September 13, 2018

Via Email and U.S. Mail

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RE: Request for Short-Term Modification of WAC 173-201A-200(1)(f)(ii)

Dear Ms. Bellon and Ms. Bartlett:

Pursuant to WAC 173-201A-410(1) and (2), the Northwest Sportfishing Industry Association, Columbia Riverkeeper, and Save Our Wild Salmon (hereinafter collectively referred to as "NSIA") respectfully request that the Washington State Department of Ecology ("Ecology") grant a short-term modification of WAC 173-201A-200(1)(f)(ii), which Ecology promulgated pursuant to RCW 90.48.035. The existing rule sets water quality standards ("WQSs") for total dissolved gas ("TDG") in Washington's fresh surface waters. Generally, the rule requires that TDG levels not exceed 110 percent saturation. However, the rule includes exemptions to facilitate fish passage past hydroelectric dams on the Snake and Columbia rivers as follows:

> The following special fish passage exemptions for the Snake and Columbia rivers apply when spilling water at dams is necessary to aid fish passage:
>
> TDG must not exceed an average of one hundred fifteen percent as measured in the forebays of the next downstream dams and must not exceed an average of one hundred twenty percent as measured in the tailraces of each dam (these averages are measured as an average of the twelve highest consecutive hourly readings in any one day, relative to atmospheric pressure); and a maximum TDG one-hour average of one hundred twenty-five percent must not be exceeded during spillage for fish passage.

By this letter, NSIA seeks a short-term modification of this particular provision pursuant

to WAC 173-201A-410(1) and (2) to allow more flexibility in the management of total dissolved gas levels at eight dams on the lower Snake and lower Columbia rivers in order to aid fish passage and hydropower generation while minimizing interference with or injury to other aquatic resources. This request will also aid the efforts of Governor Inslee's Orca Task Force by increasing downstream juvenile salmon survival through higher levels of spill and, consequently, increase abundance of adult salmon that are important prey for orcas.

This request is made in the context of on-going discussions among the State of Washington and other entities about increasing the allowable levels of total dissolved gas to improve juvenile salmonid passage survival, provide flexibility for increased power generation during periods of peak demand, an increase orca prey availability at critical times—all goals that NSIA supports, so long as the actions taken actually improve upon past operations and increase salmon returns.

Specifically, NSIA asks Ecology to adopt a short-term modification that would (a) eliminate Washington's current forebay TDG standard at all eight lower Snake and lower Columbia river dams; and, (b) allow voluntary spring spill up to 125 percent TDG (as read at tailrace) during some or all non-peak power generation hours at some or all of the eight dams, beginning March 1, 2019, and continuing as described below for a period of at least three years or until replaced by a permanent change to the TDG standards through appropriate rulemaking. The goal of this short-term modification is to create a new TDG ceiling for voluntary spring spill operations without requiring spill to a specific level at all times, thus allowing increased upward flexibility for both voluntary spill and power generation.

Rather than specify the exact details of such a short-term modification, we suggest below one version of such a modification that we believe would be appropriate and achieve both better fish passage at the dams (by providing more spill at certain times than is allowed under current TDG standards) and provide more flexible power generation (by allowing periods of lower spill during peak demand hours):

> Between March 1 and June 30 each year, TDG may not exceed an average of one hundred twenty-five percent as measured in the tailrace of each dam on the lower Snake River in Washington and the lower Columbia River to which WAC 173-201A-200(1)(f)(ii) currently applies. This average is measured as an average of the twelve highest consecutive hourly readings in any one day.
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> During the period from March 1 through June 30, TDG also should remain at lower levels as measured in the tailrace of each dam for a limited number of hours in each twenty-four-hour period to accommodate increased hydropower generation.

We believe there may be other versions of a short-term modification, starting in 2019, that would also accomplish our goals, so long as TDG levels up to 125 percent of saturation are allowed on an appropriate basis.

We seek this short-term modification for a period of no more than three years, or until such time as Ecology completes a rulemaking to permanently modify WAC 173-201A-

200(1)(f)(ii) to eliminate the existing 115 percent TDG limit in the forebay of each dam and allow TDG levels up to 125 percent in the tailrace at each dam.

The basis for this request for a short-term modification of WAC 173-201A-200(1)(f)(ii) pursuant to WAC 173-201A-410 is set forth below.

BACKGROUND

I. SPRING SPILL IS VITAL TO SALMON AND STEELHEAD PROTECTION.

There is broad and longstanding scientific agreement that voluntary spill past eight federal dams on the lower Snake and lower Columbia rivers provides substantial survival benefits to endangered salmon and steelhead. Indeed, Ecology has acknowledged that spill is important for salmon and steelhead.[1] We review some of this evidence below, including recent evidence that spill to 125 percent of saturation in the tailrace at each of the lower Snake and lower Columbia river dams is beneficial to salmon and steelhead survival.

For juvenile salmon and steelhead migrating in the Snake and Columbia rivers, non-powerhouse passage (spill and powerhouse surface passage) indisputably provides the safest passage through the Federal Columbia River Power System ("FCRPS") dams.[2] Substantial evidence also shows that spill can be managed to avoid impeding adult salmon and steelhead passage though dams.[3] Allowing increased water over the spillways at these dams allows juvenile salmon to avoid traveling through the power turbines—a passage route that increases mortality by subjecting these fish to rapid pressure changes and direct impacts with turbine blades. Increased spill also results in lower mortality than the practice of diverting fish from the turbine intakes and "bypassing" them through a series of screens, pipes, and tunnels to return to the river on the lower side of the dam.[4]

Experience underscores the beneficial effects of spill. Court injunctions have required the U.S. Army Corps of Engineers ("Corps") to spill additional water at the FCRPS dams to aid downstream fish passage. Court-ordered spill has allowed more juvenile salmon to migrate in the river under better conditions and has had a positive effect on smolt to adult return rates according to analyses by the Fish Passage Center ("FPC").[5]

The FPC's conclusions were questioned by the National Marine Fisheries Service/NOAA Fisheries ("NOAA"), which conducted a separate review concluding that the high sockeye returns in 2008 were generally due to favorable ocean conditions. In response, FPC reviewed

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[1] Department of Ecology. August 10, 2009. Response to Petition for Rulemaking – Chapter173-201a WAC – Water Quality Standards. Response to Petition Issue 1.

[2] *See* NMFS 2000 Federal Columbia River Power System Biological Opinion ("2000 BiOp") at 6-17.

[3] *See* CRITFC. July 3, 2008. Memorandum to the AMT, Review of Adult Passage Through Different Dam Passage Routes.

[4] 2000 BiOp at 9-83.

[5] FPC Memo (July 14, 2008) at 2. The "years analyzed" in FPC's analysis were 1998–2007.

NOAA's analysis, carefully reexamined its own findings, and concluded that:

> There is no doubt that ocean conditions are important, but this does not reduce the importance of migration conditions and fish survival in-river . . . . The NOAA conclusion that attributes the 2008 high return of sockeye salmon to the marine/estuary conditions while discounting the effect of higher in-river survival, lower proportion transported and improved in-river conditions, is flawed because it fails to recognize that fish must reach the oceans/estuary alive to benefit from good ocean conditions. Even the best ocean conditions will not resurrect dead fish.[6]

FPC has also reviewed NOAA's analysis of juvenile steelhead reach survival for 2009, confirmed the agency's findings of 66-69% in-river steelhead survival rates from Lower Granite to Bonneville dams, and concluded that:

> based upon multi-year analysis the most important variables explaining variability in reach survival for steelhead were spill proportion and water transit time (i.e. flow). Higher spill proportions, particularly for the Snake River, are likely the primary factors contributing to the higher juvenile survivals and faster juvenile travel times which occurred in 2007, 2008, and 2009.[7]

Indeed, NOAA has previously acknowledged that, along with removable spillway weirs, "[h]igher survival for in-river migrants in 2006 was likely the result of higher flows and greater volumes of water spilled."[8] NOAA had also concluded as long ago as 2000 that "measures that increase juvenile fish passage over FCRPS spillways are the highest priority" for passage improvements.[9]

More recent analyses by the FPC confirm that voluntary spring spill at TDG levels of 125% in the tailrace of each dam is safe for downstream migrating juvenile salmon and steelhead and will further improve juvenile survival – and ultimately adult return rates – as compared to the lower levels of spill allowed under the current TDG exemptions. The most recent such analysis is set out in the FPC's Comparative Survival Study (CSS) 2017 Annual Report, especially in Chapter 2, "Life Cycle Modeling Evaluation of Alternative Spill and Breach Scenarios" and Chapter 3, "Effects of the In-River Environment on Juvenile Travel Time, Instantaneous Mortality Rates and Survival." As explained in this report, the CSS analysis is based on extensive data collected over many years and life cycle modeling that has been developed and reviewed by experts within the region since at least 2013. Rather than fully summarizing the technical details of this analysis here, NSIA refers Ecology to the CSS 2017 Annual Report which is available at: http://www.fpc.org/documents/CSS/CSS_2017_Final_ver1-

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[6] FPC Memo to Ed Bowles, ODFW (Feb. 18, 2009) at 1. Available online at: http://www.fpc.org/documents/memos/18-09.pdf.

[7] FPC Memo to Ed Bowles, ODFW (Sept. 29, 2009) at 1–2. Available online at: http://www.fpc.org/documents/memos/157-09.pdf

[8] NMFS, Northwest Fisheries Science Center, Preliminary Survival Estimates 2006 Spring Juvenile Migration at 1-4 (Aug. 30, 2006).

[9] 2000 BiOp at 9-82.

1.pdf, and http://www.fpc.org/documents/CSS/CSS_2013_Workshop_Report_-_FINAL_w_presentations.pdf (containing detailed smolt-to-adult returns at various spill levels, flows and ocean conditions).

Briefly, however, the 2017 CSS analysis indicates that, relative to spilling to the current Washington TDG caps of 115% in the forebay and 120% in the tailrace at each dam, allowing TDG of 125% in the tailrace of each dam as requested herein would lead to a significant increase in smolt-to-adult return rates for Snake River spring/summer Chinook.[10] In addition, the 2017 CSS analysis concludes that TDG levels well above 125% are only a weak or non-factor in instantaneous mortality rates. Together, these conclusions are (a) more robust than similar conclusions Ecology has previously reviewed in connection with requests to modify its TDG standards; (b) have been reviewed by the Independent Scientific Advisory Board with suggestions for additional steps to strengthen the conclusions but without any fundamental disagreement with the CSS findings; and, (c) confirm that a short-term modification of Ecology's current TDG water quality standards for the lower Snake and lower Columbia River dams is scientifically well supported.

In short, the spill volumes allowed by TDG levels up to 125 percent would provide the best and safest route of passage for juvenile and adult salmon and steelhead by allowing them to avoid higher turbine and screen bypass mortalities, reducing passage delay, and dispersing predators. Even though excessive spill *can* cause excessive TDG levels which can harm fish and other aquatic life, we believe state and federal laws require Ecology to set TDG limits that maximize salmon survival by balancing the benefits of increased voluntary spring spill with the risks of harm from Gas Bubble Trauma ("GBT") to salmonids and other species. The short-term modification NSIA requests meets this requirement as explained in more detail below.

II. A SHORT-TERM MODIFICATION OF WAC 173-201A-200(1)(f)(ii) WOULD NOT INTEREFERE WITH OR INJURE OTHER AQUATIC RESOURCES.

Based on the evidence described above, NSIA believes that a short-term modification of Ecology's existing TDG standards would better protect migrating juvenile salmon and steelhead and increase adult returns. Based on the discussion below, NSIA also believe that this modification would not interfere with or injure other aquatic biota.

NSIA recognizes that, in the past, Ecology has given weight to the potential for harm to non-salmonid aquatic biota from higher levels of TDG. A 2009 Adaptive Management Team sponsored by Ecology and the Oregon Department of Environmental Quality ("ODEQ") looked in detail at the relationship between increased TDG levels due to spill and the incidence of GBT in aquatic organisms. A joint report by Ecology and ODEQ[11] described three independent literature reviews conducted by Ecology, NOAA Fisheries, and Parametrix. Each review examined the effects of TDG on aquatic life and took special notice of species other than

[10] *See* CSS 2017 Annual Report at 50 (Figure 2.10).

[11] Adaptive Management Team, Total Dissolved Gas in the Columbia and Snake Rivers; Evaluation of the 115 Percent Total Dissolved Gas Forebay Requirement. 2009. Washington State Department of Ecology and State of Oregon Department of Environmental Quality. Publication No. 09-10-002. p. 68 (hereinafter "AMT Evaluation").

salmonids. NOAA and Parametrix both concluded, at that time, that removing the 115% forebay TDG requirement would have negligible harmful effects on aquatic life.[12] Ecology, however, reached a different conclusion: while it recognized that any aquatic life living deeper than one meter would not be affected if TDG increased to 120 percent, Ecology concluded at that time that there was a potential for a small increase in impacts to aquatic life within one meter of the water surface.[13]

As NSIA and others pointed out in a subsequent petition to Ecology, a number of other studies supported a different conclusion. In addition, the information in some of the studies Ecology did consider may not have been fully addressed. For example, Ecology based its conclusion that invertebrates and other surface-dwelling aquatic life would be harmed by removal of the 115 percent forebay standard on the mortality rates found in experimental studies, and, in NSIA's view, did not give sufficient weight to field studies reaching contrary conclusions.[14] As multiple such field studies have noted, because TDG levels in captive fish can be substantially higher than levels found in the field, these experimental data can systematically overestimate the risk of GBT. NSIA urges Ecology to reconsider this information in light of the requirements applicable to this request for short-term modification discussed below. Such a review should lead Ecology to conclude that the short-term modification requested herein is appropriate.[15]

In addition, NSIA is also not aware of any anecdotal evidence that any non-salmonid aquatic biota have suffered harm from TDG levels above 125% even though these levels of TDG occur frequently in the lower Snake and lower Columbia rivers in the spring due to involuntary spill. This absence of data of harm suggests any non-salmonid biota that may be affected by higher levels of TDG are able to avoid these areas before adverse effects occur. In the absence of compelling new field evidence that the risks of higher levels of TDG, including 125 percent of saturation, are harmful to non-salmonid aquatic biota, the more robust evidence of the benefits to salmonids of increased spill as a result of a short-term modification of Ecology's TDG standards to 125 percent on a twelve-hour basis in the tailrace of each dams should lead Ecology to approve the short-term modification requested herein.

III. ALLOWING HIGHER LEVELS OF TDG WOULD ALSO BENEFIT OTHER SPECIES.

Salmon are not the only anadromous species migrating through the hydrosystem. Pacific lamprey (*Lampetra tridentata*) may also benefit from the short-term modification of the forebay and 120 percent tailrace TDG standards requested herein, a benefit to aquatic biota that Ecology may not have previously fully considered.

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[12] *Id*. at 59.
[13] *Id.*
[14] *Id.* at 46–47.
[15] *See, e.g.*, Ryan, Brad A., E.M. Dawley, & R.A. Nelson. 2000. Modeling the effects of supersaturated dissolved gas on resident aquatic biota in the main-stem Snake and Columbia Rivers. North American Fisheries Management 20:192–204.

Pacific lamprey have shown widespread decline since the 1960s in the Columbia River system due to habitat loss, water pollution, ocean conditions, and problems with dam passage.[16] Lamprey decline is of particular concern in the Northwest because of their importance to Native Americans' cultural heritage and tribal fisheries.[17] In fact, the lamprey's situation is perilous enough that the Oregon Natural Resources Council petitioned the USFWS to list the species under the Endangered Species Act in 2002. Although the USFWS denied the petition, claiming a lack of information, the USFWS has continued to voice concern over the status and distribution of Pacific lamprey.

NSIA recognizes that little information is available about precise juvenile lamprey survival benefits from increasing spill levels. However, it is highly likely that juvenile lamprey will benefit indirectly from increased spill. Juvenile lamprey are frequently impinged, and are injured or die, on the turbine intake screens meant to divert juvenile salmon into the bypass system; one study estimated a juvenile lamprey mortality rate of as high as 25 percent at dams with extended-length turbine intake screens.[18] When spill is reduced, more juvenile lamprey are forced through the screened bypass routes.[19] Indeed, the FPC has highlighted that reducing spill during spring lamprey migration:

> will be detrimental to lamprey, since elimination of spill will result in additional juvenile lamprey passage through screened power house bypass systems (Starke and Dalen 1995,1998; Moursand et al., 2000, 2001, 2002, 2003; Bleich and Moursand, 2006). Impingement of juvenile lamprey on turbine intake screens is a serious regional problem.[20]

Even if lamprey do not pass through the spillway, lamprey are less susceptible to injury or mortality from turbine passage compared with other, particularly larger, fish.[21] Moreover,

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[16] Close, D.A., M. Fitzpatrick, H. Li, B. Parker, D. Hatch & G. James. 1995. Status report of the Pacific lamprey (*Lampetra tridentata*) in the Columbia River Basin.

[17] *Id.*; *see also* Nez Perce, Umatilla, Yakama and Warm Springs Tribes. 2008. Tribal Pacific Lamprey Restoration Plan for the Columbia River Basin. Formal Draft, p. 4.

[18] CRITFC, Pacific Lamprey Passage Design, Project No. 2008-524-00. FY 2008-2009 F&W Program Accords (MOA) Proposal Review. pp. 10 – 11; *see also* BioAnalysts, Inc. 2000. A Status of Pacific Lamprey in the Mid-Columbia Region. Rocky Reach Hydroelectric Project. FERC Project No. 214, pp. 26–27.

[19] Fish Passage Center, "Review of the NOAA Transportation analyses and potential effects of reducing spill for fish passage in May and beginning the transportation program earlier in the spring and supporting analyses". Feb. 9, 2010. pp. 2, 10–12. Available online at: http://www.fpc.org/documents/memos/15-10.pdf.

[20] *Id.* at 10.

[21] Moursund, R.A., M.D. Bleich, K.D. Ham, and R.P. Mueller. 2003. Evaluation of the Effects of Extended Length Submerged Bar Screens on Migrating Juvenile Pacific Lamprey (*Lampetra tridentate*) at John Day Dam in 2002. Final Report prepared for the U.S. Army Corps of Engineers, Portland Oregon under Contract DE-AC06-76RL01830 at p. 4.3.

juvenile lamprey move downstream primarily at night, so increasing nighttime spill would increase juvenile lamprey dam passage when such passage is safest due to the closure of the bypass system. Additionally, if sufficient salmon pass via spill, allowing screens to be removed or lifted at some projects during parts of the year, lamprey mortality due to screen impingement could be reduced even further.

In addition, the increased spill allowed by the requested short-term modification of TDG standards would also provide immediate benefits for endangered Southern Resident Killer Whales. These whales rely on adult chinook salmon from the Columbia and Snake Rivers as an important prey resources at certain times of the year and these whales are nutritionally stressed. Whale scientists believe that increasing prey availability for these whales is crucial to halting and reversing their decline. In this context, allowing higher levels of TDG, and in turn higher levels of voluntary spring spill, will lead to higher juvenile survival and increased adult chinook return to the Columbia, especially spring/summer chinook, a priority prey resource for the whales.

In short, Ecology should also consider the potential benefits to both endangered Southern Resident Killer Whales and Pacific lamprey in deciding to modify TDG standards as requested.

IV. ECOLOGY SHOULD GRANT NSIA'S REQUEST FOR A SHORT-TERM MODIFICATION OF WAC 173-201A-200(1)(f)(ii).

In relevant part, WAC 173-201A-410 provides as follows:

> The criteria and special conditions established in WAC 173-201A-200 through 173-201A-260, 173-201A-320, 173-201A-602 and 173-201A-612 may be modified for a specific water body on a short-term basis (e.g., actual periods of nonattainment would generally be limited to hours or days rather than weeks or months) when necessary to accommodate essential activities, respond to emergencies, or to otherwise protect the public interest, even though such activities may result in a temporary reduction of water quality conditions.

(1) A short-term modification will:

(a) Be authorized in writing by the department, and conditioned, timed, and restricted in a manner that will minimize degradation of water quality, existing uses, and designated uses;

(b) Be valid for the duration of the activity requiring modification of the criteria and special conditions in WAC 173-201A-200 through 173-201A-260, 173-201A-602 or 173-201A-612, as determined by the department;

(c) Allow degradation of water quality if the degradation does not significantly interfere with or become injurious to existing or designated water uses or cause long-term harm to the environment; and

(d) In no way lessen or remove the proponent's obligations and liabilities under other

federal, state, and local rules and regulations.

(2) The department may authorize a longer duration where the activity is part of an ongoing or long-term operation and maintenance plan, integrated pest or noxious weed management plan, water body or watershed management plan, or restoration plan. Such a plan must be developed through a public involvement process consistent with the Administrative Procedure Act (chapter 34.05 RCW) and be in compliance with SEPA, chapter 43.21C RCW, in which case the standards may be modified for the duration of the plan, or for five years, whichever is less. Such long-term plans may be renewed by the department after providing for another opportunity for public and intergovernmental involvement and review.

The short-term modification of WAC 173-201A-200(1)(f)(ii) that NSIA requests in this letter meets these requirements.

First, consistent with the above requirements, NSIA requests a short-term modification for a period of approximately 120 days each year, at each of the eight lower Snake and lower Columbia river dams. The actual periods of higher and lower TDG (and spill) pursuant to the short-term modification at each dam would depend on the details of the annual Spring Fish Operation Plan (FOP) for these dams developed and adopted in collaboration with the State of Washington and other sovereigns by the relevant federal agencies each year. The short-term modification would, however, provide the flexibility for longer periods of spill to the higher 125 percent TDG level and other, shorter, periods of lower spill, likely during peak electricity demand hours. In addition, and in accordance with WAC 173-201A-410(2), the duration of the short-term modification would only be for the spring juvenile salmon migration season, which may run from about March 1 to about June 30 each year depending on the details of the Spring FOP, and the modification would only be in place for three years or until Ecology adopts any permanent modification of the requirements of WAC 173-201A-200(1)(f)(ii), whichever occurs sooner.

Second, the modification requested herein is necessary to accommodate the essential activity of securing beneficial dam passage conditions for migrating juvenile salmon and steelhead in the spring while also allowing appropriate hydropower generation. Most of the species that pass the dams and would be affected by the short-term modification have been listed as threatened or endangered under the Endangered Species Act for many years. As described above, increasingly robust scientific evidence indicates that increased spill, up to at least the levels NSIA seeks in this short-term modification, increases salmonid survival. For this reason, the short-term modification also is in the public interest.

Third, the short-term modification NSIA seeks is conditioned to minimize any degradation of water quality, existing uses, and designated uses in the affected waters. The modification would only apply during the spring juvenile salmonid migration season. During this time, TDG levels in the tailrace of each dam are often 125 percent or higher anyway, because of involuntary spill resulting from high spring runoff and low electricity demand. NSIA is not aware of any evidence that these annually occurring high levels of TDG—which vary from year to year depending on weather, snowpack and other factors—have significantly harmed water

quality or existing or designated uses. Accordingly, due to the frequent unavoidable exceedances of the current TDG standards, the short-term modification NSIA seeks would likely affect dam operations and TDG levels for a considerably shorter time than indicated by the terms of the proposed modification.

Fourth, the short-term modification NSIA seeks would not reduce or remove the Corps' responsibility to otherwise comply with Washington's water quality standards at all times not subject to the short-term modification or alter the Corps' obligations and responsibilities under other federal, state, or local rules and regulations. In fact, the short-term modification NSIA seeks may help facilitate dam operations over the next few years under a biological opinion developed pursuant to the federal Endangered Species Act in order to avoid jeopardy to species of salmon and steelhead that are protected by that Act.

CONCLUSION

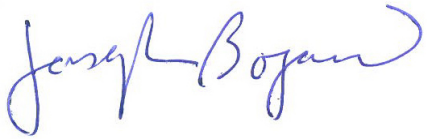
Voluntarily spilling water over the dams on the Snake and Columbia rivers during the spring juvenile migration season undeniably benefits salmon and steelhead. While spill can pose a risk to salmonids if TDG levels are too high, biological monitoring conducted over the last decade and more, as well as anecdotal evidence, demonstrates that tailrace TDG levels of 125 percent do not negatively impact migrating salmonids, resident fish, or invertebrates. By contrast, the TDG levels currently allowed under Washington's water quality standards unnecessarily limit the benefits of spill for juvenile salmon and steelhead migrating downstream in the spring.

For the reasons above, NSIA hereby requests that Ecology approve the short-term modification of WAC 173-201A-200(1)(f)(ii) requested herein under the provisions for such modifications set forth in WAC 173-201A-410(1) and (2), effective on or about March 1, 2019, for a period of three years or until Ecology permanently changes the TDG standards that apply to the lower Snake and lower Columbia rivers.

Respectfully submitted,

Liz Hamilton, Executive Director
Northwest Sportfishing Industry Association

Brett VandenHeuvel, Executive Director
Columbia Riverkeeper



Joseph Bogaard, Executive Director
Save Our Wild Salmon

cc: Richard Whitman