Monitoring Salmon Recovery in WRIA 8

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Scott Stolnack and Hans Berge
King County Department of Natural Resources and Parks
1999: Puget Sound Chinook salmon listed as Threatened under ESA
Water Resource Inventory
Area 8:

Lake Washington, Cedar, Sammamish Watershed

“Lead Entity” for Salmon recovery

Collaborative “Salmon Recovery Council” of 27 jurisdictions plus business and environmental groups
Science-based Chinook Conservation Plan (2005) requires monitoring to:

- Measure and document progress toward salmon recovery and habitat restoration goals
- Assure $$ is spent on actions that make a difference
- Provide information to guide course corrections, if (when) needed – i.e., Adaptive Management
WRIA 8 Monitoring Framework

**Status and Trends**
- Fish
  - Juveniles
  - Adults
  - Redd counts
  - Smolt trapping
  - PIT tagging
- Spawner surveys
  - Field Assessments
  - Remote Sensing
  - Hydrologic Monitoring and Modeling
  - Water Quality
- Habitat
  - Wadeable streams
  - Rivers
  - Forest cover
  - Impervious cover
- Other
  - Lakeshore Assessments
  - Locks/Ship Canal Passage
  - Q min, max
  - Flashiness
- Upland and edge habitat
- Littoral habitat

**Implementation**
- Education/outreach
  - Programs
  - Land use
- Projects
  - Levee setbacks/flooplain reconnection
  - Lakeshore modification
  - Pool habitat creation
  - Riparian restoration
  - Improving water quality
  - Managing exotic species
  - Reducing fine sediment

**Direct Effectiveness**
- Education/outreach
  - Programs
  - Land use
Is the watershed producing more Chinook? (“Fish in/Fish Out” Status and Trends Monitoring)

- Spawner counts, age structure, natural vs. hatchery
- Redd surveys
- Outmigrant trapping
- PIT tagging (survival, migration rates)

Partners: WDFW, local jurisdictions, King Conservation District, Muckleshoot Tribe

Provides cornerstone information about Chinook abundance, spatial distribution, productivity
Are watershed conditions improving? (Habitat Status and Trends Monitoring)

- Field assessments (EMAP)
- Land cover classification (CCAP)
- Water quantity (flow characteristics)
- Water quality

Key indicators of watershed health over time
Field Assessments

Physical and Biological Characteristics

• Direct tie-in to WA Department of Ecology Status and Trends Monitoring Program
• Similar protocols to USEPA EMAP
• Uses Ecology random sampling strategy
• BIBI, FIBI
EPA Grant

New for 2010:
- Increase sample size to 50 sites in WRIA 8 and up to 10 EPA sentinel sites outside WRIA
- Funding secure through 2013
- Same physical and biological parameters, 12 added stream gauges
- Add hydrologic analysis (flow-habitat relationships)
- Requires stronger linkages to Adaptive Management
- King County is lead agency in collaboration with WRIA 8
Land Cover Change

- Are we retaining forest cover in the areas we said were important?
- Are we protecting riparian buffers?
Quantify forest cover change...

Then focus in on most crucial areas for a closer look
Flow Characteristics

- Use existing gauge data and analyses:
  - Winter high flows – more frequent and higher highs?
  - Summer low flows – lower lows?
  - Changes in overall timing?
  - Explore predictive computer models for places without flow gauges (EPA grant support)
What do County data tell us about trends in:

- Temperature
- Dissolved Oxygen
- Turbidity – total suspended solids
- Pre-spawn mortality study
- Stream benthos

Thanks to Jim Simmonds and his group for their analytical support
Implementation Monitoring

FLOODPLAIN CONNECTIVITY: Setback and remove dikes and levees to restore floodplain connectivity. Floodplains provide off-channel and margin refuge habitats, as well as lower velocity areas during periods of high flow. (5 projects)

**Goal:** 6,800 Linear Feet  
**Actual:** 4,350 Linear Feet  
**Progress:** 64% Completed

- Progress towards goal (4,350)
- Remaining (2,450)

HABITAT PROTECTION: Protect property within the Cedar River basin through easements, acquisitions, or transfer of development rights. These actions will protect floodplain, riparian, and upland watershed processes and enable future restoration efforts. (16 projects)

**Goal:** 606 Acres  
**Actual:** 93.2 Acres  
**Progress:** 15% Completed

- Progress towards goal (93.2)
- Remaining (512.8)

CHANNEL COMPLEXITY: Add large woody debris to create pools. Channel complexity provides juvenile Chinook with refuge and foraging opportunity, while adult Chinook benefit from areas to rest on their upstream migrations. (5 projects)

**Goal:** 3,500 Feet  
**Actual:** 800 Feet  
**Progress:** 23% Completed

- Progress towards goal (800)
- Remaining (2,700)
Effectiveness Monitoring

- Least-developed at this time

- Dependent on regional analyses (e.g., SRFB) or local agencies/jurisdictions

- Focus for the present is on compiling reports from partner jurisdictions, agencies, County departments
Adaptive Management

Plan, Decide

Monitor

Implement

Assess
Adaptive Management

- Is the sum of our actions having the desired effect?

- If not, what are we going to do about it?
Adaptive Management

- One important element of the EPA grant was a strong feedback loop to jurisdictions, decision-makers.
- WRIA 8 will tie the monitoring framework to course-correction framework through the Salmon Recovery Council (e.g., 2010 Summit), County Council, PSP and others.
Thank you

- King Conservation District
- U.S. Environmental Protection Agency
- Puget Sound Partnership
- King County Environmental Lab
- King County Department of Natural Resources and Parks
- WRIA 8 Partner Jurisdictions, Agencies and supporters