Monitoring Watershed Conditions

In WRIA 8, we monitor for changes in habitat and water quality as recommended by the WRIA 8 Plan, to the degree possible with limited funding. Thanks to a National Estuary Program grant awarded through the Puget Sound Partnership, we assessed land cover change to gauge the rate of change in overall forest cover and streamside areas. For water quality trends in the watershed, we rely on water quality and benthic macroinvertebrate data collected by King County. Overall trends in watershed stream conditions are monitored by King County through an Environmental Protection Agency (EPA) grant co-administered by WRIA 8 and King County – a program that contributes data to the Washington Department of Ecology Status and Trends monitoring project.[6] Funding for this project lasts through 2013.

Land Cover Change

The WRIA 8 Plan places a high priority on protecting forest cover wherever practical throughout the watershed. Intact forests contribute to natural watershed processes and high water quality, both of which are necessary for salmon survival. In priority areas where forest cover no longer exists or cannot be maintained, it is crucial to protect and restore riparian buffers (i.e., forested streamside areas).

Overall forest cover declined in 42 of 47 WRIA 8 subbasins between 1991 and 2006. Areas *outside* the urban growth area (UGA) boundary displayed negligible forest cover loss during that period, while forest cover *inside* the UGA boundary declined 21% in Tier 1[7] areas and 23% in Tier 2 areas (**Figure 7**). For streamside areas, the amount of impervious area increased between 2005 and 2009 in nearly all subbasins studied. Forest cover in streamside areas declined in some subbasins and stayed constant in others (**Table 4**). The majority of forest cover loss in the streamside areas analyzed appeared to be the result of "vested" development – that is, construction legally permitted under older sensitive areas rules.[8]

Between 2005 (top) and 2009 (bottom), houses and roads replaced forest along a tributary to Bear Creek.

Change between 2005 and 2009	
Forest Cover	
Inside UGA	-3.8%
Outside UGA	-1.5%
Impervious Cover	
Inside UGA	10.6%
Outside UGA	5.5%

Table 4. Change in forest cover and impervious cover along selected WRIA 8 streams, 2005-2009. *Data source: King County Department of Natural Resources and Parks.*

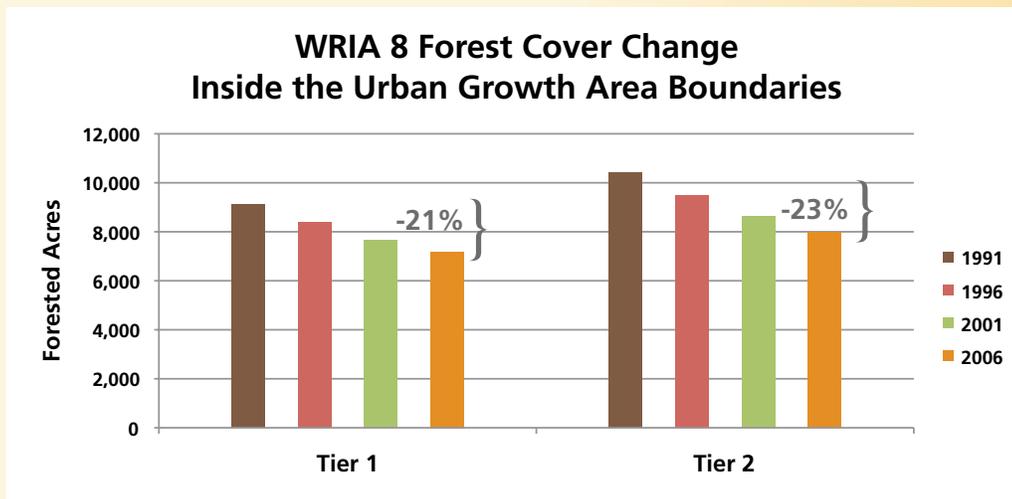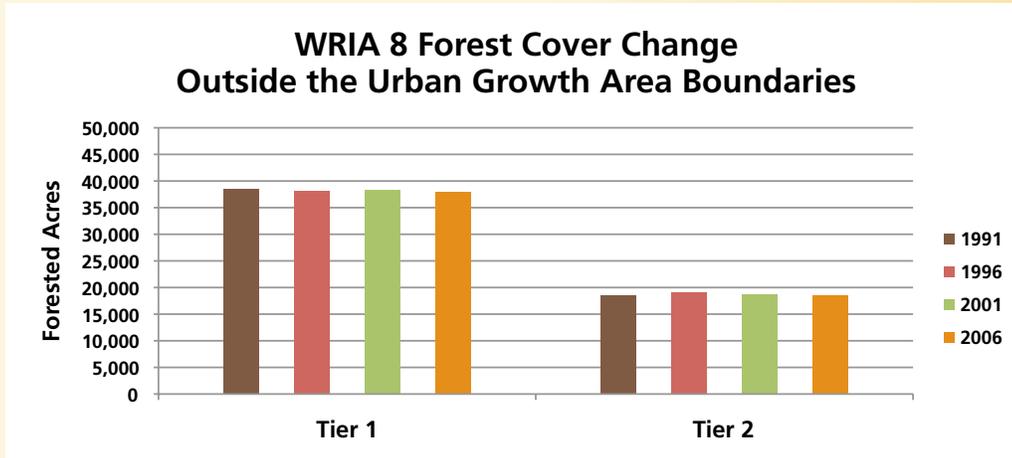[6] *http://www.ecy.wa.gov/programs/eap/stsmf/index.html*

[7] "Tiers" denote priority areas for Chinook salmon in WRIA 8. Generally, Tier 1 and 2 areas are highest priority and have the greatest potential for salmon habitat conservation and restoration. Tier 3 areas are important for water quality improvement and protection.

[8] *http://www.govlink.org/watersheds/8/reports/W8LandcoverChangeReport7-19-2011.pdf.* See report for details.

Figure 7. Forest cover change in Tier 1 and Tier 2 areas in WRIA 8, 1991-2006.
Data source: King County Department of Natural Resources and Parks.

**WRIA 8 Forest Cover Change
Outside the Urban Growth Area Boundaries**

**WRIA 8 Forest Cover Change
Inside the Urban Growth Area Boundaries**

Water Quality

The WRIA 8 Plan relies on the efforts of state and local jurisdictions to protect and improve water quality to help salmon. Likewise, WRIA 8 relies on monitoring efforts by King County and others to provide information on the status and trends in water quality in the watershed. One metric commonly used to report water quality is the Water Quality Index.[9]

The Water Quality Index (WQI) incorporates eight water quality parameters that include temperature, pH, fecal coliform bacteria concentration, dissolved oxygen concentration, sediment load, and nutrient levels. A higher number indicates better water quality, with 100

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[9] *http://www.ecy.wa.gov/biblio/0203052.html*

the highest possible score. In general, stations scoring 80 to 100 meet expectations for water quality and are of "lowest concern;" scores of 40 to 80 indicate "marginal concern." Water quality at stations with scores below 40 does not meet expectations, and these streams are of "highest concern." Water quality data is presented in **Figure 8**.

Benthic Index of Biotic Integrity

Another overall indicator of stream health, the Benthic Index of Biotic Integrity[10] (BIBI) incorporates information on the composition and numbers of aquatic insects living in streams into a score between 10 and 50, with 10 being very poor and 50 being excellent. In WRIA 8, between 2002 and 2010, on average 53% of the sample sites scored "Poor" or "Very Poor," 33% scored "Fair," and 14% scored "Good" or "Excellent." The data display no apparent trend during this period (**Figure 9**).

Watershed Habitat Status and Trends

In 2009, WRIA 8 began a project to conduct physical and biological monitoring in 30 stream reaches in the watershed to characterize watershed conditions. In 2010, we added 20 stream reaches with the aid of an EPA grant written in partnership with King County. We are still analyzing data from the first few field seasons; these will inform our next progress report.

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[10]*http://www.pugetsoundstreambenthos.org/*

Figure 8. Water Quality Index (WQI) for selected WRIA 8 streams, 2001-2009. Cuts to the King County water quality monitoring program in 2009 reduced the number of stations in WRIA 8 (hence the shorter bar for 2009). *Data source: King County Department of Natural Resources and Parks Water Quality Monitoring Program.*
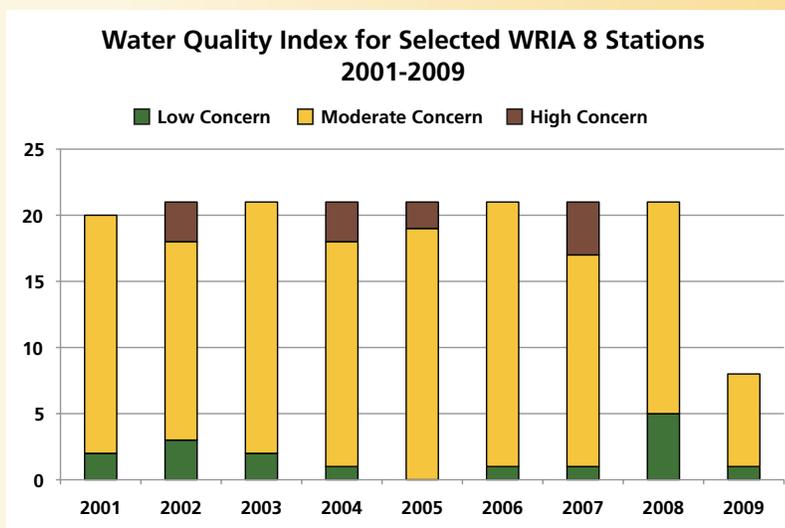

Figure 9. Benthic index of biotic integrity scores for WRIA 8 streams. Percentages represent aggregate scores of 79 to 89 survey reaches per year. *Data source: King County Department of Natural Resources and Parks Ambient Monitoring Program.*