

# Science

## BRIEFING

January 7, 2014

# BULL TROUT MONITORING

## BACKGROUND

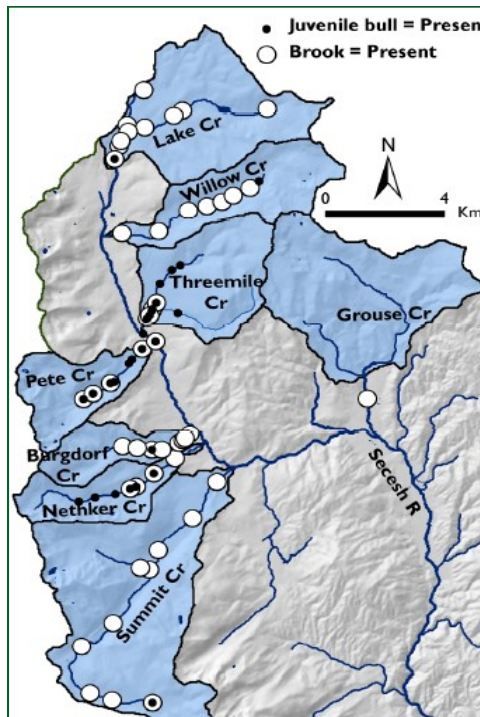
Bull trout (*Salvelinus confluentus*) are native to much of the Pacific Northwest, and although the species remains widely distributed, population declines prompted listing under the Endangered Species Act in 1999. As part of the recovery process, monitoring of bull trout populations for determination of status and trend is required. Within the USFS, similar impetus for monitoring exists because bull trout are a Management Indicator Species.

The extensive lands managed by the USFS require monitoring that can be applied rapidly and inexpensively, yet provide powerful and accurate trend detection. Monitoring has traditionally focused on tracking site level abundance, but this approach is costly and is being replaced by monitoring focusing on assessing temporal patterns of occurrence within suitable habitats. This requires less intense sampling at individual sites, which makes it possible to sample larger and more representative areas relevant to land management.

## RESEARCH

Researchers at the Boise Aquatic Sciences Laboratory have adapted occupancy estimation approaches for application to bull trout. Monitoring of bull trout distributions consists of several steps: 1) stream network delineation in the area of interest using automated GIS routines, 2) filtering of the stream network based on ecological criteria to delineate suitable habitat patches, 3) selection of random sampling sites within suitable patches, 4) sampling to determine patterns of bull trout occurrence within and among suitable patches, and 5) resampling at 5-10 year intervals to assess changes in distribution. As data are collected, models of sampling detection efficiency and species occurrence can be developed and used to refine future sampling efforts.

A pilot project to test application of the protocol was initiated in 2006 with the Payette National Forest. The study site was the 640 km<sup>2</sup> Secesh River Watershed in central Idaho. Stream network delineation and filtering reduced the total stream network by 63%. Three two-person crews worked 4 days and sampled 64 random sites in eight of the patches. Bull trout were detected in all patches, but invasive brook trout had eliminated bull trout from some sites. Sample sites were georeferenced and now provide a baseline for later comparisons.



*Distributions of bull trout (black circles) and brook trout (white circles) at randomly selected locations within eight suitable habitat patches in the Secesh River Watershed.*



## KEY FINDINGS

- Traditional monitoring approaches based on abundance estimates are costly to apply to extensive USFS lands. Monitoring focusing on species distributions is more efficient and may be more informative for land management.
- GIS can be used to stratify a stream network into suitable and unsuitable habitats, significantly streamlining field efforts by reducing the area where sampling occurs.
- Random sampling within suitable habitats provides statistically reliable information to assess status and trends of populations from local to watershed scales using a variety of analytical techniques.

## MORE INFORMATION

Bull trout and climate change website, [www.fs.usda.gov/rm/boise/AWAE/projects/bull\\_trout/bt\\_home.html](http://www.fs.usda.gov/rm/boise/AWAE/projects/bull_trout/bt_home.html)  
[www.fs.usda.gov/treesearch/pubs/32526](http://www.fs.usda.gov/treesearch/pubs/32526)  
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