Northwest Forest Plan Interagency Regional Monitoring, 20-Year Report
Status and Trend of Watershed Condition

Aquatic and Riparian Effectiveness Monitoring Program (AREMP)
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Objective

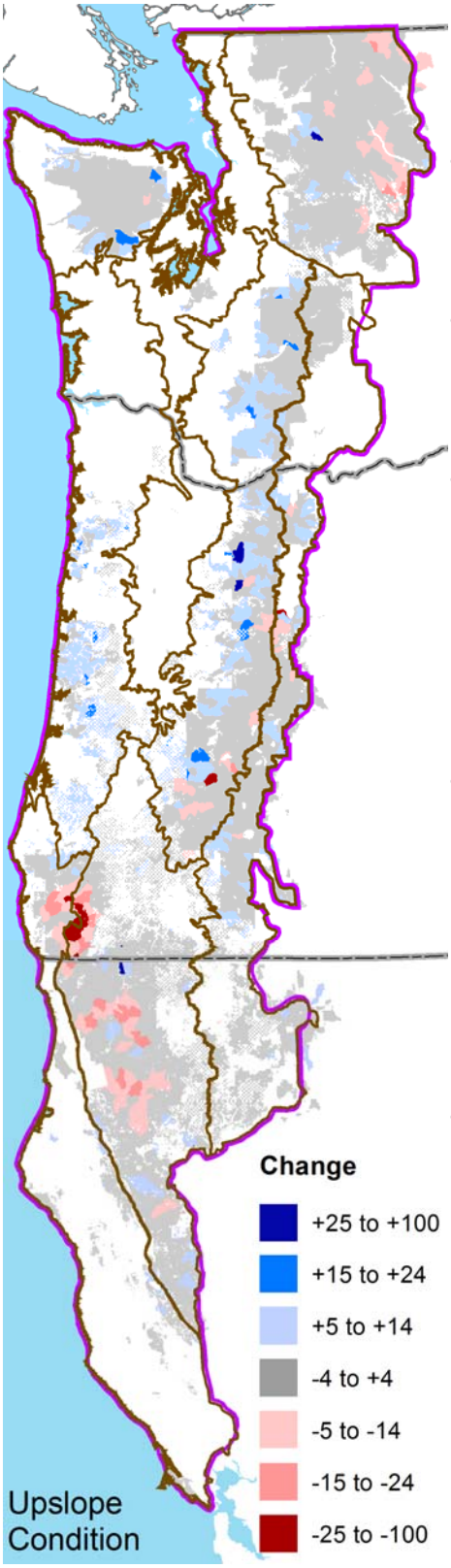
The Aquatic and Riparian Effectiveness Monitoring Program (AREMP) evaluates whether the Northwest Forest Plan (NWFP) aquatic conservation strategy (ACS) is achieving the goal of maintaining and restoring the condition of watersheds.

Methods

AREMP determines the status and trend of stream, and upslope/riparian watershed condition for sixth-field watersheds within the Northwest Forest Plan (NWFP) area. Upslope and riparian condition was based on mapped data (e.g. road density, vegetation) representing the years 1993 and 2012 for all watersheds with ≥5% federal ownership. Stream condition uses yearly physical stream data (e.g. substrate, wood, pools, temperature, and macroinvertebrates) collected under a sampling program that visits watersheds with 25% or more federal ownership in repeating eight year rotations. The first rotation (2002-2009) is complete and we are currently halfway through the second rotation (2010-2017). Watersheds were scored from 0 to 100 for stream condition and upslope/riparian condition, separately. Scores closer to zero signify a watershed has adversely deviated from expectation; 100 denotes above expectation.

What's new this time?

Models for upslope/riparian and stream condition, were standardized across aquatic provinces for more consistent and comparable assessment. A more empirical approach was used for evaluation based on the distribution of values found in minimally disturbed sites for each vegetation zone and physical stream habitat metrics. Environmental variability was directly incorporated into the models by including information such as geology, landforms, and precipitation.



Key Results:

Upslope and Riparian

- At the plan scale, we did not detect a trend in mean condition score between 1993 and 2012.
- However, at the watershed scale, score increases outnumbered declines by 2:1 (16% versus 7%).
- Overall, sharp declines in score were mainly driven by large fires, and were offset by moderate, broad-scale improvements in vegetation and focused improvements from road decommissioning.
- Fires often impacted reserve areas, such as with the Biscuit fire in SW Oregon, the B&B complex in the central Oregon Cascades, and numerous fires along the eastern edge of the North Cascades in Washington.
- The majority of the positive changes occurred in areas that had previously been the most heavily managed, including the Oregon Coast range and western flank of the Cascade Range.

Figure 1—Trend in upslope & riparian scores represented by the change in scores from NWFP inception 1993 to 2012.

Management Considerations and Next Steps

Upslope and riparian scores reflect negative impacts of roads to sediment delivery into streams and fish passage. As such, decommissioning roads improved model scores but other fish passage improvement work is not tracked well by agencies at the regional level.

Forest growth led to broad-scale moderate increases in scores, particularly on matrix land. These are realized through cumulative small increases in vegetation growth across the landscape. Vegetation scores in reserves declined slightly owing to wildfires. Effects of wildfire on aquatic systems can be positive and negative.

Improvements in macroinvertebrates and water temperature stream condition may suggest increased growth of riparian vegetation has positively affected streams. Declining pool tail fine scores may indicate a negative effect of roads, fire, or even climate change. However, increasing overall substrate scores offset this decline.

We will continue to work towards understanding the causal relationships between upslope management actions and stream response at varying spatial scales. We are also further working toward better understanding and evaluation of the multiple effects of wildfires.

Response to Local & Regional Needs

AREMP has made several program adjustments in response to needs presented by the region and the local units.

- We are able to provide scaled down customized reports for local units and districts.
- The empirical approach that we now use is more consistent with regional and national programs in both the Forest Service and BLM allowing us to feed into reporting at even larger scales.
- We have coordinated a multi-agency project and created a consistently defined reference networks allowing agencies operating in the NWFP area to draw upon these data to inform stream condition benchmarks.
- Evaluation tools developed by AREMP can be used by any agencies working on NWFP federal lands.
- We continue to explore ways to better integrate regional scale monitoring with management unit planning and national landscape level initiatives.
- AREMP has substantial baseline data, and the tools necessary to assess change for evolving management across the landscape.

Key Results: *Stream Condition*

Consistent with FEMAT and ACS expectations, stream condition yearly status scores indicate that no trend in overall physical habitat was detected (fig 2).

- Trends in physical habitat were not expected for several decades. Overall trends in physical habitat were not detected but this does not imply that no trend exists.
- Individual components of the physical habitat score components show a decline in pool tail fines and improvements in substrate (fig 3).
- Improving status trends were detected for both macroinvertebrate diversity and water temperature.

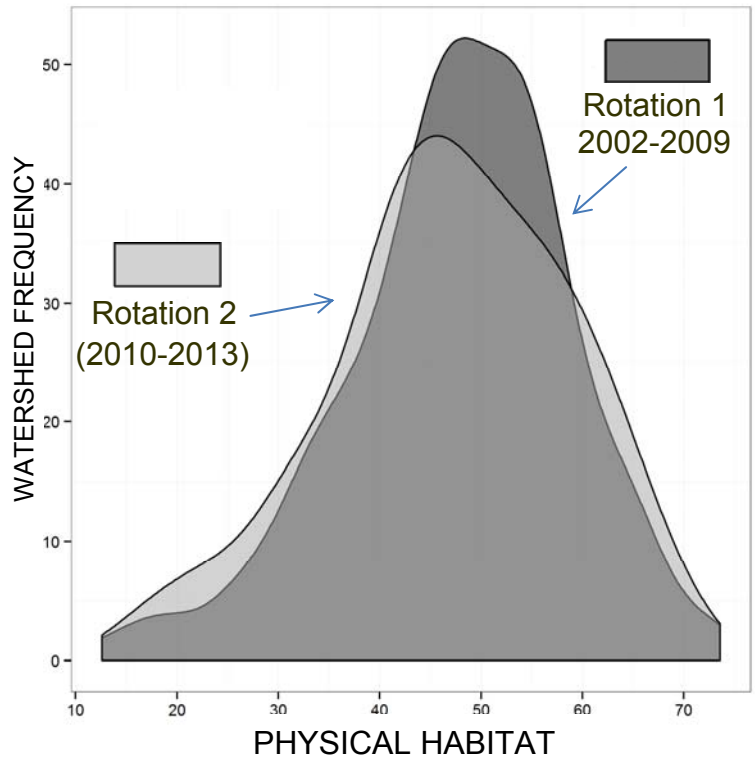


Figure 2—Trend in Stream Condition between rotations.

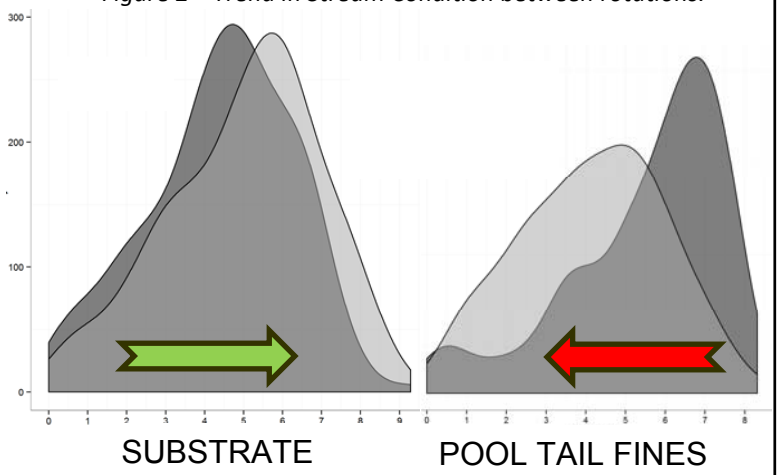


Figure 3—Trend in individual habitat metrics between rotations. Arrows represent the direction of change in each component.