

# **Columbia-Snake River Irrigators Association**

Media/Press Release—For March 9, 2017

More Information: 509-783-1623

## ***Killing Fish--Columbia River ESA Litigation and 2015 Fish Operations***

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One tragic scene from the Vietnam War came from a U.S. Army Officer who conveyed that “to save the village, they would have to destroy it.” The Columbia-Snake River Endangered Species Act (ESA) litigation, now belaboring for twice as many years as the Vietnam Era, induced a similarly destructive image in 2015, when state/federal fish managers engaged in lethal, in-river juvenile fish passage actions instead of relying on the Lower Snake River fish transportation program. Today, an injunction motion was heard in U. S. District (Oregon) Judge Michael Simon’s Court to perpetuate killing fish, and the ESA fish survival objective is being turned around backward by environmental groups and the state of Oregon.

The long years of Columbia-Snake River Biological Opinion (BiOp) legal wrangling have cost the region billions-of-dollars, and nourished some fanatics within the “salmon recover industry” who seek solely to breach the Lower Snake River dams rather than acknowledge the projects’ substantial benefits; including operation of a well-developed juvenile fish transportation system that can protect fish in years when low water and high temperature conditions prevail--a year like 2015.

CSRIA’s legal counsel methodically described the legal and operational management principles that should have guided fisheries operations in 2015, but were either overlooked or deliberately altered. Citing a forensic management review prepared by Seattle-based Columbia Research Corp., it was apparent that important warning signs and protocols were ignored:

- The 2015 in-river conditions were the worst since 2001, and low water flows were forecast well before the start of the fish migration period. The early spring water temperatures were high.
- At a minimum, state and federal fish managers should have been following a BiOp (Court) mandated fish passage policy known as “spread the risk,” where roughly equal numbers of juvenile fish are diverted by spillway passage or placed in water temperature controlled transport barges.
- But the fish passage managers, some unyielding supporters of project passage fish spill, delayed the start of the juvenile fish transportation program.
- Not everyone agreed with delaying fish transport, and twice, NOAA Fisheries’ key scientists called for immediate fish transport operations. They were rebuffed by the on-site fish passage managers.
- In a year when juvenile fish transport should have been maximized (and called for under the BiOp), fish transport numbers were reduced to an all-time low, with only 13% transport. River water flows and temperatures were comparable to 2001, where the documented fish survival benefits from the transport program totally overshadowed in-river fish passage survival.
- Fish managers had to have known the danger. The 2015 fish passage operations will contribute significantly to impaired adult salmon/steelhead returns to the Columbia-Snake River system in 2017 and 2018.

The 2015 fish operations stand as a testament to CSRIA’s call for invoking the Endangered Species Act Committee (God Squad) to settle, with reasoned judgment, the required fish protection measures for the Columbia-Snake River system. The 25-years of BiOp litigation have failed the fish.

Columbia Research Corp.  
Columbia-Snake River 2015  
Management/Operations Review

## MEMORANDUM

To: Dr. Darryll Olsen, Columbia-Snake River Irrigators Association  
From: Daniel Seligman, Attorney at Law, Columbia Research Corp.  
Date: March 2, 2017  
SUBJECT: The “spread the risk” policy for transporting juvenile fish and the extreme river conditions of spring 2015

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## QUESTIONS ASKED

You asked me to answer the following questions based on a review of legal documents and available public records:

- Is the “spread the risk” policy for transporting juvenile fish on the Columbia and Snake Rivers still valid?
- Did the federal agencies<sup>1</sup> with a role in river management correctly implement this policy when they allowed only 13% of juvenile fish to be transported on the Snake River during extreme low flow and high temperature conditions in spring 2015?
- Were these actions consistent with the 2014 Supplemental Biological Opinion (“Supplemental BiOp”) prepared by NOAA Fisheries?

## ANSWERS

- Yes, the “spread the risk” policy is still valid and should guide federal agencies in deciding whether and when to transport juvenile fish rather than let them remain in the river. The policy, as adopted the federal court, recognizes that both transport and in-river migration may benefit young fish at certain times of year and under certain water conditions, or, conversely, may cause unintended mortality. The policy is supposed to rest on science, not a rigid formula that is applied no matter what. The policy contemplates that federal agencies will generally leave about half the fish in the river and transport the other half.

The policy was first approved by U.S. District Court Judge James Redden in 2005. Plaintiffs in the case (environmental groups and others) asserted that federal agencies had violated the Endangered Species Act (“ESA”) by not protecting threatened and endangered salmon and steelhead runs on the Snake River.

In his opinion, Judge Redden noted that the U.S. Army Corps of Engineers (“Corps”) had developed both spill and transportation operations as early as 1992 to facilitate juvenile salmon migration:

This [dual approach] increased the chance of survival past the dams to the ocean and the subsequent return of adults to propagate the species. Studies do not establish, with absolute certainty, the relative benefits of spill versus transportation. Therefore, the Corps says it has adopted a “spread the risk” philosophy, using spill and transportation in relatively equal measure.”<sup>2</sup> (Underline in original)

Judge Redden invalidated an all-transport approach for late spring because it contained no provisions for in-river passage (spill) and constituted a radical departure from the “spread the risk” policy.<sup>3</sup> But he upheld the proposal for early spring spill and transport because it “effectuates a reasonably balanced spread-the-risk approach consistent with past operations” and “is based on the best available science.”<sup>4</sup>

The “spread the risk” policy remains – at least on paper – an integral part of the federal court orders on the management of the Columbia and Snake Rivers. If implemented properly, it would involve an approximate 50-50 split between transportation and in-river migration, depending on water and weather conditions and other factors.

- The federal agencies deviated from this long-standing policy in spring 2015 when they used transportation to move only 13% of juvenile fish during low flow and high temperature conditions, when young fish are generally the most vulnerable to the adverse effects of remaining in the river. This is the lowest percent transported since records were first kept in 1993.<sup>5</sup> Although there is no fixed formula for determining if the “spread the risk” policy is properly designed or implemented, the federal agencies have an obligation to create a transparent administrative record showing why they made a particular decision. In this case, records show NOAA Fisheries attempted to obtain agreement for an earlier start date to transportation (e.g., to get the juvenile fish out of the river during adverse conditions) but other agencies and entities did not support this effort. From the records in the public domain it is not possible to say more about the federal decision-making process: we do not know who made (or acquiesced) to the decision to allow for significantly-reduced transport under these extreme river conditions.
- The actions of the federal agencies do not appear consistent with the 2014 Supplemental BiOp, which (among other things) called for starting transport of juvenile steelhead on April 21 and spring Chinook on May 1, subject to changes reflecting conditions on the ground. As it turned out, more than half the fish had already migrated when transport began.

## LEGAL DEVELOPMENTS

The issue of transport versus in-river migration is now before U.S. District Court Judge Michael H. Simon, who took over the long-standing proceedings from Judge Redden. On May 6, 2016, Judge Simon found that the 2014 Supplemental BiOp, prepared by NOAA Fisheries, was inadequate and ordered the Corps and other federal agencies to prepare a new BiOp and accompanying Environmental Impact Statement on river operations.

Judge Simon directed the agencies to address a host of alternatives for protecting the ESA-listed fish runs. Meanwhile, Judge Simon held that the existing 2014 Supplemental BiOp remained in place.

Then, on January 9, 2017, plaintiffs State of Oregon and National Wildlife Federation asked the Court to order more spill at the four Lower Snake River dams for fish passage.<sup>6</sup> The request has taken the form of a proposed injunction in which they ask the Court to direct the defendant federal agencies to follow a formulaic approach, spilling a specified amount of water (measured in cubic feet per second) at each dam.

There are two problems with this request.

First, the existing Supplemental BiOp does not call for rigid spill requirements, as Oregon requests. Oregon's request, for example, would double the spill at Lower Granite Dam on the Snake River (subject to a cap on total dissolved gas). Its motion to support the requested injunction contains no analysis of the long-standing "spread the risk" policy. In contrast, the 2014 BiOp confirms the policy and calls for an annual review and other technical analysis to adjust the start date of transportation to respond to conditions in the river.

Second, Oregon asked the Court to delegate power away from the federal agencies and give it to the "salmon managers" of the Fish Passage Advisory Committee ("FPAC"), an adjunct group of the Fish Passage Center ("FPC"). The FPC retains no legal authority to make Columbia River operations decisions.

Nonetheless, Section II, Spill (3) of Oregon's proposed order states:

The Corps may shift spill patterns or reduce spill below spill cap levels based on biological constraints if there are no objections to the proposed shift or reduction by the salmon managers of the Fish Passage Advisory Committee.

If adopted by the Court, this provision would further delegate and diffuse authority away from the federal officials with a statutory duty to ensure ESA compliance and comply with the Court's orders based on the best available science.

In prior years, NOAA Fisheries scientists (Northwest Fisheries Science Center in Seattle) found that juvenile salmon and steelhead are generally better off with transport in low flow, high-temperature conditions. See declaration of Dr. Darryll Olsen of CSRIA ("Olsen Declaration") filed with the Court on February 9, 2017. In his declaration, Dr. Olsen cited a 2010 NOAA Low Flow Transport Operations Proposal, previously filed with this Court on March 31, 2010. Dr. Olsen highlighted the evidence that in previous low-flow years, like 2001, "transport survival benefits totally overwhelm the in-river survival estimates."<sup>7</sup>

Despite NOAA's findings and concerns, here are the facts surrounding the 2015 spring operations:

1. The Supplemental BiOp, filed with the Court in January 2014, confirmed the long-standing policy of "spreading the risk" between transportation and in-river migration for juvenile fish. It concluded that "data indicates transport returned more adult steelhead and spring Chinook" for all years with the exception of 2006.<sup>8</sup> It noted that spring Chinook often show no benefit to transport prior to May but steelhead, in contrast, appeared to do better using a start date in April. "A challenge to managing the transport program is to select a period when it is clearly beneficial to both species."<sup>9</sup>

2. The BiOp therefore adopted an April 21 start date for steelhead transportation, subject to adjustments from an inter-agency committee, Technical Management Team (“TMT”) – the most important of the regional technical and operational review committees.<sup>10</sup>
3. According to the 2014 Supplemental BiOp, the TMT would review studies and provide for an annual recommendation for how to achieve the goal of transporting about 50% of juvenile steelhead. Thus, the planning dates for transporting steelhead were tentatively set to start at Lower Granite between April 21 and April 25 unless the Corps adopted a later date recommended by the TMT but no later than May 1. These dates were intended to be flexible. The BiOp made clear the Corps could select an “alternative start date” if it determined, in conjunction with NOAA Fisheries, that the change was warranted.<sup>11</sup>
4. In February 2014, only a month after the BiOp was submitted to this Court, the Fish Passage Center advocated for a later date for transportation. In a memo to the Fish Passage Advisory Committee, FPC data analyst Jerry McCann disputed a key assertion in the BiOp and objected to the April 21 start date.<sup>12</sup>
5. In March 2014, FPC manager Michele DeHart wrote to the Oregon Department of Fish and Wildlife (“ODFW”) arguing against an essential part of the just-adopted BiOp.  

“There is no biological basis for assuming a 50/50 split [between in-river and transportation], and the earlier transportation date [April 21, adopted in the BiOp] is not supported by the most recent survival analysis,” DeHart wrote.<sup>13</sup>

She concluded: “Current data does not support a transportation goal of 50% steelhead, so BiOp requirements for transportation dates should be redefined.”<sup>14</sup>
6. Then, in April 2014, ODFW representative Erick VanDyke wrote NOAA on behalf of the state, federal and Tribal fishery agencies – the same “salmon managers” that Oregon would like to empower in its proposed order. VanDyke urged NOAA to abandon the April 21 start date for collecting juvenile fish on Snake River. The technical data do not support April 21, he concluded.<sup>15</sup>
7. The Army Corps’ Fish Operations Plan (“FOP”), dated March 2015, apparently reflected those views. It adopted a **May 1** start date for juvenile steelhead transportation assuming average runoff conditions.<sup>16</sup>
8. By early April 2015, however, the federal agencies knew the snowpack was low.<sup>17</sup> They also knew that rising temperatures would threaten juvenile fish. The April 1 water temperatures in Little Goose reservoir were higher than in the previous seven years. See **Attachment A** for a summary of the spring 2015 operating conditions and related technical management information prepared by Dr. Darryll Olsen of CSRIA.
9. Even then, the federal agencies did not change (move up) the May 1 start date for transport.

10. The federal agencies, however, had the freedom to do so. The Corps had the discretion to start the barge transports earlier and thus avoid leaving the fish to migrate through warm reservoirs.<sup>18</sup> The FOP, for example, allowed the Corps and other entities that are members of the TMT to recommend changes in the juvenile transportation program.<sup>19</sup>

Changes in spill levels when flow conditions are higher or lower than anticipated will be coordinated through the TMT. This could include potential issues and adjustments to the juvenile fish transportation program.

11. But the TMT minutes for spring 2015 show that changes were not even discussed much less implemented. Instead, it was the FPAC that appeared to slam the door shut on earlier transport. On April 14 and again on April 21, scientists from NOAA Fisheries proposed starting the transport program early. But the NOAA proposal received no support from other entities on the FPAC and was apparently not submitted to the TMT.<sup>20</sup>
12. Nor does the TMT's Year End Review shed light on what happened in the spring of 2015 and how the federal agencies will likely respond in the future to similar events. Among the questions raised was whether the agencies "are using transportation as effectively" as they could, particularly in dry years. "Should we increase transportation in low flow years? Start transporting earlier than May 1?" But those are the types of questions that the 2014 Supplemental BiOp and prior BiOps had already attempted to answer.<sup>21</sup>
13. The default date of May 1 remained in place, a decision that was consistent with the views of the FPAC and the salmon managers who sought to adopt a later start date for transportation even in low flow and high temperature conditions.
14. But the fish migrated early that year. By May 1, when collection for transport began at Lower Granite and Little Goose, and by May 2, when collection began at Lower Monumental Dam, more than 58% of wild yearling Chinook and hatchery fish had already passed in the river. As for steelhead, about 48% had already passed Lower Granite, according to a NOAA memorandum prepared by Northwest Science Center, senior scientist Richard Zabel ("Zabel Memo").<sup>22</sup>
15. In the end, only 13% of fish were transported – the lowest percentage since records were first kept in 1993.<sup>23</sup>
16. What conditions did the fish face instream? In general, "the combination of conditions in the Snake River during the 2015 migration was unlike any year in our time series," the Zabel Memo said. "Water temperatures and spill percentages reached record highs while flow was near record low."<sup>24</sup>
17. What effect will this have on returning spring Chinook and steelhead? We do not know precisely but if the past is any record, we can expect to see diminished returning runs (compared to what would likely have occurred if more transport had been used selectively during this period). See analysis in CSRIA's response to the motion for injunction. PACER docket #2141.
18. Despite those facts, Oregon now comes before this Court and asks that it to grant the salmon managers of the Advisory Committee of the Fish Passage Center more authority – a *de facto* veto over the Corps and NOAA Fisheries scientists.

19. The “spread the risk” approach, as noted above, has been federal policy since Judge Redden approved it in a 2005 opinion, and it remained in effect for the 2014 Supplemental BiOp.
20. The plaintiffs’ proposed injunction would in effect eliminate or permanently weaken the policy. A key portion of the 2014 Supplemental BiOp would become invalid.

## **CONCLUSION**

Under this Court’s May 6, 2016 order, the 2014 Supplemental BiOp remains in place until a new BiOp is prepared. The existing BiOp reiterates long-standing policy to “spread the risk” between transport and in-river passage. Unfortunately, the available documents do not explain why federal agencies did not respond more quickly and forcefully to extreme low flow and high temperature conditions in spring 2015 and begin transport earlier than scheduled. Granting the plaintiffs’ request for an injunction will likely tie the hands of the agencies in the future and make flexible, adaptive management more difficult to implement. A repeat of 2015 seems likely.



## ENDNOTES

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<sup>1</sup> There are four federal agencies with a role in river management and ESA compliance on the Columbia and Snake Rivers:

- U.S. Bureau of Reclamation;
- Bonneville Power Administration (“BPA”);
- U.S. Army Corps of Engineers (“Corps”); and
- National Oceanic and Atmospheric Administration Fisheries (“NOAA Fisheries”).

The Army Corps owns the four federal dams on the lower Snake River and therefore plays an essential role in river management there. Under the ESA, the “action agencies” are required to consult with a variety of entities, including states and Tribes. The consultation process has resulted in the significant delegation and sharing of duties. For purposes of this memorandum, however, we focus on the actions of the federal agencies that have specific obligations under the ESA and the Biological Opinion (“BiOp”).

<sup>2</sup> *National Wildlife Federation et al. National Marine Fisheries Service, et al.*, case no 3:01-CV-00640 (“*NWF litigation*”), order from Judge James Redden, December 29, 2005, page 6, PACER docket #1221.

<sup>3</sup> *Id.* at 6-7.

<sup>4</sup> *Id.* at 6-7.

<sup>5</sup> See page 21 of CSRIA’s response to the motion for injunction for two charts showing historic transportation percentages of spring Chinook salmon and steelhead. PACER docket #2141.

<sup>6</sup> *NWF litigation*, PACER dockets #21112 and #21114.

<sup>7</sup> *NWF litigation*, PACER docket #2147 at page 12 for declaration of Dr. Darryll Olsen (“Olsen Declaration”). The NOAA study was originally filed with this court in 2010, PACER docket #1752-5.

<sup>8</sup> See 2014 Supplemental Biological Opinion (“2014 BiOp”), January 17, 2014 at page 369.

<sup>9</sup> *Id.* at page 369.

<sup>10</sup> *Id.* at page 370. See revised Reasonable and Prudent Alternative (“RPA”) 30 at page 375.

<sup>11</sup> *Id.* at pages 369-370.

<sup>12</sup> See McCann memo dated February 18, 2014 in the FPAC minutes, available at [www.fpc.org/documents/fpac\\_minutes/fpac\\_minutes\\_currentyear.html](http://www.fpc.org/documents/fpac_minutes/fpac_minutes_currentyear.html)

<sup>13</sup> See DeHart memo to Ed Bowles at ODFW, March 25, 2014, page 4, and as recorded in the FPC’s Advisory Committee minutes, available at [www.fpc.org/documents/fpac\\_minutes/fpac\\_minutes\\_currentyear.html](http://www.fpc.org/documents/fpac_minutes/fpac_minutes_currentyear.html)

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<sup>14</sup> *Id.* at page 5.

<sup>15</sup> See VanDyke memo, available at [www.fpc.org/documents/fpac\\_minutes/fpac\\_minutes\\_currentyear.html](http://www.fpc.org/documents/fpac_minutes/fpac_minutes_currentyear.html)

<sup>16</sup> See Army Corps, Fish Operations Plan, March 2015, page 8.

<sup>17</sup> See Fish Passage Advisory Committee memorandum, April 6, 2015, page 2, available at [www.fpc.org/documents/fpac\\_minutes/fpac\\_minutes\\_currentyear.html](http://www.fpc.org/documents/fpac_minutes/fpac_minutes_currentyear.html)

<sup>18</sup> *Id.*, page 1.

<sup>19</sup> *Id.*, page 16.

<sup>20</sup> See “Action Notes” from the FPAC meetings on April 14, 2015, page 2, and April 21, 2015, page 2. NOAA advocated possible alternative every other day transport beginning on April 25.

<sup>21</sup> Technical Management Team, Year End Review, Minutes of December 2, 2015 meeting, page 28.

<sup>22</sup> See memorandum from NOAA scientist Richard W. Zabel (“2015 Zabel Memo”)(page 6), dated September 10, 2015, and attached as Exhibit 3 to the Olsen Declaration, PACER #2147.

<sup>23</sup> See minutes from the Technical Management Team, year-end review, December 2, 2015, page 20. See, also, memorandum from Richard W. Zabel (2016 Zabel Memo”)(page 21), dated September 26, 2016, and attached as Exhibit 4 to the Olsen Declaration, PACER #2147.

<sup>24</sup> 2015 Zabel Memo, page 5.

**ATTACHMENT A:**  
**CSRIA Columbia-Snake River 2015**  
**Operations Summary**  
(NOAA Fisheries Data, 2015, 2016)

## **2015 Lower Snake River Temperature-Flow-Spill And Juvenile Fish Transportation and In-River Survival**

### Water Temperature Conditions (Little Goose Dam):

- The initial April 1, daily water temperatures were higher than the previous 7-year tracking period; and the temperature was about 25% higher than the tracking period (2008-2015) mean temperature.
- The April 1-15 temperatures remained higher than the tracking period mean temperatures, then approximately coincided with the mean on about April 15.
- The April 15-30 temperatures consistently exceeded the tracking period mean temperatures by about 12-15%.
- After April 30, temperatures exceeded the tracking period mean by 15-30% (or more).

### Flows (Little Goose Dam):

- The April 1-15 flows decreased relative to the tracking period mean by about 40-45%.
- The April 15-30 flows remained below the tracking period mean by about 40%
- After April 30, the flows continued to decrease below the tracking period mean by >40%.

### Spill Program (Mean Spill at LGR, LGO, LMN):

- During April 1-30, the project spill program ranged from about 35-40% of flow, with spill at about 50% of flow on April 15.
- During April 30-May 30, the project spill program ranged from about 30-40% of flow.

### Fish Passage (Lower Granite Dam):

- Peak Yearling Chinook fish passage occurred between April 15-30 and April 30-May 15. The same peak passage periods occurred for Steelhead.

### Transportation TIRs Under Low Flow Conditions:

- The NOAA Fisheries estimates for transport vs in-river passage survival display higher juvenile fish survival for transport versus in-river passage for lower flow water years—2001, 2005, and 2010. This applies to both Yearling Chinook and Steelhead.

### In-river Passage Survival Estimates, 2015:

- The 2015 in-river passage survival, between LGR and McN) for Yearling Chinook (68%) and Steelhead (63%) is among the lowest survival rates for low flow/high temperature conditions. In 2001, Yearling Chinook survival was about 56% and Steelhead survival at about 17%.

### Conclusion:

- Hindsight provides “20-20 vision,” but there were clear indicators in the early spring of 2015 that water temperatures and low flows would prevail during the juvenile fish migration period. Given that the fish managers were well aware of previous years’ impacts on low flow-high temperature conditions, the project(s) spill program should have been substantially decreased, or curtailed, and all efforts made to optimized the juvenile fish transportation program. Oversight was lacking.

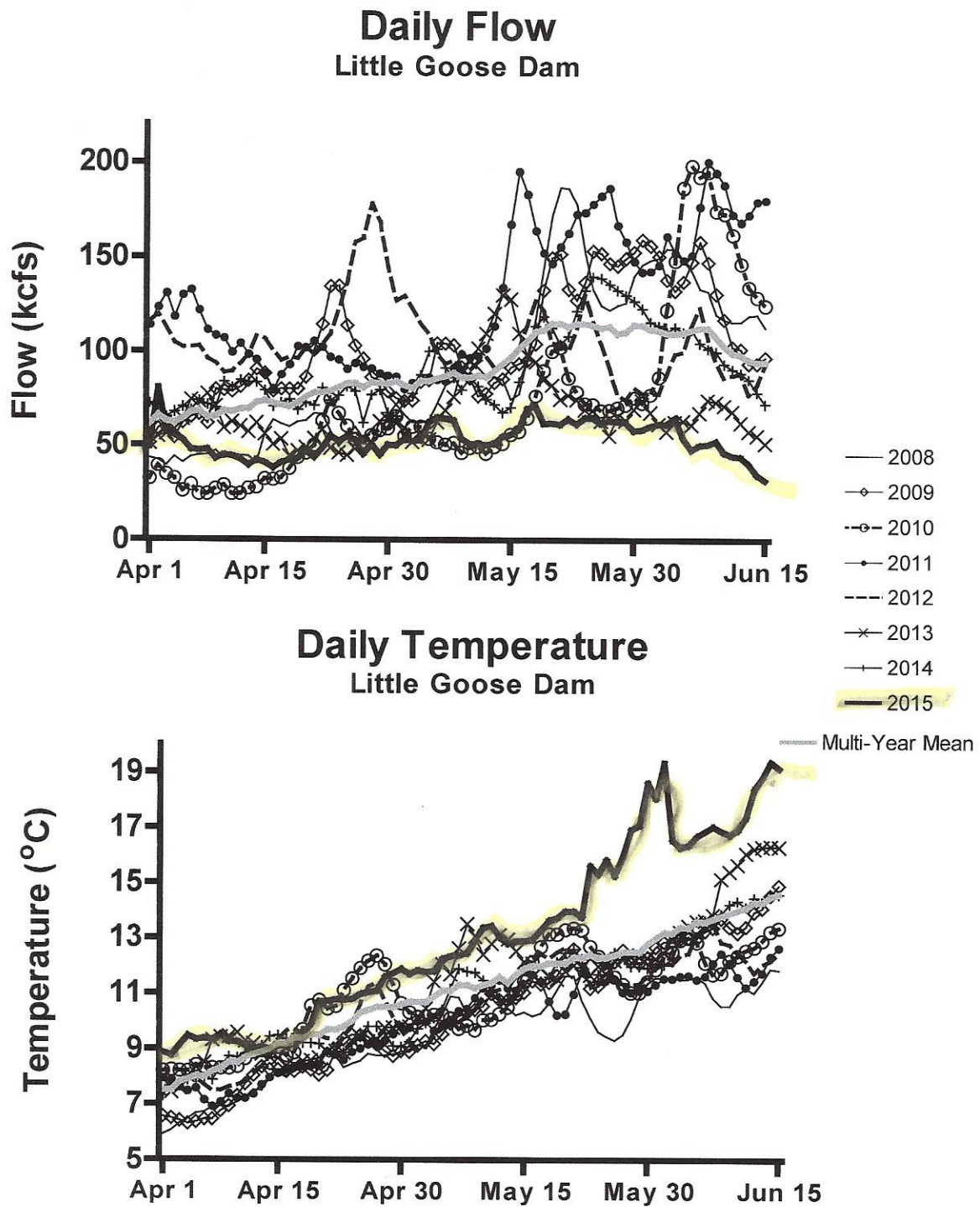


Figure 4. Snake River flow (kcfs; top panel) and water temperature (°C; bottom panel) measured at Little Goose Dam during April and May, 2008-2015, including daily long-term means (1993-2015).

## Mean Spill LGR, LGO, LMN

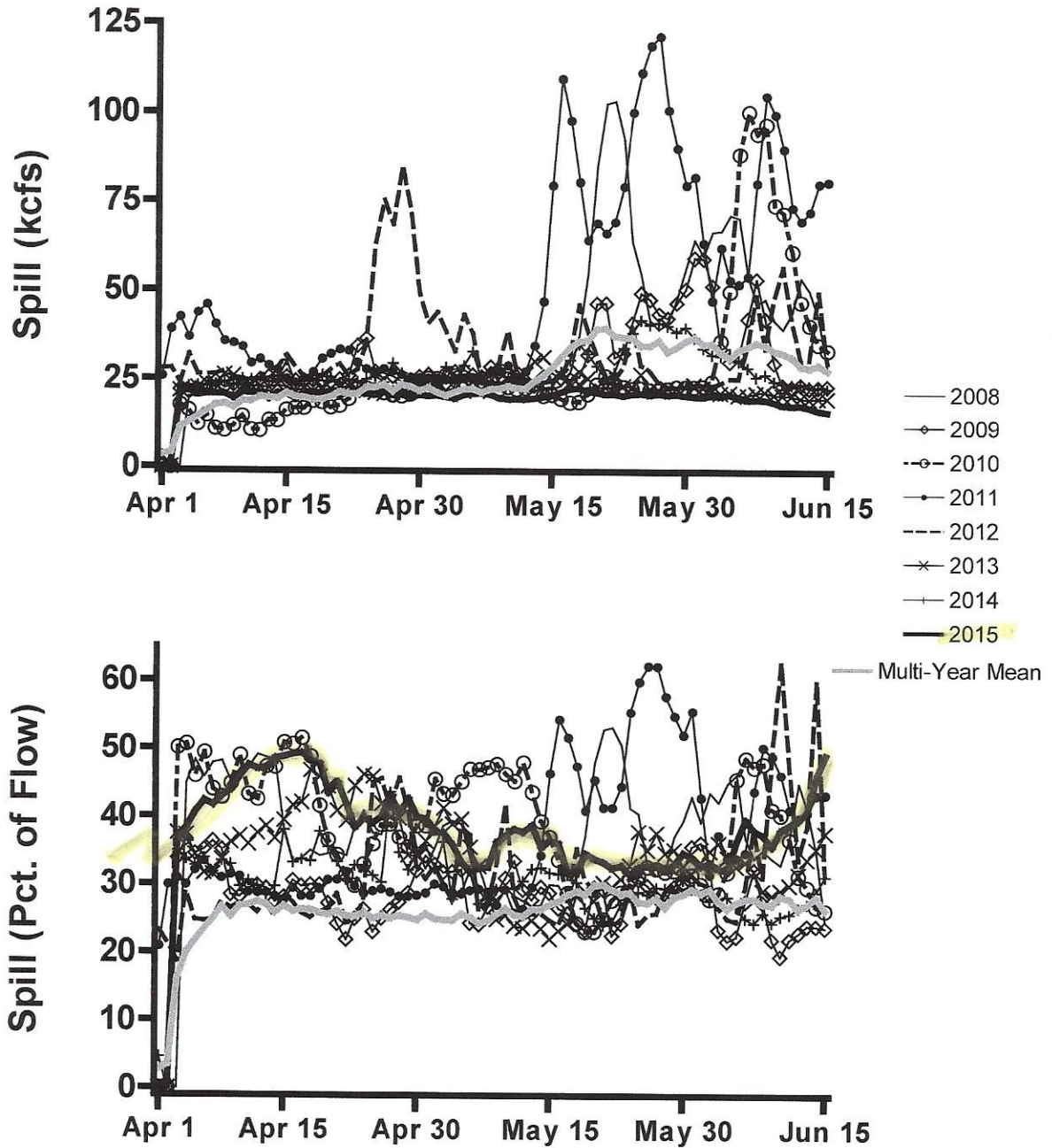
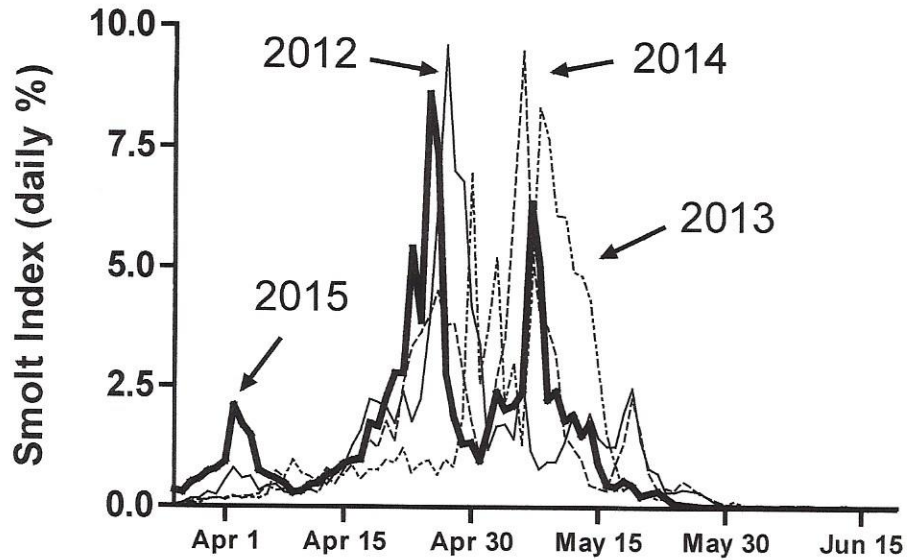


Figure 5. Mean spill (top panel shows kcfs; bottom panel shows percentage of total flow) at Snake River dams during April and May, 2008-2015, including daily long-term means (1993-2015).

## Smolt Passage at Lower Granite Dam

### Yearling Chinook



### Steelhead

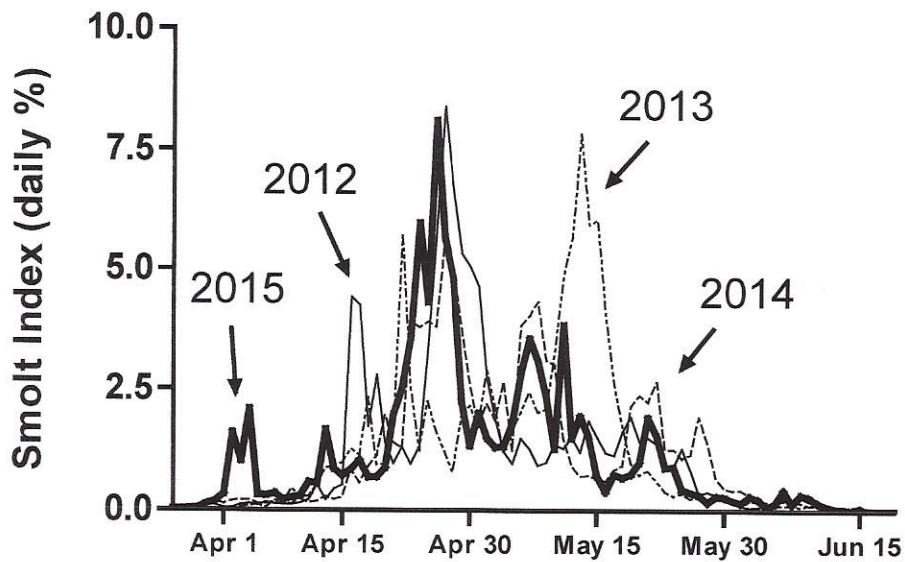


Figure 6. Smolt index as daily percentage of total passage at Lower Granite Dam 2012-2015 for hatchery and wild combined yearling Chinook and steelhead.

transportation.<sup>6</sup>

<u>Migration Year</u>	<u>Wild Chinook TIR</u>	<u>Wild steelhead TIR</u>
1999	1.14	2.28
2000	0.60	1.45
2001	8.96	37.00
2002	0.65	4.25
2003	1.05	4.41
2004	1.09	14.30
2005	2.14	4.88
2006	0.78	0.85
2007	1.27	2.89
2008	1.19	1.16
2009	1.11	1.31
2010	1.21	1.45
2011	0.68	1.18
2012	0.71	0.88
2013	1.42	2.15

(Adapted from Tables A.44 & A.54 in the CSS 2016 Final Report. (Olsen Decl. Ex. 5).)

Adult returns from 2014, 2015 and 2016 are not yet complete to calculate final TIRs; as explained below, 2015 in particular is expected to show a significantly-higher TIR.

Because the TIR is almost always greater than one, a science-based approach to fish management will nearly always minimize spill and maximize transportation.

Because TIRs vary during a migration season (with benefits rising over time as water temperatures rise and in-river conditions deteriorate), actual decisions about

transportation—and spill—should of course take account of in-river conditions. Court

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<sup>6</sup> These calculations are biased against transportation by comparing transported fish to what is in most years a minority group of fish with the best in-river survival, non-detected fish. (McKern Decl. ¶¶ 36-38.) NMFS has previously advised the Court that in making a decision whether or not to transport fish, it is appropriate to evaluate the performance of transport groups against the entire in-river group, not just the non-detected fish. (See NMFS, *Analyses of Juvenile Chinook Salmon and Steelhead Transport from Lower Granite and Little Goose Dams*, filed March 31, 2010, at 4 [Docket No. 1752-3].)



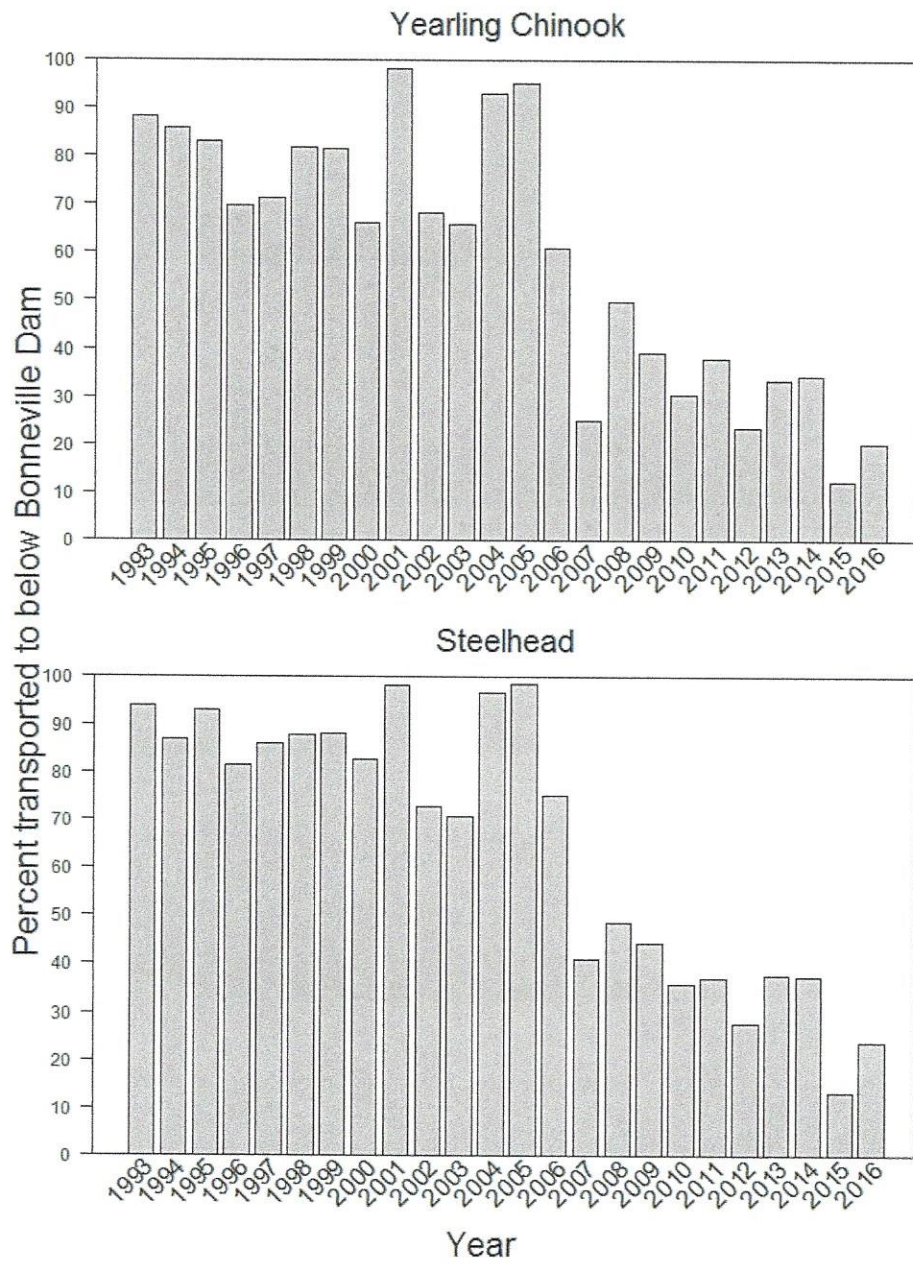


Figure 7. Estimated percent of yearling Chinook salmon and steelhead (hatchery and wild combined) transported to below Bonneville Dam by year (1993-2016).