Monitoring for Adaptive Management

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

Scott Stolnack
Hans Berge
Dan Lantz
Curtis DeGasperi
King County

Roger Tabor
US Fish and Wildlife Service

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
Descriptive Statistics

BIBI by Year

2009: Tier 1 and Tier 2 areas only (n = 29)

2010-2013: All Tiers (n = 52)
Correlations Matrix

% 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

(Salmon Recovery Council)

Plan, Decide

Implement

Monitor

Assess

(27+ Local Jurisdictions)

Establish baseline

Re-assess
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

scott.stolnack@kingcounty.gov