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Monitoring for Adaptive Management: Status and Trends Monitoring of Aquatic and Riparian Habitats in the Lake Washington/Cedar/Sammamish Watershed

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Status and Trends Monitoring of Aquatic and Riparian Habitats in the Lake Washington/Cedar/ Sammamish Watershed

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May 1, 2014
Lake Washington/Cedar/Sammamish Watershed

- 1.4 million inhabitants
- Most highly developed watershed in the state
Two listed Chinook salmon populations, plus steelhead, bull trout, kokanee, other salmonids

Protected headwaters (Cedar Watershed)

Spawning and rearing areas generally outside urban growth boundary

Salmon recovery governed by a collaborative “Salmon Recovery Council” of 27 jurisdictions plus business and environmental groups
Status and Trends Monitoring

• Chinook Salmon (VSP)
  • (Fish in/fish out monitoring)

Watershed Conditions
- Stream Condition (habitat, biota)
- Streamflow
- Water Quality
- Land Cover
Approach: Status and Trends

- 52 sites in WRIA 8
  - (Ecology/EMAP GRTS sample draw)
- 5y sampling window
  - (year 1: n = 29)
- +5 EPA “Sentinel” sites across Puget Sound
  - Chuckanut Creek
  - Glendale Creek
  - Griffin Creek
  - Dewatto River
  - Big Beef Creek
Metrics:
Baseline Information/Status & Trends

- Biology: BIBI, FIBI, diversity indices
- Habitat: normalized metrics vertical residual pool area, embeddedness, % fines, LWD count/volume, riparian cover, disturbance, etc. (ECY/EMAP protocols)
- Hydrology: Flashiness, high pulse count, low pulse count, TQ Mean, R-B Index, etc (subset of sites)
- Summer water temperature: 7DADM, days above critical thresholds, etc. (one year)
- Land cover: % urban, % impervious, % forest, population/KM², elevation, forest fragmentation, etc.
Derived from LandSat (30m) land cover product:
“300 feet” = 3 pixels and “1,000 feet” = 10 pixels
SOME ASSEMBLY REQUIRED
2009: Tier 1 and Tier 2 areas only (n = 29)

2010-2013: All Tiers (n = 52)
% Urban
% Impervious
Population/km^2
% Patch (PPA)
Densiometer
% Human Disturb.
% Native Fish spp. (PNS)
% Sands+Fines
Wood count
Avg pool depth
Vertical Residual Pool Area
% Small core (PSC)
Sculpin count
Fish IBI
% Large Core (PLC)
% Perforated
% Forest
BIBI (100 scale)
Multivariate Approaches

- Principal Components Analysis
- Nonmetric Multidimensional Scaling
- Logistic Regression
Principal Components Analysis

% Impervious
Population/km^2
% Patch (PPA)
Densiometer
% Human Disturb.
% Native Fish spp. (PNS)
% Sands+Fines
Wood count
Vertical Residual Pool Area
% Small core (PSC)
Fish IBI
% Large Core (PLC)
% Perforated
% Forest
BIBI (100 scale)

Plot numbers = increasing order (population per km^2)
Adaptive Management

Plan, Decide

(Salmon Recovery Council)

Implement

(27+ Local Jurisdictions)

Monitor

Assess

Establish baseline

Re-assess
Adaptive Management

10-Year Review (2015)

• Are we doing what we said we’d do?
• Are actions having the predicted effects?
• Interlocal Agreement renewal
• Recovery Plan update
• Recommendations to leadership
• Corrective actions
Each jurisdiction has its own local priorities and schedules concerning:

- Land use and critical areas planning
- Shoreline planning updates
- Capital improvement programs
- Local needs (urban, rural)
- Election cycles
- Special interests
- Etc...
Thank You

• U.S. Environmental Protection Agency
• WRIA 8 Salmon Recovery Council & Partners
• King County Dept. of Natural Resources and Parks
• Washington Department of Fish and Wildlife
• Washington Department of Ecology

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