

## SUMMARY OF PEER REVIEW COMMENTS FROM 5 SCIENCE PANELISTS

### Submitted April, 2005: Bull Trout Core Area Conservation Status Assessment

#### **(1.) Is the theoretical reasoning behind the status assessment, employing the Heritage ranking process sound?**

This analysis was an excellent attempt to synthesize a great deal of information and generate educated approximations of risk in a standardized, scientific fashion. It represents the best available scientific effort to assess the status of bull trout.

It is transparent and straightforward. Most of the biases tend to be in an optimistic direction. As a result, the risk summaries are a best-case scenario. The assessment applied an inherently optimistic approach, rewarding lack of information with neutral risk values. Scoring a lack of information in a neutral or optimistic manner may be a significant theoretical shortcoming of the current process and should be taken into account when interpreting the results.

The Service should assign uncertainty to each of the individual criteria and work toward achieving more quantitative measures of aspects such as internal connectivity. It would be helpful if the Service considered incorporating aspects of NOAA's VSP report, such as spatial structure of local populations and diversity (of life history forms and habitat). It would be helpful if the specific purpose of the assessment is more clearly defined.

In general, the evaluation is based on principles of conservation biology, though the linkages are not always obvious. The theory behind this evaluation works best at the core area level, but tends to get washed out at higher organizational levels (e.g., evolutionary units). The large number of core areas lacking data on abundance and trend make interpretation at the aggregated scale (evolutionary unit) difficult.

#### **(2.) and (3.) Do the conclusions about risk at the core area level and larger unit scale follow from the data? Is there enough information in the assessment to make a meaningful contribution to our understanding bull trout risk at the core area level? At larger scales?**

Clearly, it is at the core area scale that the risk ranking process is most useful and easiest to interpret. Summarizing information by State, while informative, is not biologically relevant. Combining data and characterizing at the scale of evolutionary units generally resulted in a loss of information and compounding of uncertainty. To do so at an even larger scale magnifies this uncertainty.

#### **(4.) Are the specific adaptations of the Heritage criteria, made for this bull trout assessment (e.g., using "key recovery habitat" as a surrogate for distribution, upward weighting of adfluvial populations), sound?**

Yes, given the limitations of the available data. The authors did their best to adapt the Heritage criteria in a meaningful and practical manner. The Service should consider combining or somehow weighting population size and trend scores, because of their interrelationship. There is some concern about a lack of transparent data or logic track to support the threats assessment, making it appear highly subjective.

#### **(5.) Population and trend classifications were based largely on professional judgment, not statistical analysis. Is there a better way?**

No, not given the quality of the data sets. If you rely on professional judgment, transparency and repeatability are key. Use of “fuzzy logic” or “Bayesian belief networks” might be useful in that regard. Statistical power to analyze these data sets should improve with time. You have to ask “what additional information does professional judgment incorporate that are missing with a more quantitative assessment?” More details are required in order to answer this. For areas with unknown distribution a predictive model at the 6<sup>th</sup> code HUC level could be built to estimate the parameters. Subsequent surveys could validate those predictions.

**(6.) Is it necessary to understand the life history forms and connectivity for understanding risk at the core area level and larger spatial scales?**

Absolutely yes, migratory forms are likely key to recovery. It is also critical to consider unique populations, or those residing in unique environments as irreplaceable and they may be important for recovery.

**(7.) The Service assigned “unknown” status to abundance in approximately 20% of core areas. Would it be better to assign a category using best professional judgment?**

There are few options. Given the circumstances, most respondents felt extrapolation from professional judgment is probably the best approach. Another point of view is that extrapolating from similar areas with known distributions may be a more useful approach. The key to a scientifically sound and defensible assessment is to rely on empirical information whenever possible, and to extrapolate those results to similar situations to minimize subjectiveness. The Service should clearly describe what type of information was used and where. It is critical that this review sets the stage for future assessments and identifying areas of important data gaps is useful. More trend monitoring is essential.

**(9.) Are there major gaps or omissions?**

A detailed examination of the assumptions and their influence on the ultimate result would be useful. Key omissions may include a conclusions section, an a priori set of criteria, addressing uniqueness, the obvious lack of population and trend data.

**(10.) Over half the bull trout core areas had unknown population trends. The model “rewards” core areas where information is lacking in that regard. Any suggestions?**

One point of view, held by two reviewers, was that you accept this for what it is and consider the assessment an “optimistic” risk assessment. Two others felt this was a serious flaw in the model for each of the ranking factors, because “unknowns” were generally assigned not just neutral values but rather “low risk” values. They felt this issue should be addressed. “Assigning a stable trend value to areas with no information is dangerous business.” The visual maps also obscure determining where information is available vs. simply unknown. This “reward for ignorance” could lead to a disincentive to those with management responsibility to gather information. These reviewers felt a rule should be developed to disqualify core areas with insufficient information from classification, or a probabilistic ranking should be assigned. Finally, the fifth reviewer felt it was not that big a problem because threats play such a large role in driving the model, and for the most part threats were not ranked as unknown. He was less concerned about the effects of unknowns in the analysis, than in making sure the use of professional judgment was well-supported.