Reply to John McKern Rebuttal re:
The Case for Breaching the Four Lower Snake River Dams to Recover Wild Snake River Salmon

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John McKern's January 2016 *Rebuttal* to "*The Case for Breaching the Four Lower Snake River Dams to Recover Wild Snake River Salmon*" ("*The Case for Breaching*") is incorrect on many levels. Further, it is remarkable for its failure to cite authorities or scientific data for most of its claims, and for its failure to distinguish between wild salmon and steelhead versus hatchery fish. Throughout his rebuttal McKern fails to recognize that it is the wild salmon and steelhead that NOAA Fisheries is charged with recovering. He conflates wild and hatchery fish. They are not the same. According to NOAA Fisheries, "[a] self-sustaining viable population has a negligible risk of extinction due to reasonably foreseeable changes in circumstances affecting its abundance, productivity, spatial structure, and diversity characteristics over a 100-year time frame ***and achieves these characteristics without dependence upon artificial propagation***." *Emphasis added*; West Coast Region NOAA Fisheries, *Proposed ESA Recovery Plan for Snake River Fall Chinook Salmon* (October 2015) ("*NOAA Recovery Plan*"), pp. 30-31. This is possible only with dam breaching.

In addition, the *Rebuttal* is notable for the number of facts that support breaching the dams that McKern does not dispute. Where he does attempt to rebut *The Case for Breaching,* McKern asserts debunked contentions often based on myths and propaganda. He also erects several straw man arguments that are not helpful to his rebuttal.

Moreover, there is now added support for breaching the dams. Recently, the Nez Perce environmental organization, Nimiipuu Protecting the Environment, emphasized the need for a free flowing river, demanded that the agreements between the U.S. and the Nez Perce Tribe be honored, and endorsed breaching the four lower Snake River dams to increase the opportunities to exercise the tribe's treaty fishing rights, "which sustained our people for millennia." Moffett, E. L., *Lewiston Tribune, Breach the Dams* (1/31/16).

1. McKern Does Not Dispute many of the Facts set forth in *The Case for Breaching*.

Perhaps the most important aspect of McKern's *Rebuttal* is the facts that he does not dispute. These facts support an immediate breach of the four lower Snake River dams. They include:

- Salmon are a keystone species, critical to preserving the Snake River ecosystem.
- All four Snake River wild salmon runs are threatened with extinction and listed as threatened or endangered under the Endangered Species Act.
- Snake River wild salmon are not meeting minimum survival goals.
- Native wild runs are remaining at dangerously low levels, if not declining.

- Despite three decades of studies and billions of dollars spent on anything but breaching the dams, ***wild populations*** have not experienced gains since they were listed under the ESA.
- Only 96 sockeye returned to near their Snake River spawning grounds in 2015. More than half of these were trapped. The rest of the estimated 4000 Snake River sockeye run died in the lethally warm waters of the Columbia and Snake Rivers.
- An artificial hatchery system cannot replace wild fish runs in the long term.
- Dam breaching offers the only opportunity to recover the natural flowing Snake River and its wild salmon, and with them, the Snake River ecosystem.
- Fall Chinook salmon surrogates have inflated the returning adult runs for the last several years, contributing to the touted "record" runs.
- Of the touted record runs, 85% of returning adult salmon are hatchery fish.
- Relatively few salmon or steelhead make it back to their spawning grounds and even fewer of these are wild fish.
- Hatchery fish and supplementation practices are diluting the wild fish genetics.
- Genetic dilution must be ended immediately.
- Snake River hatchery fish are being allowed to dilute the wild gene pool at a faster rate, making wild salmon more susceptible to population crashes.
- Fish are getting smaller. Mini and micro jacks are returning in as little as four or five months in the ocean. (McKern does dispute that hatchery fish are a cause of fish getting smaller.)
- In 2002 all available science suggested that dam breaching presented the greatest biological potential for recovering endangered and threatened Snake River salmon and steelhead.
- In 1999 the National Marine Fisheries Services (NMFS), aka NOAA Fisheries, determined that for the Snake spring/summer Chinook, the ***most risk averse action*** would include dam breaching, a harvest moratorium, and vigorous improvements in habitat and hatcheries.
- NMFS' results demonstrated that for Snake River fall Chinook and steelhead, ***dam breaching by itself would likely lead to recovery***.

These facts, by themselves, make a strong case for breaching the four lower Snake River dams as soon as possible.

2. McKern's Arguments to Maintain the Dams Are Based Largely on Unfounded Contentions or Well Worn Propaganda and Myths

Because *The Case for Breaching* is based on science gathered largely by federal agencies, McKern is forced to rebut the facts by relying on unfounded contentions and oft repeated propaganda and myths, including the following.

McKern states that "[r]ecords show naturally spawning fish are being restored throughout the Snake River Basin." (*Rebuttal*, p. 6.) While McKern fails to cite any source for this

statement, "naturally" spawning fish are not the issue. Wild fish are. The bulk of naturally spawning fish are hatchery derived. Naturally spawning fish are part of the problem as explained in *The Case for Breaching*, particularly with Snake River wild fall Chinook. Naturally spawning hatchery fish contribute to density dependence. *NOAA Recovery Plan*, p. 202. This is an increasing problem for Snake River wild fall Chinook salmon. Without expanding mainstem habitat through dam breaching, density dependence will only worsen. Hatchery fish releases will need to be increased into the already overcrowded river, in an attempt to permit fall Chinook to survive.

> ***The dominant concern regarding hatchery-influenced selection in the Snake River fall Chinook salmon hatchery programs is the presumed extent of gene flow, based on the high proportion of natural spawners that are of hatchery-origin***. In theory, the effect of large numbers of hatchery-origin fish spawning in the wild can be alleviated somewhat by inclusion of natural-origin fish in the hatchery broodstock. ***In recent years, however, the proportion of natural-origin fish in the broodstock has been under 10 percent, and the proportion of hatchery-origin fish on the spawning grounds has been over 70 percent*** (WDFW et al. 2011).

Emphasis added; *NOAA Recovery Plan*, p. 201. See also*, id.,* pp. 202-205, for a discussion and summary of other hatchery caused threats to Snake River wild fall Chinook salmon.

Contrary to the evidence, McKern contends that in-river fish passage for juvenile salmon and steelhead is not a problem. (*Rebuttal*, pp. 7-8.) While juvenile passage may be less of a problem than it once was, since the four lower Snake River dams were erected millions of juvenile fish have been killed annually trying to navigate downriver. The reason the $33 million *Lower Snake River Feasibility Report/EIS* was conducted was to attempt to address this problem. Nevertheless, McKern spouts the decades old propaganda and strongly suggests juvenile fish survival through the dams is no longer a problem. He contends, for example, that in optimal years, the per project survival rate has improved to over 95%. (*Rebuttal*, pp. 8, 13.) Even if this were true, it would mean that under the best conditions, the eight dams that Snake River salmon and steelhead must navigate kill up to 40% of the juveniles attempting to reach the ocean. NOAA Fisheries research shows that juvenile downriver migration survival rates are much lower than McKern's. The long term average for wild yearling Chinook salmon is 45%, while the long term average for wild steelhead is 42%. NOAA Memorandum, Zabel, R., *Preliminary Survival Estimates for the Spring-migrating Juvenile Salmonids through Snake and Columbia River Dams and Reservoirs*, 2015, 9/10/15, p. 2-3. In 2015 survival rates for juveniles were significantly lower than the long term averages. For *wild* Snake River yearling Chinook, the mean estimated survival from the Snake River trap to the Bonneville dam tailrace was 38.4%. *Id.* For *wild* steelhead, the estimated survival rate from the Snake River trap to the Bonneville Dam tailrace was only 30.1%. *Id.* For Snake River sockeye in 2015, survival from the tailrace of Lower Granite Dam to the tailrace of Bonneville Dam was 37.3 percent. *Id.* Based on fall Chinook surrogates, NMFS' analysis estimated current average survival rates to range between 18.7% and 53.4% (NMFS 2008b). *NOAA Recovery Plan*, p. 164. Contrary to McKern's contention, these low survival rates are a problem.

McKern contends that *The Case for Breaching* asserts erroneously both that fish ladders impede adult fish moving upriver and that the reservoirs stratify. (*Rebuttal*, pp. 1, 5.) Again McKern is wrong. Although the water may be mixed well in the tailraces, fish ladders do impede adult fish traveling upriver, and the reservoirs do stratify. Stratification impedes

upstream adult fish migration, particularly due to its thermal effects on fish ladders. In a peer reviewed study funded by the United States Army Corps of Engineers (USACE), Walla Walla District, using tagged Chinook salmon and steelhead, researchers documented that the four lower Snake River dams had strong direct and indirect effects on river corridors used by migrating fish. Caudill, C. et al., *Indirect Effects of Impoundment on Migrating Fish: Temperature Gradients in Fish Ladders Slow Dam Passage by Adult Chinook Salmon and Steelhead* (*Indirect Effects of Impoundment*).[1] Ladder temperature gradients can create a migration obstacle that slows adult salmon and steelhead passage at Snake River dams. *Id.* A temperature difference of greater than 1° Celsius between the bottom and top of a ladder consistently was associated with longer fish passage times. *Id*. "The additional time fish spent passing dams also may have had adverse effects including increased potential for expression of heat shock protein, disease susceptibility, impaired ovulation, increased levels of stress hormone, and decreased migration success." *Id.* Further, as stated in *The Case for Breaching*, transported fish have increased fallback rates. Another report funded by USACE, Walla Walla District showed that "[w]hen compared to in-river migrants, barged Chinook salmon were 1.9 times more likely and barged steelhead were 1.3 times more likely to fall back at dams as adults." Keefer, M. L., et al., *Effects of Transport during Juvenile Migration on Behavior and Fate of Returning Adult Chinook Salmon and Steelhead in the Columbia-Snake Hydrosystem 2000-2003* (2006) (*Effect of Transport*), p. v. Among fish that fell back, a significantly greater proportion of barged fish experienced multiple fallback events than in-river migrants. *Id.*

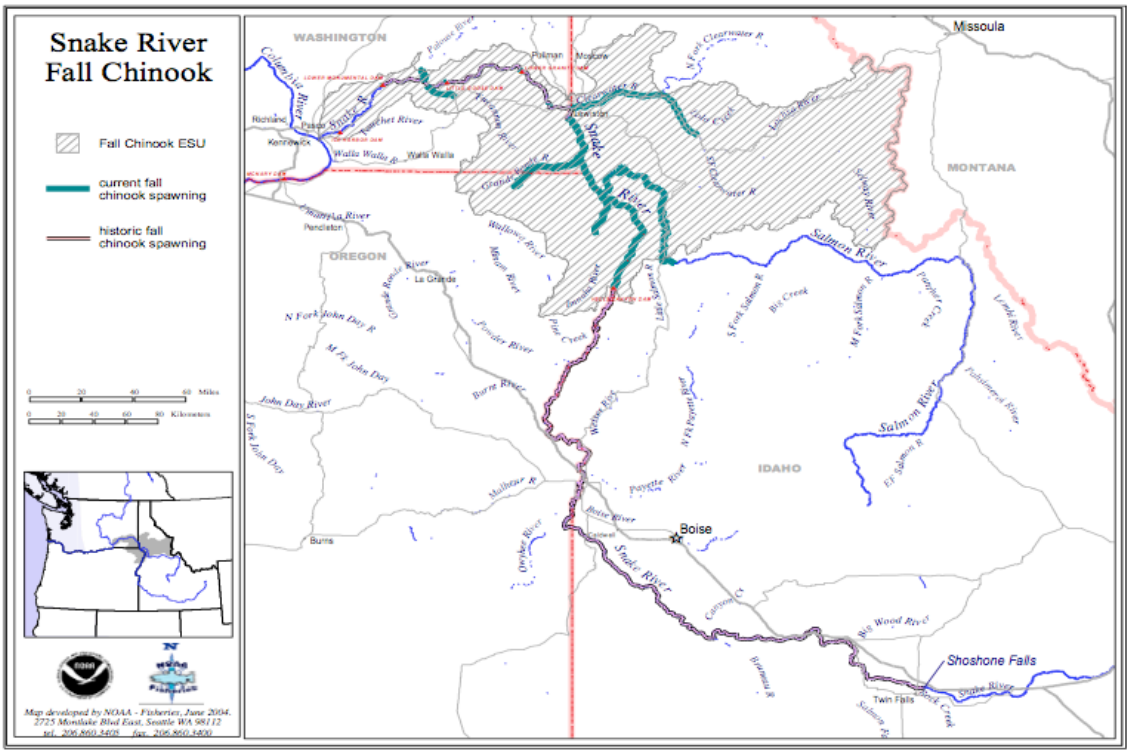
Dams additionally affect fish behavior and physiology in the migration corridor by altering water temperature, dissolved gas concentrations, and other physiochemical conditions both upstream and downstream from the dams. *Indirect Effects of Impoundment.* Temperature alteration is concerning because it plays a central role in regulating fish physiology, behavior, and survival. *Id.* In contrast to free-flowing rivers, fish moving upriver in dammed rivers may encounter much warmer or cooler thermal environments, increased thermal heterogeneity, and potential thermal barriers. *Id*. In all four lower Snake River reservoirs, increased water residence times and solar heating cause additional thermal layering, especially in dam forebays. *Id*. Prevailing upstream summer winds reinforce the layering by slowing the movement of surface water. *Id*. This can result in stratification and net transport of warm masses upstream over a deeper water mass moving downstream. *Id*.

McKern states that *The Case for Breaching* erroneously claims the Juvenile Fish Transportation Program does not work. (*Rebuttal*, p. 1.) This is a misstatement. The *Case for Breaching* asserts that out-of-river transport does not mitigate for the harmful dam effects on juveniles migrating downstream. That fact is supported by research. See, e.g., *Comparative Survival Study of PIT-tagged Spring/Summer/Fall Chinook, Summer Steelhead, and Sockeye, 2015 Annual Report,* p. xxiv. McKern also claims that the transportation program has a 95% to 98% percent survival rate for transported juvenile fish. (*Rebuttal.*, pp. 8-9.) In making this statement, McKern fails to cite any source or to account for the delayed mortality caused by transport. Further, he readily admits that straying caused by transport (returning to a spawning ground other than the natal spawning area) is a problem. (*Id.*, p. 9.) According to McKern apparently since the rates of straying have not been enough "to officially stop the program,"

[1] Published in PLOS One, December 13, 2013, http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0085586.

transport is not a problem. (*See, id.*) Research has shown otherwise. Relationships between juvenile transport and subsequent adult behaviors are a concern for managers because straying by hatchery fish to spawning sites of wild salmonids may compromise genetic integrity and recovery efforts for wild listed stocks, and slowed adult migration at dams and fallback can be associated with high energetic costs, pre-spawn mortality, and prolonged exposure to fisheries. *Effect of Transport, supra,* p. 1.

McKern perpetrates and perpetuates the myth that the lower Snake River mainstem historically was not a fall Chinook spawning area. He is incorrect. "Snake River fall Chinook salmon spawn primarily in the mainstem Snake River where habitat conditions are greatly affected by hydropower development and operations." *NOAA Recovery Plan*, p. 138. Further, the mainstem of the lower Snake River historically was a major fall Chinook spawning area. *Id.,* p. 166. The reservoir above Lower Granite Dam inundated historical Snake River fall Chinook spawning habitat. *Id.,* p. 164. Although limited spawning continues to occur in the lower Snake River dam tailraces, the upper end of the Lower Granite Dam pool is now considered the downstream limit of the Snake River fall Chinook salmon spawning habitat. *Id.* The inundated spawning grounds likely fostered phenotypic diversity in spawn timing as water temperature varied from upstream areas and tributary reaches. *Id.* See also, NOAA Fisheries 2004 map *Snake River Fall Chinook*, historical and current distribution, below. It shows graphically the historical lower mainstem Snake River spawning grounds used by fall Chinook. Increasing mainstem habitat is critical to recovering the wild fall Chinook runs.



McKern contends that the "deeper, cooler reservoirs aided by cold-water releases from Dworshak Reservoir have improved the rearing capacity of the lower Snake River compared to historic conditions." (*Rebuttal*, p. 11.) While the cold water releases have

improved the warmer water temperatures caused by the hydrosystem particularly in the reservoir created by Lower Granite Dam, McKern's contention is inaccurate to the extent he claims improvement over historic conditions. Hydropower system development and operations have inundated historical production areas and reduced mainstem habitat quality. *NOAA Recovery Plan*, p. 182. Increased competition or changes in food resources in the reservoirs may be contributing to a declining growth rate in fall Chinook salmon. *Id.,* p. 40. The reservoirs likely have caused later migration of fall Chinook. *Id.,* p. 70. This becomes important in years when June river temperatures rise. Additionally, juveniles pass much faster through free flowing stretches of river than through reservoirs. *Id.*

In fact, NOAA Fisheries lists the reservoirs as one of the main threats to fall Chinook salmon. *Id.,* p. 166. Fish predators "congregate near dams or at hatchery release sites to feed on migrating smolts. ***The largest portion of salmon lost to fish predators is in the reservoirs***." *Emphasis added; id.,* p. 40. When water temperatures are cool enough, smolts use the near shore that exposes them to shoreline predators. *Id.,* p. 162. Historically, when smolts moved to the fastest, deepest water available, they could avoid predators. This technique is not as effective against predators in reservoirs, because predators can more easily maintain their position at any point in the reservoir (Tiffan et al. 2009b). *Id.*

In sum, "[t]he system of dams and reservoirs contributes to reduced abundance, productivity, and spatial structure by lowering survival through the mainstem corridor, as well as the amount of spawning rearing habitat available to fall Chinook in historical production areas. This impact on spawning and rearing habitats could also affect life history diversity." *Id.,* p. 182. Clearly this is not improvement compared to the historically free flowing river.

McKern states that *The Case for Breaching* blames 2015 warm water temperatures and losses of Snake River sockeye on the four lower Snake River dams. He further argues that "[t]he lower Snake River dams are not responsible for increased water temperatures and thermal losses of Snake River sockeye." (*Rebuttal*, p. 5.) These contentions are mistaken. First, The *Case for Breaching* does not claim that the dams by themselves caused the mass killing of the more than 450,000 sockeye that occurred in 2015. On the contrary, it states that, "[t[he high water temperatures caused by ***drought, climate change and dams*** proved to be catastrophic to migrating sockeye in 2015." Emphasis added; *The Case for Breaching*, p. 7. Second, by slowing water flow and increasing surface area for solar radiation, dams cause increased water temperatures in the reservoirs. DeHart, M., Fish Passage Center, Memorandum (10/28/15), p. 2. Thermal blocks that are longer in duration and larger in size than would have existed historically without the dams affect Snake River adult upstream migrants. *NOAA Recovery Plan*, pp. 182-183. While drought and climate change may be primary factors for raising water temperatures, the increase in temperature caused by the dams has a significant effect on migrating fish.

McKern contends that the critically endangered Southern Resident Killer Whales are increasing in population in recent years. In fact they have declined from 88 whales in 2005 when they were listed as endangered, to 85 whales today. No new calves survived between September 2012 and late December 2014. At least seven whales died during that period. The Southern Residents' current population includes nine new calves born between late December 2014 and today. The gestation period for orcas is 17 months. That means the "baby boom" coincides with the larger Snake River hatchery salmon runs that occurred in 2013 through 2015, runs that were inflated by the fall Chinook surrogate research program. Many of the calves were

conceived in the year 2013 when the Southern Residents largely were absent from the Salish Sea inland waters, presumably feeding on coastal Chinook. This is good evidence that if there are plentiful Snake River Chinook, the Southern Resident orcas can conceive, reproduce, survive and recover. While there is an expected 50% mortality in the first year of life for Southern Resident calves, hopefully all survive. However, they are not light eaters. If all nine calves do survive, the population will need between 30,000 and 50,000 additional Chinook salmon to sustain the calves as juveniles. Removing the Snake River dams could go a long way toward providing these additional fish.

3. McKern's Straw Man Arguments Discredit His Rebuttal

McKern expends considerable effort in raising a number of straw man arguments that he then knocks down. This is not helpful to his argument. Below are some of the more conspicuous straw man arguments McKern created.

McKern states that *The Case for Breaching* minimizes the historical cumulative impact of human activity. (*Rebuttal*, p. 1.) *The Case for Breaching* neither raised nor contested the fact that since the mid-1800's human activity, especially that of European settlers, has caused the wild salmon and steelhead populations to plummet in the Snake River Basin. That is a given. The point in *The Case for Breaching* is that those lower Snake River wild salmon populations that managed to survive the human onslaught for more than a century, were then decimated by the four lower Snake River dams, as was predicted. The dams caused such a precipitous decline, that by the 1990's all four wild populations were listed as threatened with, or endanger of, extinction under the Endangered Species Act. All the technical fixes and system improvements to the dams have not brought back the wild populations. Wild salmon and steelhead are meeting neither NOAA Fisheries' survival or recovery goals. Since these dams caused this most recent decline, removing the dams has the most potential for allowing the wild fish in the lower Snake River to recover.

McKern claims that *The Case for Breaching* fails to consider nearly 150 years of overharvest and hatchery practices on the overall integrity of the wild fish populations. (*Rebuttal*, p. 1.) The *Case for Breaching* neither raised nor contested that historical overharvest and hatchery practices have harmed wild salmon and steelhead. Instead, it concerns the plight of the four listed threatened or endangered Snake River wild salmon and steelhead runs today. While *The Case for Breaching* does not delve into 150 years of bad practices, it is replete with discussions about the current hatchery practices' effects on Snake River wild fish populations. In fact, in Appendix 1, the surrogate appendix, The *Case for Breaching* makes specific recommendations on measures to reform hatcheries to promote wild fish production.

McKern contends that the four lower Snake River dams did not inundate the majority of the fall Chinook spawning area. (*Rebuttal*, p. 4.). This argument refers to the entire Snake River, upper, middle and lower. *The Case for Breaching* is based on the 140 mile mainstem of the ***lower*** Snake River, not the entire Snake River mainstem. Fall Chinook are mainstem spawners. Clearly, the four lower Snake River dams did inundate the majority of the existing fall Chinook spawning grounds on the lower Snake River. "In addition to blocking access to or inundating historical fall Chinook salmon production areas, hydropower system development

and operations also reduce mainstem habitat quality and affect both juvenile and adult migration." *NOAA Recovery Plan*, p. 38. Limiting factors for adult fall Chinook salmon in the migration corridor include reduced spawning area. *Id.*

McKern claims that *The Case for Breaching* is overly optimistic that breaching the Snake River dams will recover *Idaho's* wild salmon runs to historic levels. (*Rebuttal*, p. 1.) This is an argument McKern creates out of thin air. The *Case for Breaching* focuses on the four lower Snake River dams in eastern Washington. While there would be an impact on the recovery of wild fish in Idaho to the extent the four dams affect Idaho salmon and steelhead, nowhere in *The Case for Breaching* is the argument made that wild salmon would return to historic levels. A good outcome would be if in the decade or so after dam breaching, the lower Snake River wild salmon and steelhead were to recover to levels of production that occurred before the four dams were constructed. A great outcome would be if fisheries managers could double pre-dam wild fish populations by working to increase their production.

McKern states that "[s]pill is the safest way to pass fish," but then points out the problems with spill. (*Rebuttal*, p. 8.) It is unclear why McKern decided to discuss spill. It is clear, however, that breaching the dams, the ultimate spill, is the safest way to pass fish.

McKern claims that *The Case for Breaching* "would have you believe that 85% of the Snake River fall Chinook spawned in the 140 mile stretch affected by the lower Snake River dams." (*Rebuttal*, p. 2.) He then states "that is not true." *Id.* What is true is that nowhere in *The Case for Breaching* is there a discussion about the percentage of fall Chinook salmon produced by the lower Snake River.

Conclusion

McKern's claim that *The Case for Breaching* does not take "a holistic approach to the multiuse river system" (*Rebuttal*, p. 12), simply is code for not enough importance was placed on economic interests and too much weight was given to salmon, steelhead and the Snake River ecosystem. This is not true. Barging is in decline. The hydropower produced by the four lower Snake River dams is surplus. Irrigation issues can be negotiated. Indeed, as John Hurley predicted would happen in June 1950 before the dams were built, the four lower Snake River dams would create "some of the most expensive electricity in the United States" because of their impacts on salmon and steelhead. Harrison, John, Northwest Power Council, *Dams: Impacts on Salmon and Steelhead* (10/31/08). It is time for the dams to be breached.