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Counsel for the United States of America

**IN THE DISTRICT COURT OF THE FIFTH JUDICIAL DISTRICT OF THE
STATE OF IDAHO, IN AND FOR THE COUNTY OF TWIN FALLS**

In Re SRBA

Case No. 39576

)
) Subcase Numbers: 51-13089, 51-13090,
) 51-13091, 51-13092, 51-13093, 51-13094,
) 51-13095, 51-13096, 51-13097, 55-13897,
) 55-13898, 55-13899, 55-13900, 55-13901,
) 55-13902, 55-13903
)

) **AFFIDAVIT OF BRYCE A. BOHN**
)

STATE OF IDAHO)

) ss:

COUNTY OF ADA)

COMES NOW, Bryce A. Bohn, after being duly sworn before an officer authorized to administer oaths, swears and declares as follows:

I. Introduction.

1. Current position and duties. My name is Bryce A. Bohn. I am an employee of the United States, Department of the Interior, Bureau of Land Management (BLM). The following statements are based upon my personal knowledge, expertise in my field and review of BLM's claims. I currently serve as the Idaho BLM state hydrologist and riparian program lead at the Idaho State Office. My primary duties are to provide leadership and direction for the soil, water, air, and riparian programs. I have held this position since 2008.

2. Education. I hold three advanced degrees in natural resources. I have an Associates of Arts (AA) in Forestry from Oklahoma A&M (1984), a Bachelor of Science (BS) degree in Forest Hydrology from the University of Montana (1990), and a Master of Science (MS) in Fisheries and Aquatic Ecology from Utah State University (1997). My Curriculum Vitae is attached hereto as Attachment A.

3. National Riparian Service Team member. I have served as an at-large member of the National Riparian Service Team since 2001. In that role, I have taught, interpreted, and provided feedback on the lotic and lentic Properly Functioning Conditioning (PFC) protocols. I have helped edit the revised lotic technical reference (2015) and am on the core group of specialists currently revising the lentic technical reference.

4. Faculty positions. I am also an adjunct faculty member at the University of Montana Western where I teach a 400-level riparian ecology course. Since 2001, I have taught the Lotic and Lentic PFC protocols to both Forest Service and BLM agency specialists and the general public, as well as to students at the University of Montana Western and the University of Idaho.

5. **Previous positions.** I was previously employed as a forest hydrologist/fish biologist/riparian ecologist on four National Forests in three western states (*dates*): (1) Forest hydrologist/fish biologist/riparian ecologist for the Cibola National Forest in Albuquerque, New Mexico; (2) Forest hydrologist/fish biologist/riparian ecologist for the Beaverhead-Deerlodge National Forest in Dillon, Montana; (3) Forest hydrologist/fish biologist/riparian ecologist for the Bighorn National Forest in Sheridan, Wyoming; and (4) Forest hydrologist/fish biologist/riparian ecologist for the Kootenai National Forest in Eureka, Montana

6. **Experience with Rosgen Stream Classification and natural channel design methodology.** I have been thoroughly trained in the Rosgen Stream Classification and natural channel design methodology. I have completed the Level I course (Applied Fluvial Geomorphology), Level II (River Morphology and Application), Level III (River Assessment and Monitoring), and Level IV (River Restoration and Natural Channel Design).

7. **Continuing education.** I regularly attend professional seminars and keep current on the latest literature and research pertaining to riparian areas and wetlands in the arid west.

8. **Publications.** I have been the primary and co-author on several agency and peer reviewed papers pertaining to natural resource management on public lands in the west. *See* attached Curriculum Vitae.

9. **Involvement with these subcases.** As part of my responsibilities as the Idaho BLM state hydrologist and riparian program lead at the Idaho State Office, I assisted in the preparing of the Notices of Claim that were filed for the 16 Wild and Scenic Rivers in the Owyhee Canyonlands area of southwestern Idaho within Basins 51 and 55 (Owyhee Wild and Scenic Rivers) and assigned Subcase Nos. 55-13089, 51-13090, 51-13091, 51-13092, 51-13093, 51-13094, 51-13095, 51-13096, 51-13097, 55-13897, 55-13898, 55-13899, 55-13900, 55-13901, 55-

13902, 55-13903 (Owyhee Wild and Scenic Rivers claims). I participated in the quantification of the Owyhee Wild and Scenic Rivers claims that culminated in execution of the Stipulation and Joint Motion for Order Approving Stipulation (Stipulation) and the agreement by the parties to the proposed Partial Decrees attached as Attachments 1 – 16 to that Stipulation (Partial Decrees).

10. Purpose of Affidavit. I have prepared this Affidavit at the request of counsel to address the manner in which BLM identified the streamflows necessary to protect the outstandingly remarkable fisheries values of the Owyhee Wild and Scenic Rivers and specifically the aquatic habitat maintenance flow, including the needs for both aquatic habitat maintenance and riparian ecosystem maintenance.

II. Necessity for Aquatic Habitat Maintenance Flows.

11. Importance of over bankfull flows to river ecosystems. Historically, the protection of river ecosystems has been limited in scope, emphasizing water quality and only one aspect of water quantity: minimum flow. We now know that the river ecosystem relies on a characteristic pattern of flow quantity, timing, and variability. The five critical components of the flow regime regulate ecological processes in river ecosystems are: the magnitude, frequency, duration, timing, and the rate of change of hydrologic conditions (Poff et al. 1997). Included in these five critical components is the high flow or over bankfull flow.

12. Importance of variable flows, including high flows. Naturally variable flows (including over bankfull flows) create and maintain the dynamics of in-channel and floodplain conditions and habitats that are essential to aquatic and riparian species. Of particular importance are the high- and low-flow events because they often serve as ecological “bottlenecks” that present critical stresses and opportunities for a wide variety of riverine species (Poff and Ward 1989).

13. Role of high flows in transporting bedload sediment. The magnitude and frequency of high and low flows regulate numerous ecological processes. Frequent, moderately high flows effectively transport sediment through the channel system. A self-formed alluvial channel develops a channel size that reflects the quantity of water and the size and characteristics of sediment delivered to it from the drainage basin. Maintaining the conveyance of this channel size, or channel maintenance, requires that all of the mass and sizes of sediment supplied to the channel be transported so that over the long term, the channel neither aggrades nor degrades.

14. Sediment-discharge relationship. The sediment-discharge relationship is such that proportionally greater volume and size classes of sediment are transported as the discharge increases. In supply limited gravel bed streams, the most efficient way to transport the volume and size classes of sediment supplied to a stream is to maintain all flows above a threshold or “trigger” discharge. This moves the highest percentage of bedload material with the least amount of water (Schmidt and Potyondy 2004). Wolman and Miller (1960) described an assessment of the effective discharge which is that discharge which transports more sediment than any other discharge. Briefly, their concept suggests that the effective discharge is a relatively frequent event that approximately corresponds to the bankfull discharge or a recurrence interval of 1.5 to 1.7 years. (Emmett and Wolman 2001).

15. Role of over bankfull flows in maintaining ecosystem diversity. High flows provide further ecological benefits by maintaining ecosystem diversity and productivity. For example, high flows remove and transport fine sediments that would otherwise fill the interstitial spaces in productive gravel habitats. Floods import woody debris into the channel where it creates new, high-quality habitat. By connecting the channel to the floodplain, high overbank flows also maintain broader productivity and diversity. Floodplains provide important nursery grounds for

fish and export organic matter and organisms back into the main channel. The scouring of the floodplain soils rejuvenates habitat for plant species that germinate only on barren, wetted surfaces that are free of competition or that require access to shallow water tables. Flood-resistant, disturbance-adapted riparian communities are maintained by flooding along river corridors, even in river sections that have steep banks and lack floodplains (Poff et al. 1997).

16. Importance of high flows in maintaining in-channel and floodplain conditions and habitats necessary for aquatic and riparian species. Streams in the Owyhee basin are subject to a highly variable hydrograph due to climatic and geologic controls. Over bankfull flows are generally short in duration and may last only for a few days or even a few hours. However, the importance of these flows in maintaining the integrity of the abiotic and biotic components of stream health far exceed the short duration of their occurrence. Therefore, maintaining the natural hydrograph in these streams is critical to the maintenance of in-channel and floodplain components of a functioning stream ecosystem. Eliminating the high flow component of the hydrograph will adversely affect the dynamics of in-channel and floodplain conditions and habitats that are essential to aquatic and riparian species (Poff et al. 1997).

III. Quantification of Aquatic Habitat Maintenance Flows.

17. Calculation of bankfull discharge trigger. Based on the sediment-discharge relationship addressed in Section 14 above and the concept that effective discharge approximately corresponds to the bankfull discharge (Emmett and Wolman 2001), the long-term fish habitat maintenance flow component of the Owyhee Wild and Scenic River claims was selected as all flows above a “trigger” bankfull discharge corresponding to the 1.5-year recurrence interval flow for each stream segment. The 1.5-year recurrence interval flow for each stream was determined

by the United States Geological Survey (USGS) or by application of the USGS StreamStats program for Idaho.

18. Water right described in Partial Decrees provides for aquatic habitat maintenance flows necessary to preserve fisheries habitat. Based on the above-described analyses, the references noted in this Affidavit, and my professional experience, I conclude that the flows identified in the Partial Decrees (*i.e.*, the high flow component described at Section 3.a.(2) of the Partial Decrees and calculated as the 1.5-year recurrence interval flow for each stream), taking into account the small depletions likely to occur under the subordinations provided for in Section 10.b. of the Partial Decrees (as addressed in the Affidavit of Fredric W. Price being filed concurrently herewith), provide a sufficient magnitude and frequency of flows to preserve the aquatic habitat maintenance flow, including the needs for both aquatic habitat maintenance and riparian ecosystem maintenance.

IV. References.

19. References relied upon. In analyzing the aquatic habitat maintenance flows, including the needs for both aquatic habitat maintenance and riparian ecosystem, and in preparing this Affidavit, I relied upon the following references:

Andrews, E. D. 1980. Effective and bankfull discharge of streams in the Yampa River Basin, Colorado and Wyoming. *Jour. Hydrol.* 46: 311-330.

Emmett, W.W.; Wolman, M.G. 2001. Effective Discharge and gravel-bed rivers. *Earth Surface Processes and Landforms* 26(13), 1369-1380.

NMFS. 2011. Protocol for Estimating Tributary Streamflow to Protect Salmon Listed under the Endangered Species Act. NMFS-NWR, Flow Consultation Unit, Boise, ID.

Poff, N.L. and J.V. Ward. 1990. Physical habitat template of lotic systems: Recovery in the context of historical pattern of spatiotemporal heterogeneity. *Environmental Management* 14(5):629-645.

Poff, N.L., J.D. Allan, M.B. Bain, J.R. Karr, K.L. Prestegard, B.D. Richter, R.E. Sparks, and J.C. Stromberg. 1997. The natural flow regime. Bioscience, Vol. 47(1), pp. 769-784.

Schmidt, L.J., Potyondy, J.P. 2004. Quantifying channel maintenance instream flows: an approach for gravel-bed streams in the Western United States. Gen. Tech. Rep. RMRS-GTR-128. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 33 p.

Wolman M. G. and J. P. Miller. 1960 Magnitude and frequency of forces in geomorphic processes. Jour. Geol. 68: 54-74.

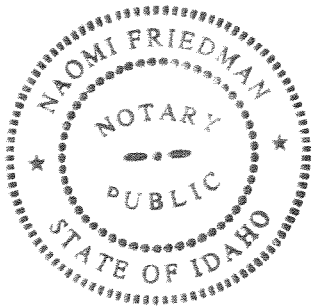
20. Further your affiant sayeth naught.

Dated this 31st day of August, 2016



Bryce A. Bohn

Witnessed by my hand and official seal.



~~Tracy A. Hadley~~ NAOMI FRIEDMAN

Notary Public in and for the State of Idaho

Residing at: Meridian, Idaho Lowman, Idaho

My Commission Expires: ~~08-22-2021~~ 07/21/2020

**ATTACHMENT A TO AFFIDAVIT OF BRYCE A. BOHN
CURRICULUM VITAE**

BRYCE A. BOHN

1387 S. Vinnell Way Boise, ID 83709
bbohn@blm.gov

RELEVANT EXPERIENCES

- Serve as the primary contact for legal requirements pertaining to the management of watersheds and water quality on BLM lands in Idaho. Principle expert and advisor to the State Director on all aspects of the Clean Water Act and other watershed management and water quality laws and regulations.
- Lead the development, organization, administration, and implementation of the regulatory components of the State of Idaho BLM watershed management and water quality management program.
- Conduct analyses of potential changes in legislative authority, statutes, and regulations affecting watershed management and water quality under various federal and state laws and develop agency positions on these matters.
- Knowledgeable of the concepts, principles, and practices of watershed science and hydrology sufficient to understand the effects of land management activities on water resources.

EDUCATION

Master of Science (M. Sc.) Utah State University
Fisheries and Aquatic Ecology, 1997

- Thesis published in the international "Journal of Environmental Management" 1998

Bachelor of Science (B.S.) University of Montana
Forest Hydrology, 1990

- University Presidential Recognition Award, Dept. of Natural Resources 1990
- Outstanding Senior Award, School of Forestry 1990

Associates of Arts (A.A.) Northeastern Oklahoma A&M
Forest Science, 1984

- Two-year full tuition and fee academic scholarship (1982-1984)

PROFESSIONAL HISTORY

Idaho Soil, Water, Air, Riparian, Climate Change Program Lead State Office, Idaho BLM Boise, ID	Nov. 2008 – Present
Forest Hydrologist and Fisheries Biologist Cibola National Forest Albuquerque, NM	April 2006 – Nov. 2008
Forest Hydrologist Beaverhead-Deerlodge National Forest Dillon, MT	Oct. 2003 – Oct. 2006
Forest Hydrologist and Fisheries Biologist Bighorn National Forest Sheridan, WY	June 1998 – April 2003
District Hydrologist Fortine Ranger District, Kootenai National Forest Trego, MT	May 1990 – June 1998

CERTIFICATE OF SERVICE

I certify that on August 31, 2016, I served a true and correct copy of the foregoing **AFFIDAVIT OF BRYCE A. BOHN; SUBCASE NUMBERS: 51-13089, 51-13090, 51-13091, 51-13092, 51-13093, 51-13094, 51-13095, 51-13096, 51-13097, 55-13897, 55-13898, 55-13899, 55-13900, 55-13901, 55-13902, 55-13903**, together with ATTACHMENT A by placing the document in the United States Mail in Boise, Idaho, postage paid, and addressed as follows:

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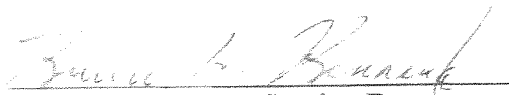
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