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Dear Mr. Deleray and Mr. Hansen:

As you both are aware, the Montana Chapter of the American Fisheries Society (MCAFS) is an organization of professional fisheries scientists and students from agencies, universities, and the private sector across Montana. Our objectives are: conservation, development, and wise utilization of Montana's fisheries; promotion of the educational, scientific, and technological development and advancement of all branches of fisheries science and practice; and exchange and dissemination of knowledge about fish, fisheries, and related subjects.

The MCAFS would like to take this opportunity to comment and provide information on development of criteria for secure population levels for bull trout (*Salvelinus confluentus*), a threatened species, and westslope cutthroat trout (*Oncorhynchus clarki lewisi*), a species of special concern, in the Flathead Lake and River system. As mandated by the Flathead Lake and River Fisheries Co-Management Plan (2000), your agencies are responsible for establishing secure criteria to ensure that bull trout and westslope cutthroat trout exhibit all life histories and are unlikely to go extinct. These criteria will establish a benchmark for conservation and management for these important native fishes. We believe that development of secure criteria will be an effective tool for native trout conservation and management in the Flathead system if this process is conducted in a conservative fashion based on the best available scientific information.

The Native Trout Security Levels for the Flathead Systems proposal is well written and the report does a good job of reviewing the literature and trying to develop definitions of 'secure' levels for bull trout and cutthroat trout. This is a difficult task because this is a new concept with little previous work to draw upon. The three criteria used to define security (population trend, geographic distribution, and genetic diversity) are logical and defensible goals.

The MCAFS believes that secure levels are not a goal to achieve and maintain, but are an absolute minimum for persistence of the population. We believe that the document should more clearly state that your agencies' goal for the Flathead System bull trout population is substantially higher than the 'secure' level to insure long-term self-sustainability. We also believe that how your agencies will determine each of these secure level factors needs further thought and development.

We feel the document focuses extensively on reasons for defining 300 bull trout redds as a

secure level and does not provide adequate definition of secure levels for other population monitoring parameters, or how the various monitoring parameters will be used in concert to direct management actions. Management actions that will be implemented or considered need to be identified and linked to hierarchical benchmarks for each criterion.

We question whether 300 redds basin-wide is a conservative value that will ensure the long-term persistence (e.g., genetic variation and resistance to stochastic events) of bull trout populations in the Flathead Basin. Rieman and Allendorf (2001) reported that an average of 1,000 adults spawning annually would be necessary to maintain genetic variation indefinitely for bull trout populations. Based on this approach using data previously collected in the Flathead System, designating 300 redds annually as a secure criterion in the Flathead System produces a value of 960 adult spawners (300 redds X 3.2 fish/redd). While this calculation appears logical, using 3.2 fish/redd is questionable due to the age of the data upon which it is based and trophic changes that have occurred within the Flathead aquatic ecosystem (Brad Shepard, personal communication), and comparisons to the ratio of adults to redds in other bull trout populations. Trophic conditions and relative species abundance in Flathead Lake have changed substantially in the past 10-15 years, which justifies suspicion of data that was collected prior to and during those years. Mr. Shepard suggested that new, additional research is needed to accurately update this parameter because the studies are outdated (Block 1955 and 1977-1981; Fraley and Shepard 1989). Additionally, the original estimate was obtained by trapping in just a few tributaries. We are pleased to see the initiation of the Development of a Protocol for Monitoring Trajectories of Bull and Westslope Cutthroat Trout Populations Using Selected Demographic Parameters Through a Probabilistic Framework. However, we believe that until the results of this study are available and can be implemented, a more conservative approach to assessing the bull trout and westslope cutthroat trout populations should be taken. In a recent study, Baxter and Westover (2000) reported that there were an estimated 1.4 to 2.1 bull trout adults per redd in the Wigwam River Drainage, British Columbia, which is located directly northwest of the North Fork Flathead River. Using an average of 2 adults/redd, for example, would be a more conservative approach based on recent data in the same geographic area (1000 spawning individuals/ 2 fish/redd = 500 redds annually). If managers desire a conservative estimate, we recommend that the lower ratio be used.

We recommend avoiding the discussion of alternate year spawning, as this discussion just confuses the issue. Redd counts are conducted annually, and the intent is to attain at least the secure level each year. Additionally, Rieman and Allendorf (2001) assumed that all fish spawn every year when they made their recommendation of 1,000 adults. MCAFS views the secure level of redds annually in the Flathead System as a minimum level for bull trout. If the long-term goal of this proposal is to create a higher level of distribution and abundance for bull trout in order to remove them from the threatened species list, then accepting the minimal level may be problematic, and will do little to enhance their status to allow consideration for their removal from the list. The population dropped to about half this number recently (redd counts were below this benchmark in five of six years between 1992-1997) and has since returned to these levels. If the causes of this decline and rebound are known, they should be presented in the document, along with any measures that have been implemented to prevent a recurrence. The population level of bull trout should be high enough so that in down years, such as 1992-97, the population does not decrease below the secure level.

Since the early 1980's, the overall population trend for bull trout has dramatically declined in the Flathead System. Examination of annual redd count data reveals that 300 redds is on the lower end of the distribution. While there have been substantial changes to the Flathead ecosystem (e.g., the establishment of Mysis shrimp and the expansion of the lake trout population), we question whether 300 redds is a conservative value given that the population has declined significantly from the 1980's values when the population was stable and averaged nearly 900 redds basin-wide, is now considered Threatened, and just recently rebounded to the lower 300 redd threshold. Again, if delisting and long-term security of the Flathead System population is desired, we feel the secure criterion for redds should be higher than 300. Setting the benchmark

based on the 1980's data may be an appropriately conservative approach to ensuring the long-term genetic diversity of bull trout populations, especially since the population was stable during that time period. Further, it is important to remember that 300 redds in the 1980's is likely not equivalent to 300 redds today. High levels of bull trout harvest occurred in the 1980's. Current regulations prohibit intentionally fishing for bull trout. Given that legal angler harvest of bull trout is effectively non-existent now, it is clear that the number of bull trout in the Flathead Lake system today is still very far below what it was in the 1980's, even when 300 redds are constructed. Again, MCAFS believes the secure criteria define a minimum population level, and extensive effort should be undertaken to substantially exceed the secure criteria. If monitoring shows the secure criteria benchmarks are being approached on a downward trend, management actions should occur in an effort to reverse the fall toward the secure criteria. As an example, using the 300 redd count as the minimum secure level, lake trout harvest would be liberalized when bull trout redd counts decrease to 350, then would be removed altogether if the bull trout redd count decreased to 325. Similar hierarchical actions should be described for each monitoring activity (for example, implement a sliding scale for lake trout harvest depending on their gill net catch rates).

The term "unlikely to go extinct" requires additional information and quantification. What is the time frame? What are the probabilities or likelihood of extinction thresholds? Please define further.

The definition of secure assumes no "unforeseen changes" to the bull trout populations. Many of the potential changes listed (i.e., environmental stochasticity, new species introductions, habitat degradation etc.) are highly probable within the next 100 years. We view this as strong reasoning to set the goal for the bull trout population level substantially higher than the secure criteria - to buffer for "unforeseen changes".

The geographic distribution criterion fails to include any commitment to maintaining local spawning populations at or above a baseline level. For example, under the proposed secure criteria of a "numeric indicator of wide geographic distribution", significant declines of strong populations (i.e., Coal Creek) would not appear to be a concern. Secure levels need to reflect the status and trends of local populations to ensure a natural collection of populations large enough to collectively meet the goals and minimum numbers for the entire system. Perhaps it is necessary to define population goals (number of spawning adults, number of redds, juvenile abundance) for each spawning tributary (or at least index tributaries) with numeric goals set for each, including a minimum secure level for each. Including a discussion of actions to reverse the decline in Coal Creek would be informative to the reader.

Finally, it is necessary to consider more than genetic variation when determining secure levels for at-risk populations, such as bull trout in the Flathead System. The entire secure level document seems based on Rieman and Allendorf's (2001) approach to establishing a secure benchmark based on 1,000 adults spawning annually. Other factors to consider while developing secure criteria include: 1) changes in the food web ecology in Flathead Lake; 2) local population thresholds; 3) dispersal and mixing rates; 4) full expression of life history and phenotypic diversity; and 5) resistance to catastrophic stochastic events (distribution among diverse habitats), and so on. Rieman and Allendorf (2001) suggest that "Mitigation of extinction threats associated with demographic processes may require larger population sizes regardless of genetic issues..." and "Maintenance of genetic diversity is essential, but not necessarily sufficient for effective conservation". We urge your agencies to consider all necessary factors when determining secure levels for bull trout in the Flathead system.

A potentially significant issue with the document is that it applies recommendations meant for individual populations to a metapopulation.

What is the definition of a population? The term population is used in the document to mean two different things: the group of fish that interbreed (such as within an individual tributary) and the whole collection of fish that utilize Flathead Lake at some point in their life history. The term

is used interchangeably throughout the document to refer to these two very different scales, which leads to confusion and potential error.

In the section on genetic threats, the document states, "there is little genetic variation within populations and high levels of differentiation between populations (Leary et al. 1993)." Thus, in order to maintain genetic diversity of bull trout in the Flathead system, "all distinct populations (each tributary) must be maintained." Rieman and Allendorf (2001) recommended that an average of 1,000 adults spawning annually would be necessary to maintain genetic variation of a population indefinitely. Rieman and Allendorf (2001) are rather clearly using the term population to refer to a group of fish that breed with one another. However, the secure redd criterion is based on the total number of redds of all spawning populations (individual tributaries) combined. Regardless of the ratio of spawners/redd and the subsequent secure number of redds, The Native Trout Security Levels for the Flathead System sets the secure number of adult bull trout at 1,000 adults spawning annually. This is the total number for the entire Flathead Lake System metapopulation. This is clearly not what Rieman and Allendorf (2001) were talking about when then were using the term 'population'. In fact, Rieman and Allendorf (2001) say, "At present, no simple rules guide consideration of the effective size of a metapopulation and simulating metapopulation processes to generate estimates for bull trout would be highly speculative." MCAFS again emphasizes we believe 1,000 adult bull trout spawning annually is an absolute minimum level for the overall system, and that the spawning tributaries should each have their own population goals and secure criteria.

The document lacks clarity and detail regarding what future monitoring plans and analysis methods will be.

On numerous occasions, the words 'can' and 'could' are used, rather than 'will' and 'would'. While this may just be semantics, it leaves the reader uncertain about what will actually be done in the future. For example, regarding cutthroat, it is stated that, "we could add new stream sections into our annual juvenile abundance monitoring..." and "we could use a lower significance level to detect changes". Rather, the document should identify if managers will add new stream sections, and if a lower significance level will be used, or at least the conditions that would require addition of more monitoring segments or lower significance levels. We look to the Development of a Protocol for Monitoring Trajectories of Bull and Westslope Cutthroat Trout Populations Using Selected Demographic Parameters Through a Probabilistic Framework to provide such information, but also would like to see a definitive plan for action in the interim.

The description of how other tools for monitoring trends will be used needs to be fleshed out in greater detail. Secure goals and numeric benchmarks are provided only for redd counts, and then only for the entire basin, not for individual spawning streams or even forks of the river drainage. Secure goals for any other criteria listed lack the measurable objectives needed to determine if the goals have indeed been met. Again, reliance on redd counts is overemphasized and the other criteria, including juvenile abundance, habitat quality, angler and gill net catch rates in the lake, and lake trout gill net catch rates in the lake are underemphasized and lack detailed descriptions. For each criterion, whether it is juvenile abundance, gill net or angler catches, or any other, there should be trigger points that define the population goal and the secure level. As previously stated, we recommend management actions that will be implemented or considered need to be identified and linked to hierarchical benchmarks for each criterion, along with a description of how those monitoring parameter benchmarks will be used in concert with one another to direct management actions.

There is inherent danger in relying on spawning health as an indicator of a population status, especially with long-lived species. With a 3-5 year lag time between juvenile population status and the number of redds those juveniles will ultimately construct, the populations could be in serious trouble well before redd counts show the decrease. Sturgeon and Missouri River rainbow trout are some examples of populations that would be classified as 'healthy' under the criterion of spawning, but other criteria show a very poor reproductive success, arguing for diverse

measurement of population status.

The secure criteria for westslope cutthroat are weak and lack quantitative standards. While The Native Trout Security Levels for the Flathead System document recognizes the commitment of the agencies to the goals of the Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout in Montana, it does not define criteria that will be used for cutthroat abundance trends or distribution. It is not clear what actions will be implemented to improve monitoring. There are no numeric standards of any kind throughout the document applied to cutthroat. Numeric criteria are needed to set a benchmark based on the best available data. Otherwise, this document pertains only to bull trout conservation and fails to establish secure criteria for westslope cutthroat trout. Because cutthroat have been petitioned for listing under the ESA, the co-managers should consider developing benchmarks that will lead to population maintenance and recovery, and thus preclude listing in the future. Perhaps using both genetics and abundance data to identify benchmarks would provide a biologically meaningful standard to ensure the long-term viability of cutthroat populations. We believe all upper Flathead Basin river drainages should be considered and included in such an analysis, including those which may suffer connectivity problems, such as the Stillwater and Whitefish drainages, and measures identified that would restore their connectivity.

The document fails to clearly define how secure level benchmarks will be used for future management of the lake-river system.

The purpose for establishing the secure criteria is vague. The document states "regardless of what these [secure criteria] levels are, managers will try to increase native trout numbers from current levels." While bull trout currently meet the secure criteria level as proposed, we are pleased to see the commitment to increase native trout numbers beyond their current level. We advocate implementation of measures to protect and improve habitat, control harvest, and suppress populations of non-native species that exert deleterious effects on the native fish of the Flathead.

Conversely, if bull trout numbers do not meet the secure level, then what will managers do to reduce negative non-native species interactions in Flathead Lake? The report states, "if a criterion is not met we will search for corroborating monitoring indices in an effort to verify population status". MCAFS advocates action (or non-action) based on sound and thorough monitoring. As described previously in these comments, the plan should identify progressive, hierarchical management actions that will be employed as monitoring indicates the population(s) is decreasing toward or falling below the secure level threshold, or by definition, extinction is 'likely' in the foreseeable future.

The main body of the document contains no discussion of how these criteria relate to potential future harvest. The executive summary states, "Secure populations cannot necessarily sustain fishing harvest." and "However, if a population meets these criteria, then fishing opportunities may exist." MCAFS supports restoring and sustaining populations to harvestable levels. However, we believe the Flathead System native fish populations must be restored to levels higher than the secure criteria indicated in the document and sustained at those levels for several consecutive generations prior to allowing harvest of bull trout or increasing harvest of cutthroat. Doing so will allow adequate time to conduct monitoring to insure the secure criteria are actually working and are sustainable.

The bull trout in the South Fork of the Flathead drainage above Hungry Horse Dam are discussed in the document, but the relevance of this discussion is not clear.

The authors state, "when discussing conservation of Flathead Lake native trout genetic variation, the South Fork populations require consideration and conservation." Hungry Horse Dam, completed in 1953, isolates the South Fork populations from the Flathead Lake-River system. The South Fork populations appear to be stable and 'secure'. Both the South Fork and Flathead Lake-River system bull trout populations represent some of the last remaining bull trout strongholds throughout their range. Population goals and secure level criteria should be

established for each because these are functionally separate metapopulations that are both critical to the persistence of bull trout throughout their range and in the Flathead River Drainage.

Hungry Horse Dam is also discussed in the section on Habitat Connectivity and Quality. It is stated that managers are not advocating fish passage at Hungry Horse Dam. We agree with that assessment at this time because we do not believe that the South Fork population should be counted on as a 'genebank' for the remainder of the Flathead System, nor should passage of bull trout or cutthroat trout past Hungry Horse Dam be considered until the potential for disease transmission, hybridization, and other necessarily considered factors are understood.

In summary, the Flathead Lake and River native trout populations are a valued cultural and economic heritage in Montana. Management decisions made today represent an opportunity to sustain our natural heritage for future generations to enjoy and appreciate. We urge your agencies to use more defined and conservative benchmarks for securing the Flathead System bull trout and westslope cutthroat trout populations, and to set a goal of sustaining them at substantially higher population levels than the secure criteria. We thank you for considering our concerns and comments.

Sincerely,

Pat Clancey
MCAFS President

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