National Marine Fisheries Service (NMFS) position regarding bank alteration as the best available indicator for the extent of incidental take for the proposed grazing strategy on allotments in the Malheur National Forest (MNF). 07/29/09

The Malheur National Forest (MNF) Biological Assessment (BA) for 2007-2011 livestock grazing listed the following potential adverse effects of grazing on listed Middle Columbia River (MCR) steelhead: 1) harassing and modification of spawning behavior due to interaction with livestock in spawning areas; 2) direct mortality of eggs and embryos due to trampling of redds by livestock; 3) modification of habitat due to reduction of shade and reduced bank stability in steams with rearing, spawning, holding and migration; 4) modifications of occupied habitat due to reduction in shade and reduced bank stability in unoccupied streams upstream of occupied habitat; and 5) changes in behavior related to modification of habitat. To limit these potential impacts, the MNF provided in the BA move indicators intended to ensure livestock grazing will not inhibit continued improvements of riparian components and channel morphology.

NMFS agreed with the MNF's use of bank alteration as an appropriate monitoring indicator (along with the indicators shrub utilization and stubble height) in the Malheur National Forest Administration of Thirteen Grazing Allotments Biological Opinion (BO) for 2007-2011(NMFS number 2007/01290). Bank alteration of 20% was proposed as one of these move indicators in the BA along with stubble height and shrub utilization. The BA states that bank alteration is the relative measure of damage to a stream bank that is directly attributable to livestock and of all the end-point indicators; it is "probably the most important."

Livestock grazing along streambanks can affect the stream in two main ways: first by changing, reducing or eliminating deep-rooted riparian vegetation; and second, by directly altering the streambank by bank shearing and trampling (Platts 1991). Forage utilization, greenline stubble height, and bank alteration are recognized monitoring methods that are used to determine the amount of vegetation use and streambank disturbance. However, Bengeyfield (2006) found that the only streams that showed significant improvement were those where the streambank alteration levels were met. Neither a forage utilization of 45% nor a stubble height at 4 inches initiated the upward trend in stream channel shape that is a necessary to achieve riparian function.

The habitat effects of the proposed action as described above are likely to injure or kill ESA-listed MCR steelhead or increase the likelihood that they will be injured or killed. When specific numbers of affected individuals of listed fish cannot be determined, the NMFS quantifies a habitat based extent of take directly related to the effects of the proposed action. NMFS believes that bank alteration is an appropriate habitat indicator for extent of take for the following reasons:

1) Bank alteration is a direct and immediate effect of livestock grazing. Through streambank sheering and trampling, livestock use directly increases sediment load and channel widths.

2) Bank alteration is directly related to the identified habitat mechanisms causing take. Increased suspended sediment increases substrate embeddedness, which leads to the loss of rearing habitat, forage abundance, and the burial of spawning substrate. Bank trampling directly widens the stream channel increasing width to depth ratios which leads to increases in stream temperatures. MCR steelhead often avoid stream reaches that approach sub-optimal temperatures or perish if they cannot flee areas where stream temperatures approach lethal levels. By limiting streambank damage, these adverse affects to stream channel morphology and water quality will be minimized.

3) Bank alteration is a quantifiable and repeatable published technique for monitoring riparian impacts related to livestock grazing. Bank alteration as an indicator is widely used (Burton et al. 2007) and accepted, simple to learn and easy to implement (Archer et al. 2008), and limiting bank alteration has been shown to maintain or improve riparian conditions (Bengeyfield 2006).

Archer et. al (2004) indicates that monitoring methodology should be sensitive enough to detect changes in ecosystems that are a result of human induced activities. Since meeting bank alteration indicators seem to allow for near optimal recovery and the attainment of Riparian Management Objectives (Cowley 2002), not exceeding bank alteration indicators (incidental take) would meet PACFISH[1] goals to maintain or restore stream channel integrity, sediment regime balance, diversity and variability of plant communities, and healthy riparian habitat for MCR steelhead.

NMFS agreed with the MNF's use of bank alteration as an appropriate monitoring indicator (along with the indicators shrub utilization and stubble height) in the 2007-2011 BO. NMFS adopted the proposed action's 20% bank alteration as a quantified indicator of the amount and extent of take where riparian conditions were healthy, end-point indicators have been consistently met, and an upward trend in riparian conditions was apparent.

In reference to the NMFS' two 2006 MNF livestock grazing biological opinions, Judge King's April 16, 2007 Opinion and Order (Civil case No. 06-946-KI) acknowledges plaintiff's complaint that NMFS failed to include a reasonable and prudent measure directed at limiting the effects of grazing on habitat, and thereby minimizing the incidental take of the species. Therefore, to further minimize the impact of the proposed grazing actions on MCR steelhead

[1] U.S.D.A. Forest Service and U.S.D.I. Bureau of Land Management. 1995. Decision Notice/Decision Record, Finding of No Significant Impact, Environmental Assessment for the Interim Strategies for Managing Anadromous Fish-Producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California. Washington, D.C. 72 p. plus appendices.

habitat, bank alteration was reduced to 10% for 10 allotments (Camp Creek, Deadhorse/Hanscombe/Fields Peak, Hamilton/King, Long Creek, Lower Middle Fork, Mount Vernon/John Day/Beech Creek, Murderers Creek, Roundtop, Slide Creek, and Upper Middle Fork) under the terms and conditions of the 2007 incidental take statement. Allowable bank alteration was reduced for these ten specific allotments for various reasons including past noncompliance, riparian vegetation in early seral status, upward trend was not apparent, and recent riparian impacts associated with trespass had occurred. More detailed allotment information on past noncompliance, vegetation status, trend, and trespass can be found on pages 71– 114 of the BO.

In general, these allotments routinely exceeded bank alteration indicators. According to MNF end-of-year reports, the 2007 grazing season resulted in 7 grazing units within 3 allotments exceeding 10% bank alteration indicators. The 2008 grazing season resulted in 19 grazing units within 6 allotments exceeding 10% bank alteration indicators. Bank alteration indicators were exceeded as a result of improper fence maintenance, undetected cattle drift, wildlife browsing, improper placement of designated monitoring areas, and permittees grazing cattle after move trigger(s) were met. The overall downward trend of these allotments is disturbing and a more robust managerial effort is needed. A bank alteration move trigger of 10% for these allotments requires more intensive in-season monitoring and management which is designed to remedy the issues stated above that are allowing excessive bank alteration.

The best available science indicates that the 10% and 20% bank alteration levels are appropriate in preventing bank destabilization and protecting habitats critical to listed fish. Pfankuch (1978) and Hayslip (1993) set 90 percent or more unaltered streambank as the lower level of excellent or optimal condition. The Thompson *et al* (1998) study indicated 95 percent unaltered streambank received the best score. Bengyfield and Svoboda (1998) suggest using 90 percent plus unaltered streambank for streams containing listed fish. Powell *et al* (2000) stated that greater than 20% of the surface affected by deep hoof prints should not occur along high value fish habitat. Cowley (2002) concluded that "streams with 90 percent of the potentially stable banks unaltered (ten percent or less alteration) would seem to allow for near optimal recovery and should not retard or prevent attainment of Riparian Management Objectives (RMOs)." By achieving RMOs, the goal stated within PACFISH (1995) of establishing healthy, functioning fish habitats will be met.

The BA states that bank alteration will be used as the quantitative measure to identify potential impacts that could retard progression toward near natural rates of recovery and attainment of RMOs. The rationale found in the above-cited publications supports the argument that levels of bank alteration should not be increased above current levels until sufficient data shows an upward trend in riparian conditions. For allotments with conditions on a downward trend, making significant progress toward habitat recovery requires a level of unaltered streambanks greater than the minimum amount necessary to maintain the stream's condition (Cowley 2002).

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