

# MEMO

## State of Idaho

### Department of Water Resources

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**Date:** November 16, 2017

**To:** Roger Chase, Chairman, Idaho Water Resource Board  
Mat Weaver, P. E., Deputy Director, Idaho Department of Water Resources

**From:** Tim Luke, Chief, Water Compliance Bureau

**Subject:** Review of the 15 Special Supplement Permit Limit for Small Scale Suction Dredge Mining on the South Fork Clearwater River

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### Purpose of Memo

The Idaho Department of Water Resources' ("IDWR") currently limits small scale mining operations on the South Fork Clearwater River ("SFCR") to a total of 15 suction dredges or power sluices from July 15 to August 15.<sup>1</sup> The annual limit of 15 dredges or power sluices on the SFCR is based largely on a water quality management plan known as a Total Maximum Daily Load ("TMDL") established for the SFCR sub-basin by the Idaho Department of Environmental Quality ("IDEQ") and the US Environmental Protection Agency ("EPA").<sup>2</sup> The TMDL relied on several assumptions for allocating an annual maximum amount of sediment discharge on the SFCR from small scale suction dredge operations, including volume of sediment discharge per dredge, daily hours of operation per dredge, and operation of no more than 15 dredges per year. The term "dredges or power sluices" is hereinafter referred to as "small scale suction dredges", or "dredges", having suction nozzle diameters of five (5) inches or less and powered equipment rated at a maximum of 15 Horsepower ("HP").

This memo summarizes the basis for the 15 dredge limit used in both IDWR's current SFCR permit program and the TMDL.<sup>3</sup> The memo also evaluates other assumptions used in the TMDL which are dependent on the 15 operating dredges. This memo has been prepared in advance of the Idaho Water Resource Board's ("IWRB") public listening session regarding SFCR suction dredge mining scheduled on December 5, 2017.

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<sup>1</sup> IDWR. "2017 South Fork Clearwater River Special Supplement Instructions" a copy of which is available on IDWR's website at: <https://idwr.idaho.gov/files/forms/2017-recreational-mining-special-supplement-sf-clearwater-river.pdf>

<sup>2</sup> Idaho Department of Environmental Quality and USEPA, *South Fork Clearwater River Sub-basin Assessment and Total Maximum Daily Loads, October 2003*.

<sup>3</sup> IDWR's current 15 permit limit applies to the maximum number of dredge operations and authorized operation sites per year, not the number of dredge operators. At present, no more than 15 dredges can be operated at any one time between July 15 and August 15.

## Background

IDWR is the state agency given primary responsibility to administer the Idaho Stream Protection Act (“Act”) which regulates alteration of streams in the state.<sup>4</sup> The Act declares “[n]o alteration of any stream channel shall hereafter be made unless approval” has been given by the Director of IDWR.<sup>5</sup> Rule 34.01 of the Idaho Stream Channel Alteration Rules (“Rules”) (IDAPA 37.03.07) states “any applicant proposing to operate a vacuum or suction dredge within or below the mean high water mark of a stream channel shall apply for and obtain a stream channel alteration permit. The vacuum or suction dredge shall only be operated in accordance with the conditions of the permit and with the applicable rules.”

The IWRB’s South Fork Clearwater River Basin Comprehensive State Water Plan (“SFCR Plan”) allows limited small scale suction dredge or placer mining on the main stem of the SFCR subject to IDWR permitting and upon requests by miners using a Special Supplement permit application.<sup>6</sup> IDWR currently permits the operation of no more than 15 dredges on the main SFCR from July 15 to August 15 of each year.<sup>7</sup> The 15 permitted dredges is referred to as a 15 permit limit for purposes of this memo.

### *Letter Permit Process*

IDWR has regulated and permitted suction dredge activities in the state since the Idaho legislature passed the Act in the 1970s. IDWR’s current stream channel alteration rules took effect in 1993. IDWR has adopted an expedited process for permitting suction dredge operations that meet minimum standards outlined in IDWR’s Rules. Minimum standards, as described in the Rules, “are intended to cover the ordinary type of stream channel alteration and prescribe minimum conditions for approval.”<sup>8</sup> Minimum standards for suction dredges apply to dredges with a nozzle diameter size of 5 inches or less and powered equipment (engines or motors) rated at 15 HP or less, and non-powered sluice equipment moving more than one-quarter (1/4) cubic yards per hour.<sup>9</sup>

IDWR permits small scale suction dredges on all streams and rivers in the state using the Idaho Recreational Mining Authorization, or expedited “Letter Permit”, except the SFCR. The Letter Permit is a pre-signed authorization letter from IDWR that includes the minimum standard conditions for small scale suction dredges found in IDWR’s Rules plus some additional, special conditions. The Letter Permit may be obtained annually and only requires the following:

- Permittee’s name and contact information (address, email, phone);
- Identification of drainage and stream segments where a dredge will be operated;
- Payment of applicable permit fee (\$10 resident, \$30 non-resident); and
- Signature of the permittee acknowledging a review and understanding of IDWR’s instructions for dredge mining and that the mining operations will conform with IDWR’s instructions, rules and Letter Permit conditions.<sup>10</sup>

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<sup>4</sup> Idaho Code §§ 42-3801 through 42-3803

<sup>5</sup> Idaho Code § 42-3801

<sup>6</sup> *SFCR Plan*, 2004 at p. 22.

<sup>7</sup> The main stem of the SFCR is the SFCR between its confluence with the Middle Fork Clearwater River and the confluence of the Red and American Rivers. See *SFCR Plan* at 3-31.

<sup>8</sup> IDAPA 37.03.07.055.

<sup>9</sup> IDAPA 37.03.07.064.01

<sup>10</sup> *Special Supplement Permit*, a copy of which is available on IDWR’s website at

<https://www.idwr.idaho.gov/files/forms/2017-recreational-mining-special-supplement-sf-clearwater-river.pdf>

## *Special Supplement Permit*

The SFCR is designated as a Recreational River in the SFCR Plan. A Recreational River is defined as “a waterway which possesses outstanding fish and wildlife, recreation, geologic or aesthetic values, and which might include some man-made development within the waterway or within the riparian area of the waterway.”<sup>11</sup> The SFCR Plan allows suction dredge or placer mining on the main stem of the SFCR as follows:

*“The main SFCR may be dredged from July 15 to August 15 under the [Letter Permit] if [the] request is made on the Special Supplement. The site must also be inspected by IDWR with a fishery biologist. With that authorization, IDWR will issue a letter of approval.”*<sup>12</sup>

The SFCR Plan was adopted by the IWRB in 2004 and approved by the Idaho Legislature in 2005.<sup>13</sup> The concept of making requests using a Special Supplement and inspecting dredge operation sites with a fishery biologist on the SFCR was not new in 2004 when the IWRB adopted the SFCR Plan. IDWR initiated the SFCR Special Supplement and required site inspections with fishery biologists from the Idaho Department of Fish and Game (“IDFG”) as early as 2001. Some site inspections were conducted on the SFCR prior to 2000.<sup>14</sup>

## *SFCR TMDL*

The Idaho Legislature authorizes the IDEQ to establish water quality standards to protect public health and welfare, enhance the quality of water and to meet the requirements of the Federal Clean Water Act.<sup>15</sup> Section 303(d) of the Federal Clean Water Act requires states to identify and prioritize water bodies that do not meet water quality standards. IDEQ has established water quality standards which have been approved by the EPA.<sup>16</sup> Water bodies not meeting these standards are placed on a list of impaired waters, called the “303d list.” The SFCR sub-basin was included in the TMDL Settlement Final Schedule of May 1, 2002 pursuant to a legal, court-ordered settlement between IDEQ, EPA and a third party.<sup>17</sup>

IDEQ must develop a water quality improvement plan, or TMDL, for those water bodies not meeting water quality standards.<sup>18</sup> The goal of a TMDL is to set limits on pollutant levels to correct water quality impairment and to support and enhance the beneficial use of water bodies by attaining water quality standards.<sup>19</sup> A TMDL establishes an upper limit, or load capacity (“LC”), for a given pollutant load discharged from all sources. The load capacity is allocated across all sources of the pollutant. Pollutant sources fall into two broad classes: point sources, each of which receives a wasteload allocation (“WLA”); and nonpoint sources, which receive a load allocation (“LA”).<sup>20</sup> Examples of point source WLAs include municipal treatment plants

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<sup>11</sup> Idaho Code § 42-1731(9)

<sup>12</sup> *SFCR Plan* at 22.

<sup>13</sup> S.B. 1035, 58th Legis., 1st Reg. Sess. (Idaho 2005).

<sup>14</sup> Ballou, Erv, retired IDWR Stream Alteration Program Coordinator. Personal communication. November 10, 2017

<sup>15</sup> Idaho Code § 39-3601.

<sup>16</sup> IDAPA 58.01.02.

<sup>17</sup> IDEQ website, November 16, 2017: [https://deq.idaho.gov/media/430275-agreement\\_0502.pdf](https://deq.idaho.gov/media/430275-agreement_0502.pdf)

<sup>18</sup> IDEQ website, November 6, 2017: <http://deq.idaho.gov/water-quality/surface-water/tmdls/>

<sup>19</sup> IDEQ website, November 6, 2017: <http://deq.idaho.gov/water-quality/surface-water/tmdls/tmdl-implementation-plans/>

<sup>20</sup> *SFCR TMDL* at p. 143.

and storm water discharge, while Las may include agriculture and forestry practices. WLAs and LAs specify how much pollutant each point source or nonpoint source release to a waterbody.<sup>21</sup>

A TMDL plan was developed for the SFCR subbasin in 2003 by IDEQ and EPA and approved by the EPA in 2004.<sup>22</sup> Suction dredge mining, which is considered a point source pollutant for sediment, is assigned a WLA of 314 tons per day between July 15 and August 15. The load allocation is limited to the July 15 - August 15 period in recognition of the season of use for suction dredging on the SFCR established by the SFCR Plan. The load assumes a maximum of 15 suction dredges operating each day during the season of use, moving a maximum of two (2) cubic yards (CY) of material or sediment per hour, and working an eight (8) hour day. The WLA is calculated as follows:<sup>23</sup>

$$(15 \text{ dredges}) \times (2 \text{ CY/hour}) \times (8 \text{ hours/day}) = 240 \text{ CY/day}$$

$$\text{Sediment density} = (96.8 \text{ lbs/cf}) \times (27 \text{ cf/CY}) = 2614 \text{ lbs/CY}$$

$$(240 \text{ CY/day}) \times (2614 \text{ lbs/CY}) \times (0.0005 \text{ tons/lbs}) = 316 \text{ tons/day}$$

In short, the suction dredge WLA is a maximum limit or cap for total sediment discharge to the bed of the stream for all permissible dredging operations. The suction dredge WLA for the rest of the year (August 16 – July 14) is 0 tons/day.

It appears the use of the 15 dredge value in the suction dredge TMDL WLA, or allocation, was based on the maximum number of IDWR permits issued in a single year for suction dredging on the SFCR from 2000 through 2002. The TMDL Plan states in pertinent part as follows:

*Since 2000, up to 15 suction dredges/year have applied for coverage under the IDWR General Permit.*

*Although there is currently no limit on the number of facilities which can operate in the SF CWR Sub-basin under the General Permit, the actual number of permits issued in recent years has been limited to 15 in 2000, seven in 2001 and eight in 2000.*

*Based on available data, for the purpose of this allocation it is assumed that 15 such operations could operate each year during the July 15 - August 15 window without resulting in increased bedload movement or surface fine sediment levels downstream of active mining.*

The TMDL Plan cites IDWR as the source for the number of permits issued from 2000 through 2002. Use of the term “General Permit” in the TMDL Plan likely refers to “General Permit Conditions” used with approved “Individual Recreational Dredging Application” forms. IDWR transitioned from the “Individual Recreational Dredging Application” form to the Letter Permit form in 2009.

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<sup>21</sup> “Glossary of Environmental Terms” IDEQ website. November 6, 2017: at <https://deq.idaho.gov/glossary/>

<sup>22</sup> *SFCR TMDL* at p. 143.

<sup>23</sup> *SFCR TMDL* at p. 219.

The TMDL dredge volume discharge assumption (2 CY per hour) was apparently based on one of the IDWR “General Permit” conditions used at the time the TMDL was developed. Specifically, the TMDL Plan states the following:

*The General Permit allows these dredges to operate only in the main stem SF CWR between July 15 – August 15, and to process no more than 2 cubic yards of material per hour as averaged over the period of operation for the entire day.*

IDWR staff review of General Permit Conditions from the Individual Recreational Dredging Application form includes the following condition:

*The dredge equipment shall not be used to move more than 2 cubic yards per hour as averaged over the period of operation for the entire year.*

This condition was included on all dredge mining permits issued in the state from 2000 through 2008, including permits issued on the SFCR. The condition was discontinued on all permits in 2009 and thereafter.

### **Analysis of SFCR TMDL Suction Dredge Allocation and Assumptions**

#### *TMDL Assumption of 15 Total Dredge Operations per Year*

As stated above, the TMDL suction dredge allocation calculation assumed 15 small scale suction dredges would operate per year. The value of 15 operating dredges per year was based on the maximum number of IDWR Letter Permits issued for suction dredging on the SFCR from 2000 through 2002.

In light of recent questions about annual suction dredge permitting and monitoring on the SFCR, IDWR staff reviewed the number of permits issued since 2000. Annual permit authorizations ranged from seven to 35 between 2000 and 2015.

It is important to note that until 2016, IDWR’s SFCR permits were issued to individual dredge operators, not to individual dredges or dredge operations. It is not uncommon for multiple operators to work a single dredge. As a result, the number of annual permits issued prior to 2016 does not equal the total number of dredges operated during each season and/or the total number of dredges operated at one time

In 2016, IDWR transitioned from operator permits to dredge permits and issued dredge identification (“ID”) cards or tags that are required to be attached to each dredge or visible at each dredge location. The issuance of the IDWR ID tags is unique to the SFCR. Issuance of permit ID tags allows more than one operator to share one dredge without the need for individual operator permits and fees. Issuance of permit ID tags potentially allows several different miners to work one permitted site as long as only one dredge is operated at one time per site. In other words, a permit holder may mine a site for one week while a second miner works the same site a different week. The second miner may work the permitted site but the permit holder assumes responsibility for all mining work under the permit. While the current IDWR 15 permit limit may seem more restrictive, it can accommodate more than 15 operators per season.

#### *TMDL Volume Discharge Assumption (2 CY per hour per dredge)*

In establishing the sediment WLA for the SFCR, the TMDL assumes that 15 dredges operate per day, discharging 2 CY/hour of material for 8 hours each day from July 15 to August 15. As previously noted, this volume rate was based on a general IDWR permit condition on all IDWR small scale suction dredge mining permits issued prior to 2009 limiting the movement of no more than 2 CY per hour as averaged over the period of operation for the entire year. The 2 CY per hour assumption was likely based on past general published suction dredge industry specifications for small scale dredges not exceeding a 5 inch suction nozzle diameter. The 2 CY per hour rate was generally viewed as an upper capacity limit for small scale suction dredges that are normally operated by one person.<sup>24</sup> Traditionally, mining operations using larger size suction dredges and equipment moving more than 2 CY per hour were considered commercial mining operations.<sup>25</sup>

Suction dredges with 4 or 5 inch nozzle diameters are the most common sized dredges used on the SFCR. Currently, some suction dredge manufacturers may advertise 4 to 5 inch nozzle size dredge models with capacities well exceeding 2 CY per hour. For example, maximum reported volume capacity specifications for 4 and 5 inch nozzle diameter models range from 5 to 10 CY per hour.<sup>26</sup> Manufacturer specifications for maximum volume capacities represent ideal conditions that are not typically encountered in most streams or rivers.<sup>27</sup>

Manufacturer field testing results for 4 and 5 inch suction dredges used in two California rivers during 2009 show volume capacities ranging from 0.46 to 0.91 CY per hour when working in rocky substrates and 0.69 to 1.37 CY per hour when working in gravel bars.<sup>28</sup> Field testing on two Idaho streams in 1980 using a 2.5 inch nozzle diameter dredge and 3 HP engine resulted in an optimal rate of about 0.17 CY per hour when working in loose gravels with diameters of 2 centimeters or less, and a consistent rate of 0.06 to 0.07 CY per hour in normal stream conditions.<sup>29</sup> An Idaho small scale suction dredge manufacturer states that volume capacities of dredges with 4 to 5 inch nozzles may range from 0.5 to 1 CY per hour depending on conditions.<sup>30</sup> However, most operators working in Idaho rivers like the SFCR, on average, move about 1 to 1.5 CY per day using a 4 to 5 inch nozzle dredge and no more than 1.75 CY per day when working hard in good conditions with a 5 inch nozzle dredge.<sup>31</sup> The lower volume rates result from miners spending a substantial portion of time moving larger cobbles and materials out of the path of the suction dredge, rather than dredging itself.<sup>32</sup> Moreover, embedded or cemented cobbles and compacted streambed materials reduce the amount of sediment moved by the dredge. USFS NPCRF staff monitoring suction dredge operations on the SFCR and other streams in the NPCRF estimate that volume disturbances typically range from about 0.5 to 1.5 CY per day depending on the operator and streambed conditions.<sup>33</sup>

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<sup>24</sup> Ballou, Erv. Personal communication. November 10, 2017.

<sup>25</sup> Trees, Alan, dredge designer and former owner, Gold Grabber Manufacturing. Personal communication. 7 November 2017.

<sup>26</sup> California Department of Fish and Game, “*Suction Dredge Permitting Program Draft Subsequent Environmental Impact Report, February 2011*”, p. 3-8.

<sup>27</sup> Keene, Patrick, Keene Engineering. Personal Communication. November 6, 2017.

<sup>28</sup> California Department of Fish and Game, 2011, p. 3-8

<sup>29</sup> Griffith, J.S. and Andrews, D.A., “*Effects of a Small Suction Dredge on Fishes and Aquatic Invertebrates in Idaho Streams*,” North American Journal of Fisheries Management 1:21-28, 1981. p. 1, 26.

<sup>30</sup> Gates, David, owner, Gold Grabber Manufacturing. Personal communication. November 7, 2017.

<sup>31</sup> Trees, Alan. Personal communication. November 7, 2017.

<sup>32</sup> California Department of Fish and Game, 2011, p. 3-13;

<sup>33</sup> Kenney, Dan. Personal communication. November 6, 2017.

The USFS NPCNF 2016 SFCR post-season suction dredge report shows a total of about 217 cubic yards were moved or disturbed over the season by nine separate operations, working a total of 609 hours.<sup>34</sup> Dredge operators reported number of hours worked and the square footage area of material moved. Reported volume of material moved at each dredge site was based on a combination of reporting from operators and NPCNF staff estimates.<sup>35</sup> Based on the volumes and hours reported, the average volume of material disturbed during the season was about 0.36 CY per hour.

#### *TMDL Hours of Operation Assumption (8 hours per day per dredge)*

The TMDL assumption of an 8 hour work day per dredge is a maximum daily limit based on a typical 8 hour work day for most occupations. The TMDL Plan did not describe the basis for the assumed 8 hour work day.

A 2008 comprehensive survey of suction dredgers in California reported that the average number of hours spent dredging was 5.2 hours for California residents and 5.4 hours for non-California residents.<sup>36</sup> The NPCNF 2016 SFCR post-season suction dredge report showed that the average daily dredge operation was 5.1 hours per day.<sup>37</sup>

## **Conclusions**

In 2016, IDWR switched from issuing unlimited individual operator permits to suction dredge miners on the SFCR to issuing no more than 15 permits for individual dredges operating at specific sites. IDWR's decision to limit SFCR small scale suction dredge mining to no more than 15 permits or dredges per year was based on the following factors:

- The 2003 SFCR TMDL annual suction dredge WLA which assumes among other things that combined dredging activity will not exceed 15 dredges operating eight hours a day from July 15 to July 16.
- Field monitoring of SFCR suction dredge operations in 2015 by NPCNF staff showed no more than 13 dredges were operated that year. Although the number of permits issued to individual dredge operators between 2000 and 2015 exceeded 15 in certain years, IDWR lacks annual reports or field notes detailing annual SFCR dredge counts and operations.
- Pre-authorized site inspections by IDWR staff with a fisheries biologist for 15 dredge operations was viewed as a manageable workload given limited staff resources and time.

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<sup>34</sup> Kenney, Dan, "Post-Season Suction Dredging Report for the South Fork Clearwater River, and Moose, Lolo, and Orogrande Creek Project Areas, Final Version - December 28, 2016."

<sup>35</sup> Kenney, Dan. Personal communication. November 6, 2017.

<sup>36</sup> California Department of Fish and Game, 2011. p. 3-13.

<sup>37</sup> Kenney, Dan, 2016 *Post-Season Suction Dredging Report*