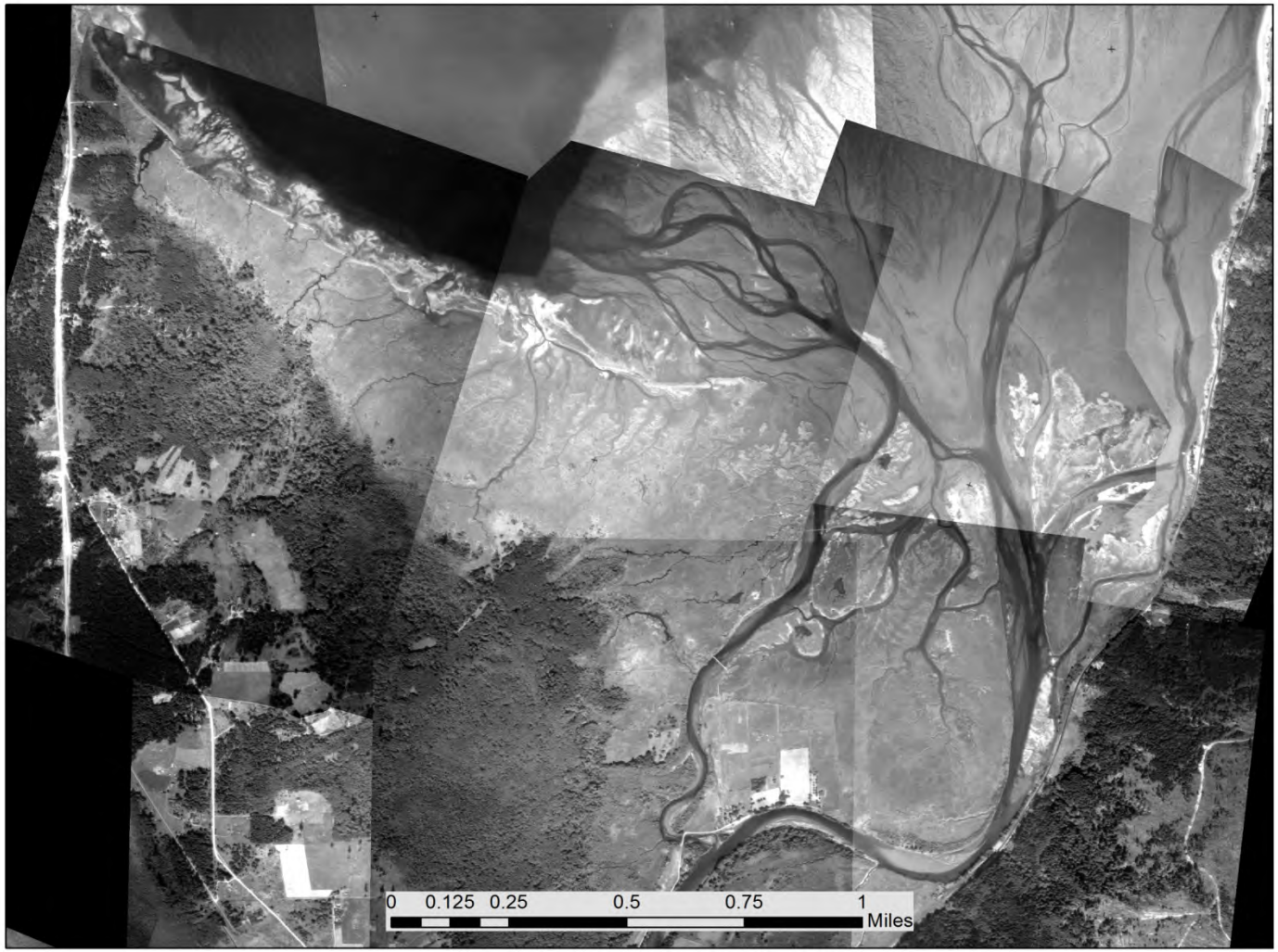
# Skokomish Watershed Action Team

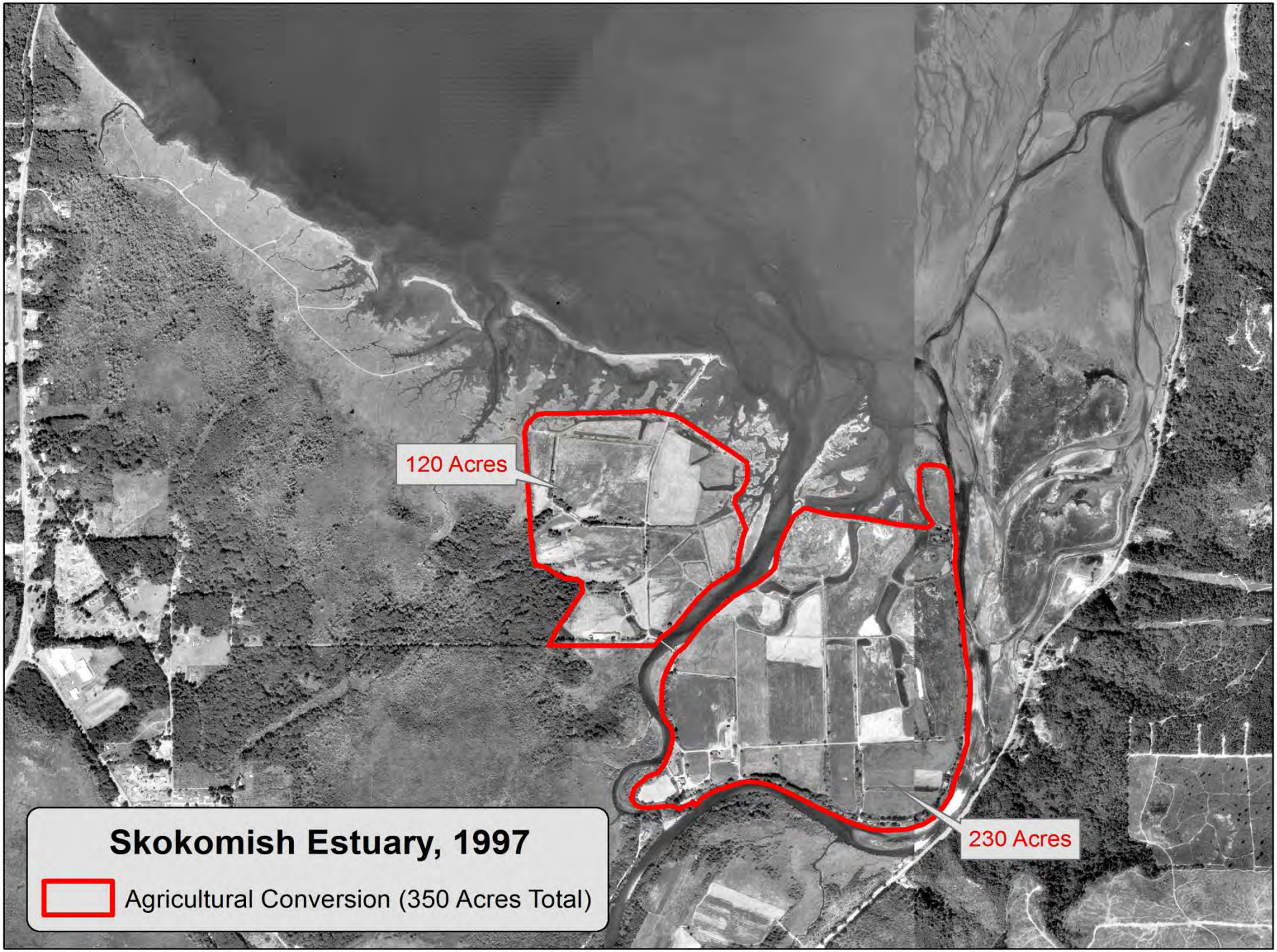
- Local stakeholders and landowners formed in 2005 – Purpose: Restore the Skokomish River

Then take action to get it done.

# Skokomish Restoration Accomplishments to Date

# Skokomish Estuary, 1938




120 Acres
230 Acres
Skokomish Estuary, 1997
Agricultural Conversion (350 Acres Total)

# Accomplishments to Date

Estuary Restoration:  1,300 acres restored, $6.1M

# Accomplishments to Date

Upper Watershed Restoration: $12.5M

Before

After

Upper Watershed Engineered Log Jams for Sediment Storage
Local Agency Focus:
Upper Watershed
No cable, pins or boulders were used for ballast….

**This gravel bar height increased by 5.5 feet**
**On average gravel bar heights increased 2.4 feet through the project reach.**

**Total Sediment Stored in One Project in One Year: 43,000 Cubic Yards**

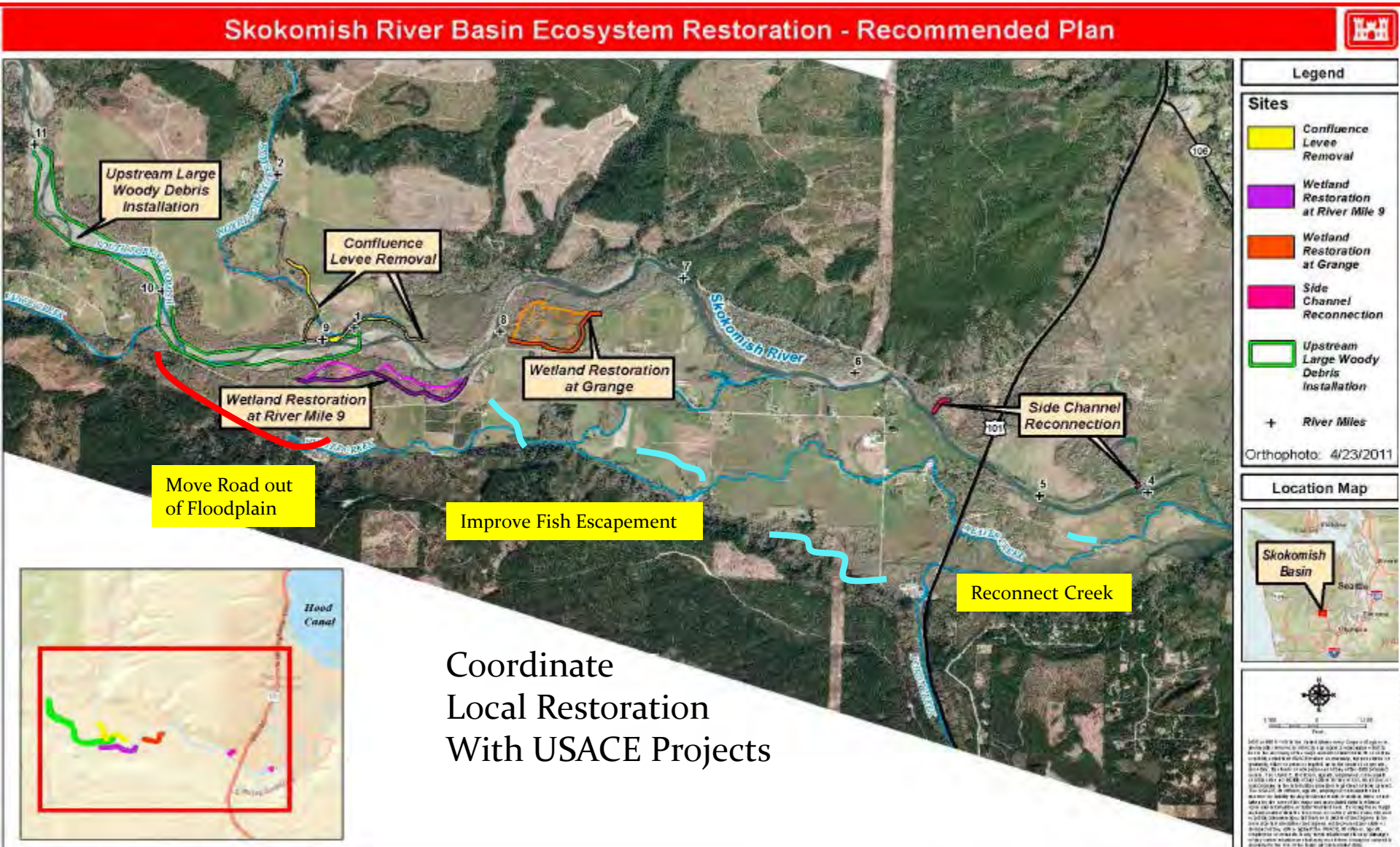
# Accomplishments to Date

Skokomish Valley Restoration & Water Quality: $23.7M

Before

After

# Valley Restoration




Coordinate
Local Restoration
With USACE Projects

# Summary

- USACE – Local Agency Team Effort
- GI Projects are keystone actions for overall restoration of the Skokomish Ecosystem
- Local Sponsors ready to commit Match Funding, LERRD, and OMRR&R
- Mason County and the Skokomish Tribe are ready to proceed with Pre-Construction Engineering and Project Construction

# BLUF:
# NWD Recommendations

- Release the draft Chief's Report for State and Agency Review for the Final Integrated FR/EIS for Skokomish River, WA, Ecosystem Restoration Project accompanied by and consistent with the District Commander's final report and NEPA document.

*Thank you to the team! – internal and external, horizontal and vertical*

# Rationale for NWD Support

- Concur with the District Commander's findings and recommendations
- Consistent with Federal, State, and local laws and ordinances
- Strong Sponsor and stakeholder support
- As part of an integrated ecosystem restoration effort in the Skokomish River watershed, the project would restore highly degraded aquatic, riparian and wetland habitat in an ecosystem of national significance.

# Certification of Legal and Policy Compliance

- District Counsel legal certification of final report: Apr 2015
- Final Response to IEPR Comments:  Feb 2015
- ATR certification: May 2015 (supplemental review Aug 2015)
- Cost certification: May 2015 (recertified Aug 2015)
- Vertical Team alignment; legal and policy reviews completed and all issues resolved
- Project is consistent with Ecosystem Restoration mission and EOPs

# Quality Assurance Activities

- Review Plan for Feasibility Study approved by MSC : Oct 2011
- Vertical team coordination to ensure technical and policy compliance
- ECO-PCX coordination
  - Approval of Skokomish Ecosystem Benefits Model for one-time use
  - ATR compliance
- Reviewed DQC compliance and certification
- Reviewed ATR comments and responses to ensure appropriate resolution and documentation
- Vertical team coordination to resolve all review comments/issues during various phases of study

# Skokomish River Basin Ecosystem Restoration Feasibility Study/Environmental Impact Statement

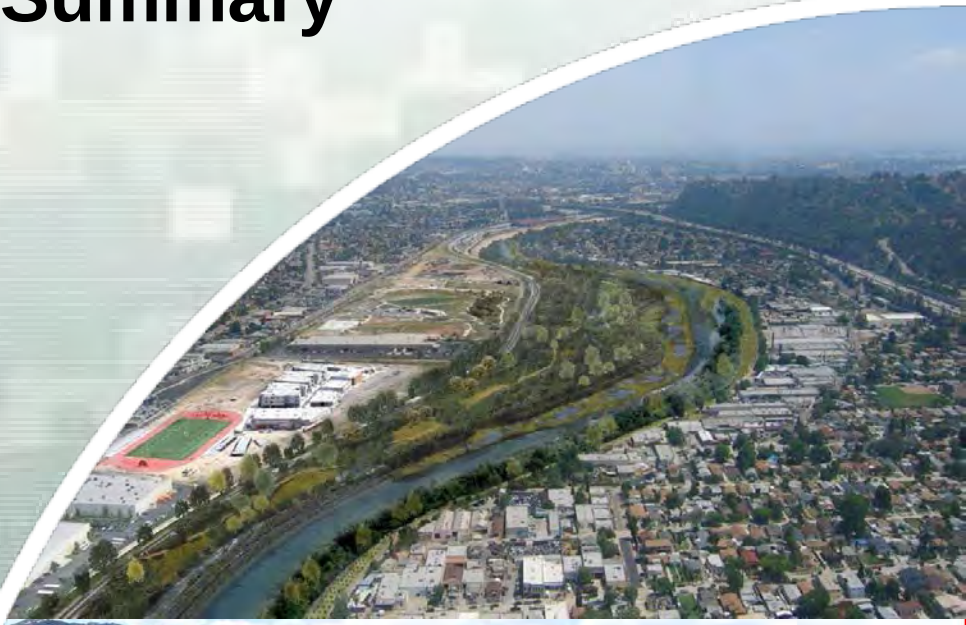
## Agency Technical Review Summary

**Andrew MacInnes (MVN)**

Agency Technical Review Leader

Ecosystem Restoration National Planning Center of Expertise

25 August 2015



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Version: 09.04.14

# Agency Technical Review – Key Dates

- ATR Report Review Dates (comments)
  - Oct 2011 Feasibility Scoping Report (45)
  - Mar 2014 Draft FS/EIS (92)
  - Dec 2014 Targeted Review of Feasibility Design Details (33)
  - Mar 2015 Final FS/EIS (52)
  - Aug 2015 Limited Review of Supplemental Analyses (0)
- Final Report ATR Completion Statement Date: Aug 2015
- Comment Status:
  - All comments closed.
  - No unresolved issues.

# Agency Technical Review Team

| ATR Team Member | Discipline | Organization |
|---|---|---|
| **Andrew MacInnes** | ATR Lead & Plan Formulation | New Orleans District |
| **Hugh Heine** | Environmental/NEPA (draft report) | Wilmington District |
| **Dave Schulte** | Environmental/NEPA (final report) | Norfolk District |
| **Mark Haab** | Economics | New Orleans District |
| **Jon Hendrickson** | Hydraulics/Hydrology | St. Paul District |
| **Jon Sobiech** | Cultural Resources | St. Paul District |
| **Jon Fleischman** | Civil Engineering | Rock Island District |
| **Karen Vance** | Real Estate | New Orleans District |
| **Mark Roenfeldt** | Geotechnical Engineering | St. Louis District |
| **Gary Smith** | Cost Engineering | Walla Walla District |

# Agency Technical Review Highlights

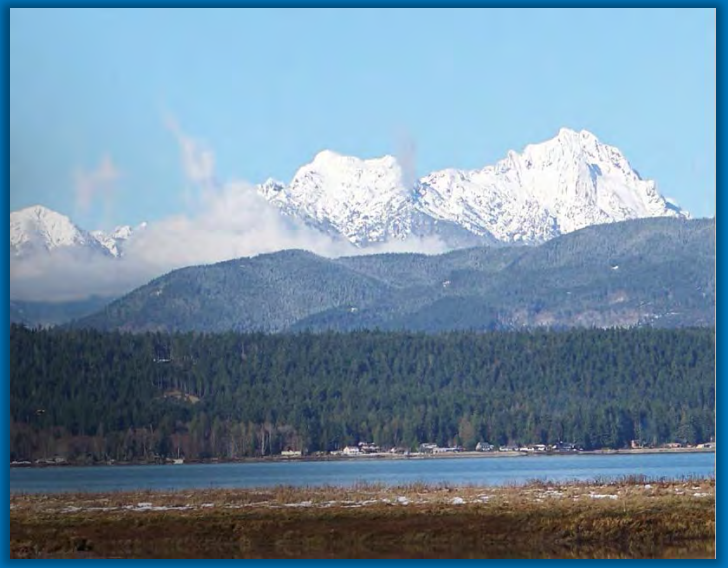
- District Quality Control process and documentation was excellent (this facilitated the ATR)
- Review of Draft FS/EIS:
  - High Significance comments focused on channel aggradation and sediment deposition; FWOP conditions; channel effects from diverting flow; and O+M considerations.
- Review of Final FS/EIS:
  - High Significance comments focused on wetland embankment heights; water surface elevations; channel capacity; cost contingencies; and cost assumptions.

# Agency Technical Review Summary

- ECO-PCX model use approval in Sept 2013.
- Final Cost Engineering MCX Certification in Aug 2015.
- No additional ATR advised for decision document.
- The NWS team has been very responsive and thorough in its consideration of and response to ATR comments. This has added significant value to the review process.

# Independent External Peer Review (IEPR) Skokomish River Basin Draft Integrated Feasibility Report and Environmental Impact Statement

Presented to the USACE CWRB on August 25, 2015



Karen Johnson-Young, PMP
*Program Manager*

Corey Wisneski
*Project Manager*



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# IEPR - Panel and Schedule

| Skokomish River Basin Panel Members | Panel Discipline |
|---|---|
| Steven Pugh (Panel Lead) | Plan Formulation |
| Colin Levings, Ph.D. | Environmental |
| Charles Vita, P.E., G.E., Ph.D | Civil Design/Construction Engineering |
| Chris Bahner, P.E. | Hydraulic Engineering |

**Skokomish River Basin IEPR was conducted from February 2014 – June 2014.**

- The Panel reviewed the January 2014 version of the documents.



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# IEPR Bottom Line Up Front

The Panel agreed with the actions presented by the PDT to address the Final Panel Comments.



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# IEPR – Results

## Final IEPR Report submitted on May 9, 2014

**Results:**

- 8 Final Panel Comments
  - 1 medium/high significance
  - 3 medium significance
  - 3 medium/low significance
  - 1 low significance

## Post – Final Panel Comment/Response Results documented on June 6, 2014

**Results:**

- PDT Evaluator Responses to Final Panel Comments
  - 8 concurs
- Panel BackCheck Responses to the PDT Responses
  - 8 concurs



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# IEPR – Significance Levels

| Level of Significance | Definition | Take Home Message |
|---|---|---|
| High | Describes a fundamental issue with the project that affects the current recommendation or justification of the project, and which will affect its future success, if the project moves forward without the issue being addressed. Comments rated as high indicate that the Panel determined that the current methods, models, and/or analyses contain a “showstopper” issue. | Project showstopper |
| Medium/High | Describes a potential fundamental issue with the project, which has not been evaluated at a level appropriate to this stage in the planning process. Comments rated as medium/high indicate that the Panel analyzed or assessed the methods, models, and/or analyses available at this stage in the planning process and has determined that if the issue is not addressed, it could lead to a “showstopper” issue. | Potential project showstopper |
| Medium | Describes an issue with the project, which does not align with the currently assessed level of risk assigned at this stage in the planning process. Comments rated as medium indicate that, based on the information provided, the Panel identified an issue that would raise the risk level if the issue is not appropriately addressed. | Risk not identified or analyzed |



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# IEPR – Significance Levels (cont'd)

| Level of Significance | Definition | Take Home Message |
|---|---|---|
| Medium/Low | Affects the completeness of the report at this time in describing the project, but will not affect the recommendation or justification of the project. Comments rated as medium/low indicate that the Panel does not currently have sufficient information to analyze or assess the methods, models, or analyses | Technical quality of document |
| Low | Affects the understanding or accuracy of the project as described in the report, but will not affect the recommendation or justification of the project. Comments rated as low indicate that the Panel identified information that was mislabeled or incorrect or that certain data or report section(s) were not clearly described or presented | Clarification |



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# IEPR – Notable Findings

1. The operation and maintenance (O&M) scope and costs of the tentatively selected plan (TSP) appeared insufficient to meet the objectives and function as designed for the life of the project. (Medium/High)

2. The sustainability of the restoration project with regard to upstream and downstream activities was not fully addressed. (Medium)

3. The restoration project did not appear to have fully considered the residual risk of future channel migration adversely affecting the function and performance of the TSP. (Medium)

4. The absence of additional rearing habitat for juvenile salmonids in the TSP reduced the plan's redundancy, resiliency, and robustness and increased the risk of diminished salmonid recovery during the life of the project. (Medium)

5. The DFR-EIS did not discuss life safety issues associated with the Grange Wetland Embankment, a component of the TSP, including potential effects of overbank flooding and levee overtopping or breaching. (Medium/Low)



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# HQUSACE POLICY REVIEW CONCERNS

## Civil Works Review Board

## Skokomish River Basin, Washington Ecosystem Restoration Study

Mark Matusiak
Office of Water Project Review
Planning and Policy Division
25 August 2015

US Army Corps of Engineers
**BUILDING STRONG®**

# HQUSACE Reviews

- Planning charette held October 2012
- Draft report review completed June 2014
- Final report review completed June 2015

# HQUSACE Review Team

- Scott Murphy, CECC-G
- Mayely Boyce, CECC-R
- Ted Nettles, CEMP-CR
- Jeff Strahan, CECW-PC
- Gary Hardesty, CECW-PC
- Mark Matusiak, CECW-PC
- John Remus, CENWO-ED-H

# Significant Policy Questions from Report Reviews

- Justification and Scaling of Setback Levees
- Sediment Aggradation vs. Sustainability
- Monitoring and Adaptive Management Plan

# Justification and Scaling of Setback Levees

**CONCERN:** The draft report included setback levees at River Mile 9 and Grange sites that approximated the heights of existing agricultural levees, ranging from 4 and 10 feet high.

**REASON:** The purpose of the setback levees is to retain 1-3 feet of water in riparian zone of Skokomish River. The setback levees were not formulated to compare ecological outputs against levee heights. A cost issue because higher levees are more expensive to build. Limited available information on topography of riparian area, higher levee would be more certain of capturing benefits than lower levees.

**RESOLUTION:** District conducted a CE/ICA to determine an appropriate height for the setback levees. Analysis showed that setback levees ranging from 3-5 feet would be sufficient to produce habitat benefits. Levee heights will be refined in PED.

**RESOLUTION IMPACT:** Concern Resolved.

# Sediment Aggradation vs. Sustainability

**CONCERN:** Feasibility report cites continuing aggradation of sediments as a major factor adversely affecting stream habitat, but none of the proposed measures address sediment aggradation.

**REASON:** HQUSACE review team concerned that continued aggradation would overwhelm restoration measures.

**RESOLUTION:** HQUSACE review team requested more information on hydraulics and sediment transport of the study area. District used existing hydraulic analysis to supplement information in report to demonstrate that the proposed measures would be self-sustaining.

**RESOLUTION IMPACT:** Concern Resolved. Additional information added to final report to address sediment transport and sustainability.

# Monitoring and Adaptive Management Plan

**CONCERN:** The final feasibility report included several performance standards that involved documenting that ESA listed species were observed to use the restored areas. Also, monitoring timeframe for all features appeared to be on an annual basis for 10 years.

**REASON:** HQUSACE determined that performance standard to observe fish use was not reasonable because it involved many externalities beyond the control of the Corps, and adaptive management actions point for these metrics point back to habitat modifications used for other metrics. With respect to monitoring timeframes, implementation guidance for Sec 2039 of WRDA 2007 states that monitoring timeframes should be the minimum needed to demonstrate success.

**RESOLUTION:** Performance standards demonstrating fish use dropped from final report, and monitoring timeframes specific to each performance standard adopted (most less than 10 years).

**RESOLUTION IMPACT:** Concern Resolved.

# HQUSACE POLICY REVIEW TEAM RECOMMENDATION

## Release the report and EA for S&A Review

# Questions & Discussion

# Applied Lessons Learned

- Early data gathering can help quantify key problems in the study area
  - What worked: USFWS Report - quantification of limiting factors
  - Room for improvement: quantification of fish stranding
- Sponsor-Corps-Landowner interfacing: clearly identify what outreach needs to happen, when, and by whom; earlier the better
- Naming conventions
- Model identification / certification
- Where appropriate, move forward with “early action” projects under other applicable authorities
  - Estuary Restoration Act



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# NWD Lessons Learned

- More involvement/coordination on selection of habitat model to ensure supports plan formulation
- Continual vertical team monitoring, engagement and coordination on the PGM
- The ADM milestone meeting is important
- Current policies make it extremely difficult to justify  setback levees in ecosystem restoration projects