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IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF OREGON

OREGON NATURAL DESERT ASS'N, **CENTER FOR BIOLOGICAL DIVERSITY**, and **WESTERN WATERSHEDS PROJECT**,

Plaintiffs,

v.

ABIGAIL KIMBELL, *et al.*,

Defendants,

v.

HARLEY & SHERRIE ALLEN, *et al.*,

Defendants-Intervenors.

Case No. 07-1871-SU

SECOND DECLARATION OF JONATHAN RHODES

I, JONATHAN J. RHODES, state and declare as follows:

1. My name is Jonathan J. Rhodes. I am the same Jonathan J. Rhodes who submitted a first declaration in this case. My qualifications are described in that declaration.

2. In my previous declaration I listed and described the material that I had reviewed at that time. Since then, I have also reviewed the Gowan Declaration and Larson Declaration and attachments, and the Response Briefs of the Government (BG) and Intervenors (BI).

Scope of Review

3. I submit this declaration to clarify issues related to the monitoring of bank alteration in the Murderers Creek Allotment (MCA) and the Lower Middle Fork Allotment (LMFA), including the methods and the results. I also explain how the monitoring described in the Christie Declaration and my first declaration was mischaracterized in the Gowan Declaration and Larson Declaration.

4. My review of the additional material does not, in any way, alter my conclusions in my previous declaration about bank alteration and the negative effects of the grazing on bank conditions and fish habitat in these allotments. I stand by all of the findings and conclusions in my previous declaration regarding the levels of bank alteration and effects of grazing on riparian areas and stream conditions in these watersheds.

The bank alteration data in the Christie Declaration are from measurements using the same criteria and methods similar to those used in USFS monitoring and should produce comparable results.

5. The BI (p. 25) and Gowan Declaration (p. 13, ¶ 26) incorrectly assert that bank alteration data in the Christie Declaration were not collected using systematic measurements of bank alteration This ignores that Christie's declaration clearly describes the systematic measurement methods, including the length of bank alteration transects, the number of point

measurements of bank alteration and bank stability (at least 50 points on each bank for >100 point samples within a transect), the spacing and distribution of these measurements within transects, and the criteria used to make these point measurements (Christie Declaration, p. 5-6, ¶ 14).

6. The criteria used in the bank alteration measurements taken by Christie and my visual estimates are described in detail in my declaration (Rhodes Declaration, pp. 5-6, ¶¶ 11-12) and clearly are clearly the same used as those used by the Malheur National Forest (MNF) to measure bank alteration (Gowan Declaration, p. 10, ¶ 17). The Gowan Declaration fails to note this use of these bank alteration criteria and thereby mischaracterizes the bank alteration monitoring by Christie and its relationship to the methods of the USFS (Gowan Declaration, pp. 13-14, ¶ ¶ 26, 27, 28).

7. The Christie measurements of bank alteration are comparable to that used by the USFS (Burton et al., 2007) in several other ways. Both measurement approaches employ point measurements of bank alteration taken at regularly spaced intervals. Christie measured bank alteration by taking point measurements of bank alteration at regular intervals determined by stepped paces within a transect, using the same criteria in the USFS guidance for measuring bank alteration (Burton et al., 2007). The USFS approach to bank alteration measurements also uses point determinations of bank alteration taken at regular intervals determined by the length of stepped pace(s) (Burton et al., 2007). Exhibit A attached to this declaration provides a conceptual illustration of how the point measurements taken by Christie were collected in comparison with that in the USFS guidance for monitoring bank alteration (Burton et al., 2007).

8. As illustrated in Exhibit A, the USFS approach merely uses very clumped sets of point measurements of bank alteration taken at regular intervals determined by the length of

stepped pace (Burton et al., 2007, p. 16), while the approach used by Christie takes single point measurements at regular intervals also determined by the length of stepped pace. Over a monitored transect of several hundred feet, the two approaches should provide results that are roughly comparable. Importantly, Christie clearly notes that all transects where he measured bank alteration were at least 300 feet long (Christie Declaration, p. 5-6, ¶ 14). The Forest Service methodology recommends 80 to 100 bank alteration measurements[1] on each side of stream in a transect at least 361 feet long, (Burton et al., 2007, pp. 6, 15), while the method used by Christie yields at least 100 measurements (50 on each side of the stream) on a transect at least about 300 feet in length (Christie Declaration, pp. 5-6, ¶ 14).

9. It is important to note that for the MCA and LMFA allotments, the total number of measurements of bank alteration collected by Christie exceed those of the MNF in the Designated Monitoring Areas. Christie took at least 100 bank alteration measurements (50 on each side of a stream segment at least about 300 feet long) in 18 stream segments in the MCA (Christie Declaration, pp. 5-6, ¶ 14, pp. 9-10, ¶ 19, and p. 11, ¶¶ 21-22). Assuming that the average number of bank measurements taken by Christie is only the minimum 100 per transect, Christie still took 1,800 point measurements of bank alteration. The Gowan Declaration (p. 10, ¶ 16) indicates that the MNF takes 70 to 100 plot frame point measurements on each of side of streams, for a total of 140 to 200 measurements, within DMAs that are ostensibly about 361 feet long. There are seven DMAs in the MCA according to the Gowan Declaration (p. 8, ¶ 13). Therefore, assuming that the MNF took an average of 170 measurements per DMA, based on the information in the Gowan Declaration, the MNF collected about 1,190 total measurements of bank alteration in seven DMAs in the MCA, which is plainly less than the at least 1,800 bank

[1] The Gowan Declaration (p. 10, ¶ 16) indicates that the MNF takes 70 to 100 plot frame point measurements on each of side of streams within DMAs.

alteration measurements collected by Christie in the MCA. Importantly, the measurement of at least 1,800 point measurements of bank alteration collected by Christie were taken in 18 areas, while the monitoring of the MNF occurred in only seven DMAs.

10. Point measurements are widely used in natural resource monitoring and research. Point measurements collected taken at paced intervals are widely used in USFS monitoring of many stream attributes, including stream substrate and bank alteration (Burton et al., 2007). Therefore, Christie's point measurements of bank alteration at regular intervals determined by paced steps is comparable with USFS bank alteration monitoring methods (Burton et al., 2007) and methods that are widely used in monitoring and research.

11. For these combined reasons, the bank alteration data in the Christie declaration are based on systematic measurements and criteria comparable to that used by the USFS and should provide roughly comparable results. The measurements taken by Christie were collected via methods are widely used in monitoring and research and, therefore, are reliable. Christie's data were augmented with considerable additional information on the location and date of the measurements, as well the manner in which it was collected. His data also were augmented with considerable photo documentation of conditions in the areas where the measurements were taken. Therefore, the assertions in Gowan Declaration, Larson Declaration, BG, and BI that the bank alteration data collected by Christie are not based on valid measurements and are unreliable due to the methods used are not merited. The assertion in the Gowan Declaration that the methods and criteria used by Christie to measure bank alteration fundamentally differ from those used by the USFS ignores the many ways in which they are comparable.

> <u>The bank alteration data in the Christie Declaration were collected in more areas than that of the MNF and, hence, are more likely be more representative of bank alteration conditions in the allotments than the data of the MNF.</u>

12. The accuracy in the characterization of conditions in a larger area tends to increase with number of areas measured. It is indisputable that the bank alteration data in the Christie Declaration were collected in more areas in the MCA and the LMFA than that of the MNF. The Gowan Declaration indicates bank alteration was only quantitatively measured by the MNF in seven Designated Monitoring Areas (DMAs) in the MCA and in only one DMA in the entire LMFA (Gowan Declaration, p. 8, ¶ 13). In contrast, Christie measured bank alteration in 18 different stream segments[2] throughout the MCA (Christie Declaration, pp. 9-10, ¶ 19) and in two segments in the LMFA (Christie Declaration, p. 11, ¶ 21-22). Thus, the difference in coverage, extent, and number of stream segments monitored by the MNF and Christie for bank alteration is significant --- Christie took bank alteration measurements in about 2.5 times the number of stream segments in the MCA that the MNF did and in double the number of stream segments in the LMFA that the MNF did. Due to the greater extent, number, and dispersion of stream segments with bank alteration measured by Christie, it is likely that the Christie data more accurately represents bank alteration conditions throughout the allotments than the measurements of bank alteration by the MNF in the DMAs.

13. It is worth noting that Christie took more measurements of bank alteration in the MCA and LMFA and over a greater total length of stream segments than the MNF apparently did. As previously discussed, the information in the Christie Declaration indicates that Christie took at least 1,800 bank alteration measurements in 18 stream segments in the MCA. These monitored stream segments had a total length of at least about 5,400 feet (or more than a mile) in the MCA, based on the information in the Christie Declaration (pp. 5-6, ¶ 14). In contrast, based

[2] One of stream segments where Christie measured bank alteration in the MCA had not been grazed for several of the most recent years. Thus, Christie measured bank alteration in 17 grazed stream segments and one rested stream segment for a total of 18 stream segments with measured bank alteration in the MCA.

on the information in the Gowan Declaration, the MNF took about 1,190 measurements of bank alteration in DMAs in the MCA. Assuming that the DMAs are at least 361 feet long, the total length of stream segments monitored for bank alteration by the MNF in the MCA was at least 2,527 feet, less than half the minimum total length of stream monitored for bank alteration by Christie in the MCA.

14. The Christie Declaration indicates that Christie took at least a total of 200 measurements over at least 600 feet in the LFMA two segments in the LMFA (Christie Declaration, pp. 5-6, ¶ 14 and p. 11, ¶ 21-22). In contrast, based on the information in the Gowan declaration, the MNF took about 140-200 measurements over at least 361 feet in the LMFA.

15. Very importantly, Christie measured bank alteration in stream segments two units in the LMFA where the MNF did not quantitatively monitor bank alteration in DMAs at all. The MNF only has one DMA in LMFA (Gowan Declaration, p. 8, ¶ 13). This DMA is not in either of the two units where Christie measured bank alteration on two stream segments (one stream segment in each unit).

16. The bank alteration measurements of Christie also provide a critically important perspective on bank alteration conditions and grazing impacts in the MCA, because Christie measured bank alteration in a stream segment that had been rested for several out of the most recent years. Researchers have repeatedly noted that the comparison of data on stream conditions from ungrazed stream segments to data from grazed areas is key to assessing grazing impacts on aquatic systems, including their trend over time (Knapp and Matthews, 1996; Magilligan and McDowell, 1997; Kauffman et al., 2002).

17. Any sampling approach that relies on subsampling to determine existing

conditions has limitations. In the case of the monitoring of bank alteration by Christie this is likely to have very limited significance for two reasons, especially in the MCA. First, bank alteration was pervasive in streams subjected to grazing. Second, this bank alteration was obviously much greater than 20%.

The Gowan and Larson Declarations provide no rational support for the contention that the conditions in stream segments where Christie measured bank alteration are not representative of conditions in the allotments.

18. In order to reasonably show that measured conditions in sampled stream segments are not representative of conditions at larger scales, it is necessary to collect and provide data at larger scales and compare it to that from sampled stream segments. Notably, the Larson and Gowan Declarations are devoid of such information. As previously discussed, the Gowan Declaration indicates that the MNF only collected bank alteration data in seven DMAs in the MCA and one in the LMFA. As previously described, the data from these DMAs were collected at fewer stream segments over a shorter total length, in fewer units and with fewer total measurements than the data collected by Christie. Therefore, by any measure the MNF's data from the DMAs do not provide data from a larger scale than the data collected by Christie. Therefore, the MNF's measurements at the DMA's in the two allotments do not provide rational support for the contention that bank alteration data in the Christie Declaration are from areas that are not representative of conditions in the allotments. The Larson Declaration also fails to provide reliable bank alteration data[3] collected at a larger scale than that collected by Christie. Therefore, it is clear that the Larson and Gowan Declarations do not provide any compelling rational support for the contention that bank alteration data of Christie is not reasonably representative of stream conditions in the allotments where it was measured.

[3] As will be discussed later in more detail, it is not clear from the Larson Declaration where and how bank alteration was monitored.

19. Notably, there is no indication in either the Gowan Declaration or the Larson Declaration that they actually evaluated the stream segments where Christie measured bank alteration and compared it to bank alteration conditions existing on other areas in the allotments.[4] This is a critical aspect for reasonably assessing how representative a monitored reach is.

20. The is no merit to the contention in the Gowan Declaration that the Christie data is not valid because it was not collected in areas that were selected by interdisciplinary teams as directed in the USFS monitoring guidance (Burton et al., 2007). Selection of valid representative areas for monitoring does not require selection by interdisciplinary teams. The Gowan Declaration provides no information on the factors and information that MNF interdisciplinary teams might have considered in selecting the DMAs for monitoring bank alteration. Similarly, the Gowan Declaration provides no credible information on how the selected DMAs are known to be representative of wider allotment conditions or more representative than the more numerous and extensive measurements of bank alteration summarized in the Christie Declaration.

21. The Gowan Declaration (p. 13, ¶ 26) implies that collecting bank alteration data in areas with defined livestock trails crossing streams is not valid and at odds with USFS bank alteration monitoring guidance (Burton et al., 2007). However, this ignores that the USFS guidance (Burton et al., 2007) clearly notes that bank alteration caused by livestock trails should be included and measured in bank alteration monitoring, as shown in Exhibit A to this declaration.

22. The need to include and consider bank alteration by livestock trails is not

[4] The Christie Declaration provides considerable detail on monitoring locations, including GIS coordinates, narrative descriptions tied to nearby features, and numerous photos. This information in the Christie Declaration is more than ample to locate the reaches for independent field evaluation.

confined to the USFS guidance (Burton et al., 2007). Simply enough, livestock trails in grazed areas are a common source of significant bank alteration in grazed areas in general, as is the specific case in the LMFA and MCA. Thus, if bank alteration measurements are consistently located in areas without livestock trails, the results do not adequately reflect actual bank alteration, due to the omission of bank alteration by trails. Although it is not clear whether or not the MNF's DMAs in the MCA and LMFA were consistently located in areas without livestock trails, the Gowan Declaration raises the specter that this may be case. If so, the bank alteration data from the MNF's DMAs are likely to misrepresent bank alteration conditions throughout the allotment due to a significant source of bias.

23. It is worth noting that some of the designated monitoring areas (DMAs) used by the MNF in the MCA may not be representative of grazing use in the units in which they are located for reasons described in the Christie Declaration (p. 8, ¶ 18).

The Gowan Declaration does not rationally support the contention that the measurements of Christie are not repeatable.

24. At a minimum, in order to reasonably determine if measurements are repeatable, attempts to repeat the measurements must be made. The Gowan Declaration provides no indication that any effort was actually made to determine if the bank alteration measurements made by Christie were actually repeatable. Such an effort is not onerous.

25. The Christie declaration provides ample information on the length, sampling interval, and criteria used in the bank alteration measurements, as well as GPS coordinates and photographs of the locations where he sampled. Thus, it is a relatively simple task to repeatedly take measurements in a transect using the approach used by Christie in order to reasonably determine if the results are repeatable. However, the Gowan Declaration does not provide any indication that any such actual test of repeatability was conducted. In the absence of such a test,

the assertion of the lack of repeatability in the measurements of Christie is unsupported and without merit.

My visual estimates of bank alteration in the allotments are reasonable and corroborate the measurements of Christie.

26. I made extensive visual estimates of bank stability and bank alteration in areas described in first declaration and augmented these discussions with photo documentation of conditions. My visual estimates were made using the same criteria for bank alteration as used in the USFS guidance (Burton et al., 2007), as described in detail in my declaration. They were also made based on more than 20 years of making frequently calibrated visual estimates in a professional capacity for a variety of research and monitoring projects, including published research on the relationship between visual estimates and independently and intensively measured data (Rhodes and Greene, 2001).

27. Research has demonstrated that visual estimates by a trained observers, with frequent calibration, can be reasonably accurate and, sometimes more accurate, than pooled random point measurements, even when they involve complex spatial attributes (Dethier et al., 1993; Latulippe et al., 2001; Rhodes and Greene, 2001). Such visual estimates are useful because they can be done rapidly, allowing for more extensive collection of data per unit of time, budget, and effort (Latulippe et al., 2001; Rhodes and Greene, 2001).

28. My visual estimates of bank alteration are an estimate of the linear fraction of lineal banks affected by bank alteration. This can be done with reasonable accuracy and is less complex than estimating areal coverage, which has been shown to be reasonably accurate even when it involves complex attributes (Dethier et al., 1993; Latulippe et al., 2001; Rhodes and Greene, 2001). Estimating the linear fraction of banks affected by bank alteration is akin to estimating the fraction of white and black line that is black. This is not difficult to do fairly

accurately with practice and calibration, both of which I have done frequently and consistently in a professional capacity for more than 20 years.

29. Notably, the Gowan Declaration (p. 15, ¶ 32) acknowledges that visual estimates of conditions done by an experienced observer have some validity in condition assessment. The Gowan Declaration implicitly made unwarranted and incorrect assumptions regarding my experience making a wide variety of visual estimates.

30. For these combined reasons, my extensive visual estimates are reasonable. They provide a reasonable and spatially extensive corroboration of the bank alteration data in the Christie Declaration for the allotments in which they were collected.

The bank alteration information collected by Larson as described in the Larson declaration and its attachments does not meet professional standards and is, therefore, not reliable.

31. The Larson Declaration and its Exhibit B include some findings that are purportedly based on the bank alteration measurements at the end of the grazing season. However, in direct contrast to the monitoring information in the Christie Declaration, the Larson Declaration and its Exhibit B provides none of the following related to Larson's monitoring:

- the actual date of the monitoring;
- a narrative description or the location of the stream segment monitored or its GIS coordinates;
- the name of the stream on which the monitored segment was located;
- the length of the monitored transect on the stream segment;
- the spacing of the measurements within the monitored stream segment;
- whether or not both banks within the monitored stream segment were measured

for bank alteration;[5]

- whether measurements were taken on the "greenline" consistent with USFS monitoring guidance (Burton et al., 2007);
- the explicit criteria used to identify bank alteration by livestock.

32. These defects are compounded by the numerous subjective assertions for which no support or rational is provided. For instance, Exhibit B (p. 1) to the Larson Declaration opines that "near natural rates of recovery" were occurring in unidentified stream reach(es). However, Larson does not report any trend data for any aspect of stream conditions to support this contention. Trend data is required to reasonably determine the rate and direction and change in stream attributes. Natural rates of recovery need to documented in order to assess whether rates of change are similar to natural rates, yet the Larson Declaration and its exhibits provide no indication of an attempt to identify or document natural rates of recovery.

33. The Larson Declaration asserts that results of Clary (1999) corroborate some of the assertions in the Larson Declaration. However, the Larson declaration omits several important aspects of Clary (1999). First, the research in Clary (1999) involved tightly controlled grazing in late-spring, lasting no longer than late June on an annual basis. In the MCA and LMFA, livestock grazing occurs much later in the summer and into the fall. USFS and BLM assessments have repeatedly noted that grazing during the summer and fall typically is more inconsistent with limiting bank damage that grazing in late spring (e.g., Platts, 1991; Kovalchik and Elmore, 1991; Leonard et al., 1997), as described in my first declaration. Thus, the results in Clary (1999) are from grazing management that likely has different effects on streambanks than that in use in the MCA and LMFA.

[5] Consistent with the USFS monitoring guidance, the Christie declaration states that bank alteration was measured on both banks within the monitored stream segments.

34. Second, the Larson Declaration fails to mention that Clary (1999) clearly states that the study found that ungrazed areas showed a greater reduction in annual bank alteration and width/depth ratio than areas that were grazed moderately or lightly during the late spring. The difference in the reduction in bank alteration and width/depth ratios with no grazing was different in a statistically significant fashion from that under moderate or light late spring grazing (Clary, 1999), which Larson also fails to mention. These are not trivial omissions, because these aspects of Clary (1999) conflict with rather than corroborate the contention that grazing in the MCA or LMFA is resulting in natural rates of recovery with respect to bank alteration and stream conditions affected by bank alteration.

35. For these combined reasons, the bank alteration information and judgments in Larson Declaration and its exhibits do not meet professional standards and are unreliable.

A few years of steelhead redd count data do not provide a reliable indication of recent habitat conditions and trends.

36. There are several reasons why a few years of redd counts do not provide a reliable indication of recent conditions and trends in steelhead spawning and rearing habitat that affect steelhead survival. First, although steelhead redd counts provide a coarse indication of the number of adult fish that successfully spawn in natal habitat, the survival of steelhead from egg to adult return to spawn is shaped by many factors outside of natal habitat. As the USFS and BLM (1997) noted:

> [T]he status and distribution of steelhead are confounded by a large number of factors operating at multiple scales in both time and space. Ocean and passage conditions, harvest and the use of hatchery fish have undoubtedly played a major role in the condition of the remaining populations. Sorting out the role of habitat change and land management effects in the decline of this species will likely result only through specific analysis capable of finer resolution and control of confounding effects.

Researchers have recommended the study of steelhead survival from egg to smolt in natal

habitat (rather than redd counts) in order to estimate anadromous fish survival in natal habitat (McCullough and Espinosa, 1996).

37. Second, anadromous steelhead spend two to seven years rearing in natal habitats before migrating to the ocean (USFS and BLM, 1997). Once in the saltwater ocean environment, steelhead then spend about one to four years there before maturing and migrating to return to natal habitats to spawn (USFS and BLM, 1997). Therefore, the return of surviving adult steelhead to spawn is lagged several years after their emergence and rearing in natal habitat where survival is shaped by natal habitat conditions.

38. Third, the survival and abundance of anadromous fish, such as steelhead, typically exhibit a high degree of variability over time. Due to this variability, reliable determination of trends in survival requires many years of data. For instance, Lichatowich and Cramer (1979) estimated that studies of the survival and abundance of anadromous fish populations may require 20 to 30 years of sampling to produce an 80% chance of detecting a 50% change.

39. For these combined reasons, a few years of redd count data do not provide a reliable indication of the trends in the conditions of natal habitat that influence steelhead survival.

Conclusions

40. The data on bank alteration in the Christie Declaration were from measurements that were collected via methods and criteria that comport with USFS guidance (Burton et al., 2007). The GD, LD, BG, and BI mischaracterize the nature of the measurements and methods used to collect the bank alteration data in the Christie Declaration. The bank alteration data in the Christie Declaration were collected more extensively and from more stream segments than the MNF did for the DMAs in the MCA and LMFA, and, therefore, are more likely to accurately

represent bank alteration in the allotments. The Gowan and Larson Declarations do not provide data that reasonably support the contention that the conditions in stream segments where Christie measured bank alteration are not representative of conditions in the allotments. The Gowan Declaration provides no reasonable support for the assertion that the measurements of bank alteration by Christie are not repeatable.

41. My visual estimates of bank conditions and bank alteration provide a reasonable assessment of these conditions, because I am highly experienced and frequently calibrate against data from measurements. Research has demonstrated that visual estimates by experienced observers have reasonable accuracy and utility.

42. The bank alteration information collected by Larson as described in the Larson Declaration and its Exhibits lacks essential detail on how and where it was collected. The Larson Declaration also makes subjective assertions that are not by data and mischaracterizes the finding of a study discussed in the declaration. For these reasons, the information related to the impacts of livestock grazing on bank alteration in the Larson Declaration and its Exhibits does not meet professional standards and is not reliable.

43. A few years of steelhead redd count data do not provide a reliable indication of current habitat conditions and trends.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge.

DATED this 7th day of May 2008.

s/ Jonathan J. Rhodes

Jonathan J. Rhodes

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