

Findings Report for Bull Trout Overlay

March 2014

1. Does the study inform a rule, numeric target, performance target, or resource objective?

Yes.

2. Does the study inform the Forest Practices Rules, the Forest Practices Board Manual guidelines, or Schedules L-1 or L-2?

Background: When a harvest unit is located within the BTO, all available shade must be retained within 75 feet of the stream. When a harvest unit is located outside the BTO, prescriptions fall under the standard rule, which may allow for harvest of a portion of shade trees within 75 feet, depending on elevation and canopy cover existing prior to harvest.

The BTO study has two primary objectives:

- Quantify changes in post-harvest canopy closure in units following the standard (SR) and the all available shade (ASR) riparian rules of eastern Washington and compare the changes between the two rule groups.
- Quantify post-harvest changes in stream temperature in these units and compare the changes between SR and ASR prescriptions.

This study informs:

- Schedule L-1 Key Question 2 “Will the prescriptions produce forest conditions and processes that achieve resource objectives while taking into account the natural spatial and temporal variability inherent in forest ecosystems”
 - Heat/Water Temperature:
 - Heat/water temperature-*water quality standards*
 - *Shade-canopy cover*
 - LWD/Organic Inputs
 - Riparian condition-stand measurements
- Schedule L-2 Performance Target
 - Eastside: all available shade within 75’ of bull trout habitat
- CMER Workplan Eastside Riparian Effectiveness Program: Bull Trout Overlay Project Critical Questions:
 - Are the Type F riparian rules effective in meeting the performance targets, resource objectives, and overall performance goals of the FP HCP?
 - Are both the standard eastside prescriptions and the all available shade rule effective in protecting shade and stream temperature and in meeting water quality standards?
 - Are there differences between the standard eastside rule and the BTO all available shade rule in the amount of shade provided and their effect on stream temperature?
 - Is all available shade actually achieved with the densiometer methodology under the BTO shade rule?

- Forest Practice Board Manual, Section 1 Method for Determination of Adequate Shade Requirements on Streams

3. Was the study carried out pursuant to CMER scientific protocols (i.e. study design, peer review)?

Yes. The study plan went through RSAG, CMER, and ISPR review. The study was conducted according to the CMER and ISPR-approved study design. RSAG, CMER, and ISPR have reviewed the report and CMER approved the revised report in February 2014.

4. A. What does the study tell us?

- On average, shade decreased 4% under the standard rule. The maximum decrease seen at any SR site was 10%. Average shade decreased 1% at the ASR sites and the maximum decrease was 4%.
- Relative to the unharvested reference reaches, the average, post-harvest stream temperature increased 0.15°C (P=0.059) across all SR reaches and did not change across all ASR sites (P=0.998). Stream temperature at SR sites increased 0.15°C, relative to the ASR sites (P=0.95).
- This study indicates that both the SR and ASR prescriptions applied to streams approximately 22 ft in width or less with canopies exceeding 85% prevent temperature changes greater than those changes observed in unharvested streams in similar settings.

B. What does the study not tell us?

- Results from this study are most applicable to streams in the mixed conifer zone ranging from 5 to 22 feet bankfull width in mid-successional forests, which make up the majority of Washington State and private forests available for timber harvest. Results may not apply to streams outside of these conditions.
- It is not clear how these results apply for harvests along the streams greater than the tested 1,000 foot treatments.

5. What is the relationship between this study and any others that may be planned, underway, or recently completed?

These results will complement those from other experimental stream temperature, shade, or riparian vegetation studies underway (; e.g. Type N Experimental Buffer Study in Basalt, Type N Experimental Buffer Study in Soft Lithologies, BCIF) and planned (e.g. Westside Type F study, ENREP).

The EWRAP study will provide greater insights into how the BTO site characteristics compare to a random sample from eastern Washington.

6. What is the scientific basis that underlies the rule, numeric target, performance target, or resource objective that the study informs? How much of an incremental gain in understanding do the study results represent?

The rules for riparian buffers are based on research showing that:

- Increased direct solar insolation to the stream following the removal of trees (shade) is the primary driver of higher stream temperatures after timber harvest.
- Bull trout require cool water temperatures.

- Most shade is produced by trees within 75 feet of the stream. This research is widely-accepted.

This study was intended to provide precise estimates of the effects on canopy cover and stream temperature of forest harvest following two specific rule sets on a subset of forested streams.

Technical implications and recommendations

Applicability to eastern Washington

Results from this study are most applicable to streams in the mixed conifer zone ranging from 5 to 22 feet bankfull width in mid-successional forests. We need to examine the effects of harvesting in different environmental settings; in particular, the lower elevation Ponderosa Pine zone with respect to the use of the BTO, but also in terms of riparian buffer effectiveness in general.

The study suggests that the shade rule is not necessary and that protection of shade and temperature could rely on the basal area and leave tree requirements alone.

The greatest uncertainty beyond applicability to other types of stands, elevations, and stream widths, is the length of the harvest unit. The BTO sites were harvested along 1000 feet of stream. Shorter or longer reaches may show smaller or greater effects.

The slight difference in temperature response between the AS and ASR encourages a discussion of whether to simply rely on standard rules.