

Habitat Goal Setting – WRIA 8

Background

A goal is a formal statement of a desired future condition. The goals in this section describe desired future conditions of *habitat components* needed to conserve and restore Chinook salmon (Chinook viable salmonid population goals are discussed in Section X). Goals may be quantitative (expressed as a number or numbers) or qualitative (expressed as a condition or other non-numeric characteristic), but to be useful, all goals should be specific, measurable, attainable, relevant, and time-bound. In the following paragraphs, WRIA 8 uses both quantitative and qualitative goals for desired future habitat conditions. [Consider a S.M.A.R.T. sidebar]

WRIA 8 Habitat Components

1. Non-wadeable streams
 - a. Cedar River
 - b. Sammamish River
2. Wadeable Chinook streams
 - a. Tier 1 streams – (Bear-Cottage Lake Creek and Issaquah Creek)
 - b. Tier 2 streams – (North, Little Bear, Kelsey, and Evans Creeks¹)
3. Lakes (Lake Sammamish, Lake Washington, Lake Union and Ship Canal)
4. Nearshore (Pocket estuaries/stream mouths)

Habitat Goal Setting Approach

The relationships between habitat conditions and Chinook salmon growth and survival are multifaceted and complex, and operate at many spatial and temporal scales. Chinook population-level responses to even large-scale habitat improvements may not be detectable for years, and may be confounded by improvements or declines elsewhere in the watershed or in the marine environment. Nevertheless, known linkages exist between freshwater habitat and salmon, backed by decades of credible research.

The WRIA 8 Technical Committee selected a short list of goals (Table 1) that focus on key elements affecting critical habitat bottlenecks as determined by conservation science, and based on the 2016 WRIA 8 conceptual model and pressure assessment. These goals focus on the most important habitat elements for conservation and recovery of Chinook salmon in the watershed and are based on local data on existing habitat conditions, the unique constraints placed on rivers and streams in the WRIA 8 watershed, and the pace of implementation progress in the last ten years. These goals are ambitious but feasible within the framework of current conditions.

¹ Coal and May Creeks were classified as Tier 3 streams in the 2005 Chinook Plan. They have experienced a recent increase in use by spawning Chinook salmon and contain areas with somewhat higher-quality habitat compared to some other Tier 2 areas. The Technical Committee will continue monitoring their status, and consider upgrading to Tier 2 if spawning continues to increase.

While the number of habitat goals is relatively small, the Technical Committee considers them to be proxies for a larger set of expected habitat improvements. Some of these multiple benefits are described in the notes accompanying the goal narratives.

Monitoring is necessary to track progress toward these goals. Reporting will occur at five-year intervals. To align with other planning horizons and still be ecologically meaningful, we recommend that adaptive-management course corrections occur in 2025, at which time goals will be re-examined and the next adaptive management planning horizon will be set. The Technical Committee will oversee monitoring efforts in the intervening periods and recommend changes if warranted by interim results.

Table 1. WRIA 8 Technical Committee recommendations for 2025 habitat goals. Goals and indicators, as well as 2055 goals, are described in more detail in the accompanying narrative.

Habitat Component	Goal (2025)	Indicator
Cedar River	Total connected floodplain acres between Lake Washington and Landsburg Dam will be 1,170 acres by 2025. Quadruple average wood volume over current basin conditions (RM 4 to Landsburg Dam) by 2025.	Total connected floodplain acres – add 130 acres by 2025 Average wood volume (m ³ /100m) – average wood volume increased to 42 m ³ /100m by 2025
Sammamish River	Areas of river are cool enough to support Chinook migration and survival (increase riparian cover and add thermal refugia by 2025).	Number of thermal refugia – add 2 by 2025 Acres of riparian forest – increase current amount by X acres by 2025 (<i>Sammamish River riparian forest cover will increase at least 10% over current conditions. Assessment of current conditions in progress.</i>)
Chinook streams	Area of riparian cover in <u>each Tier 1 and Tier 2</u> stream increases by 10% over current conditions (2015) by 2025. Average wood volume doubles over current basin conditions by 2025.	Acres of riparian forest (<i>Baseline assessment still to be performed.</i>) Average wood volume (m ³ /100m) (<i>Baseline assessment still to be performed.</i>)

<p>Lakes</p>	<p>Natural lake shoreline south of I-90 (Lake Washington) and throughout Lake Sammamish doubles over current conditions (2015) by 2025.</p> <p>Natural riparian vegetation within 25 feet of shoreline south of I-90 (Lake Washington) and throughout Lake Sammamish doubles over current conditions (2015) by 2025.</p>	<p>Length of natural bank profile <i>(Baseline assessment still to be performed.)</i></p> <p>Natural riparian vegetation within 25 feet of shoreline <i>((Baseline assessment still to be performed.)</i></p>
<p>Nearshore (Pocket Estuaries)</p>	<p>Pocket estuaries along WRIA 8 shoreline support juvenile Chinook for rearing and migration.</p>	<p>Pocket estuary count (connected to nearshore through natural channel profile and delta formation processes) - Two additional pocket estuaries (stream mouths) restored by 2025.</p>

Details of Proposed Habitat Goals in WRIA 8

Cedar River:

- **Goal:** total connected floodplain acres between Lake Washington and Landsburg Dam will be **1,170 acres** by 2025 (130 acres more than we have today).
 - Indicator: total connected floodplain acres

Notes: The Technical Committee recommends using the moderate [Channel Migration Zone](#) (CMZ) as a proxy for floodplain connectivity². There are 1,419 total floodplain acres on the Cedar River below Landsburg, using the moderate CMZ as the indicator of floodplain area. Approximately 380 acres, or 26% (2015) of the CMZ is behind levees, revetments or other hard structures (i.e., disconnected). The pace of reconnection in the first 10 years of Plan implementation (64.4 acres) is insufficient to support long-term Chinook viability in the watershed. The WRIA 8 Technical Committee (TC) determined that doubling that pace is appropriate as well as feasible. This would add 130 acres by 2025 and decrease the amount of disconnected floodplain from 26% to 17.5% of the total area. 2055 goal would be to decrease the amount of disconnected floodplain further, to 9% of the total CMZ area or less.

- **Goal:** 4x current average wood volume (RM 4 to Landsburg Dam) by 2025 (i.e. 42 m³/100m).
 - Indicator: Average wood volume (m³/100m)

Notes: Using a recent remote-sensing product (NOAA 2015), the TC estimates 5.2m²/100m wood **area** in Cedar River between RM4 and Landsburg. Assuming the typical jam is 2m tall, this

² Moderate CMZ was chosen because this area could be actively engaged by the river by lateral migration within the next 100 years, and therefore would directly affect river processes. The WRIA 8 Technical Committee chose the CMZ rather than the FEMA 100yr floodplain because of this direct relationship to the restoration of habitat forming processes.

would indicate an estimated wood volume of 10.4m³/100m. This is substantially below regional standards³ and needs to be boosted quite a bit. Even 4X the current value (= 41.6 m³/100m) does not achieve the 25th percentile and is still poor by those standards, but it would still be quite an accomplishment by 2025. 2055 goal would be to reach the median value for streams over 30m bankfull (i.e., 93 m³/100m).

Sammamish River

- **Goal:** Areas of river are cool enough to support Chinook migration and survival.
 - Indicator: Number of thermal refugia – target would be to add 2 by 2025
 - Indicator: Acres of riparian forest – increase current amount by at least 10% by 2025

Notes: A recent report on cooling options for the Sammamish River indicates that there are limited opportunities for creating thermal refugia along the river⁴. WRIA 8 and partners should also investigate other actions for cold water supplementation. Riparian forest cover amount will be set after analysis of current status completed but will be at least 10% over current conditions. (For the Sammamish River, 45 acres are planned to be planted in the next 10 years in and around Redmond. The Willowmoor project should add 35 acres of planted riparian and Redmond's next Sammamish River project should add another 10 acres. Projects in and around Bothell would add approximately 10 acres.)

Wadeable streams

- **Goal:** Area of riparian cover in each Tier 1 and Tier 2 stream increases by 10% over current conditions (2015) by 2025
 - Indicator: Acres of riparian forest
 - Bear/Cottage Lake Creek
 - Issaquah Creek (this target is focused inside UGA, since area outside UGA is fairly well forested)
 - North Creek
 - Little Bear Creek
 - Evans Creek
 - Kelsey Creek

Notes: Riparian forest cover in WRIA 8 has generally been declining or staying steady over the past decade⁵, and must increase from the current baseline to improve stream conditions. This indicator will use high-resolution land cover product produced by NOAA Coastal Change Analysis

³ Fox, M., and S. Bolton. 2007. A regional and geomorphic reference for quantities and volumes of instream wood in unmanaged forested basins of Washington State. *North American Journal of Fisheries Management* 27:342-359.

⁴ R2 Resource Consultants. 2010. Assessment of summer temperatures and feasibility and design of improved adult Chinook salmon thermal refuge habitat in the Sammamish River. Prepared for the Muckleshoot Indian Tribe Fisheries Division. Redmond, WA.

⁵ Vanderhoof, J., S. Stolnack, K. Rauscher, and K. Higgins. 2011. Lake Washington/Cedar/Sammamish Watershed (WRIA 8) Land Cover Change Analysis. Prepared for WRIA8 Technical Committee by King County Water and Land Resources Division, Department of Natural Resources and Parks. Seattle, Washington.

<http://www.govlink.org/watersheds/8/reports/W8LandcoverChangeReport7-19-2011.pdf>

Program and/or Washington high-resolution land cover product. Outside UGA, use 200' buffer width for analysis; inside UGA, relevant buffers may apply based on existing management authorities. Goal is to increase forest cover amount by at least 10 percent over current conditions.

- **Goal:** Average wood volume doubles over current basin conditions by 2025. Long term goal is to meet appropriate standards (Fox and Bolton 2007) for each stream system. Individual projects should strive to meet or exceed Fox and Bolton standards.
 - Indicator: Wood volume (m³ per 100m)
 - Bear/Cottage Lake Creek
 - Issaquah Creek
 - North Creek
 - Little Bear Creek
 - Evans Creek
 - Kelsey Creek

Notes: Wood volume is currently far below minimum standards for functional stream systems in every WRIA 8 stream⁶. This goal **requires field work** to quantify current wood loads in these eight streams and will require re-survey in 2024 or 2025. Technical committee to decide whether a census-based or probabilistic sampling-based approach should be taken. Current discussion (January 2017) about tying goals to condition bins – i.e., shifting a number of ‘poor’ reaches to ‘fair,’ ‘fair’ to ‘good,’ etc.).

Lake Washington and Lake Sammamish

- **Goal:** Natural lake edge habitats south of I-90 (Lake Washington) and throughout Lake Sammamish doubles over current conditions (2015) by 2025.
 - Indicator: length of natural bank profile

Notes: southern ends of lakes are highest priority. “Natural bank profile” = without bulkhead, with slope and substrate matching historic lakeshore contours. **Requires field survey** (current conditions not quantified).

- **Goal:** Natural riparian vegetation within 25 feet of shoreline south of I-90 (Lake Washington) and throughout Lake Sammamish doubles over current conditions (2015) by 2025.
 - Indicator: natural riparian vegetation within 25 feet of shoreline

Notes: Natural riparian shoreline = native trees and tall shrubs. May include Green Shorelines projects. Riparian assessment via remote sensing possible (current conditions not quantified).

Note: minimum assessment unit size = 25'x25'

⁶ King County. 2015. Monitoring for Adaptive Management: Status and Trends of Aquatic and Riparian Habitats in the Lake Washington/Cedar/Sammamish Watershed (WRIA 8). King County Water and Land Resources Division. Seattle, Washington. <http://your.kingcounty.gov/dnrp/library/2015/kcr2671.pdf>

WRIA 8 Nearshore (Pocket Estuaries)

- **Goal:** Two new pocket estuaries (tributary stream mouths) reconnected to nearshore by 2025.
 - Indicator: number of tributary stream mouths connected to nearshore

Note: stream mouth assessment still to be performed. “Connected” is defined as connected to nearshore through natural channel profile and delta formation processes.

WRIA 8 Science needs

- **NEED:** Science and monitoring prioritized work plan that identifies priority studies (e.g., predation, artificial light) and monitoring needs (e.g., wood inventories, lake shore riparian assessments).