DEPARTMENT OF
ECOLOGY
State of Washington

Concise Explanatory Statement Chapter 173-201A WAC Water Quality Standards for Surface Waters of the State of Washington

Summary or Rulemaking and Response to Comments

December 2019

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Publication and Contact Information

This document is available on the Department of Ecology's website at:
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Concise Explanatory Statement Chapter 173-201A WAC Water Quality Standards for Surface Water Quality Standards

Summary of rulemaking and response to comments

Water Quality Program

Washington State Department of Ecology

Olympia, Washington

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Introduction

The purpose of a Concise Explanatory Statement is to:

- Meet the Administrative Procedure Act (APA) requirements for agencies to prepare a Concise Explanatory Statement (RCW 34.05.325).
- Provide reasons for adopting the rule.
- Describe any differences between the proposed rule and the adopted rule.
- Provide Ecology's response to public comments.
- This Concise Explanatory Statement provides information on The Washington State Department of Ecology's (Ecology) rule adoption for:

Title:	Water Quality Standards for Surface Waters of the State of Washington
WAC Chapter(s):	WAC 173-201A
Adopted date:	12/30/2019
Effective date:	01/29/2020

To see more information related to this rulemaking or other Ecology rulemakings please visit our website: https://ecology.wa.gov/About-us/How-we-operate/Laws-rules-rulemaking.

Reasons for Adopting the Rule

The Department of Ecology is amending Chapter 173-201A WAC, Water Quality Standards for Surface Waters of the State of Washington (SWQS) in several sections, as follows:

1. Amend the numeric criteria for total dissolved gas (TDG) in the Snake and Columbia rivers at WAC 173-201A-200(1)(f)(ii)

   This rule amendment is being adopted to improve fish passage for salmon and steelhead migrating downstream in the Snake and Columbia rivers. Dams release water through spillways over the dam and fish using the spillway have a better chance for survival compared to those that pass through the dams' turbines. However, spilling water also increases TDG that can negatively impact aquatic life. This rule amends the TDG limit to allow for greater water flow through spillways for improved salmon migration, while ensuring that TDG limits minimize negative impacts to aquatic life through sufficient biological monitoring. These amendments:

   - Provide a new adjusted TDG criteria that may be applied at dams that operate increased spills for the purpose of improving downstream juvenile salmon and steelhead migration in the Snake and Columbia rivers.
   - Establish biological thresholds that must be met to apply an adjusted criteria up to 125% TDG.

2. Remove two sub-sections in the fresh and marine water temperature criteria relating to an incremental temperature allowance from nonpoint source activities when the water is cooler than the assigned numeric criterion (WAC 173-201A-200(1)(c)(ii)(B) and WAC 173-201A-210(1)(c)(ii)(B)).

   Although these provisions for nonpoint temperature increases have been in the standards for decades, they have not been applied in Ecology's nonpoint protection program. The provisions may also conflict with our current antidegradation requirements that already prescribe a different temperature allowance when water is cooler than the assigned numeric criterion. For these reasons, Ecology agreed to remove these sub-sections of temperature criteria and is including the revision in this rulemaking to be compliant with a 2018 U.S. District Court Stipulated Order of Dismissal between NWEA, EPA, and Ecology.

3. Amend footnote 'dd' in WAC 173-201A-240(5), Table 240 to clarify that an adjustment of metals criteria (Water Effects Ratio) pursuant to this footnote requires EPA approval pursuant to 33 U.S.C. § 1313(c).

   Ecology agreed, in a 2018 U.S. District Court Stipulated Order of Dismissal between NWEA, EPA, and Ecology, to amend the footnote in Table 240 to clarify that adjustments to metals criteria requires EPA approval. The EPA previously indicated to Ecology that any efforts to revise metals criteria by developing water effects ratios would need to go through a separate rulemaking, which Ecology agreed to. This amendment would codify the agreed-upon intent of this footnote and would not change how the footnote is currently implemented.

4. Amend the aquatic life use designation descriptions for marine waters.

In a 2003 rulemaking to update the SWQS, the restructuring of aquatic life use designations descriptions resulted in an unintentional change that applied these use designations to cold water fisheries. This error was recently discovered when the City of Everett (City) petitioned Ecology to revise dissolved oxygen criteria for marine waters. The City pointed out the discrepancies in the marine use designation descriptions, and upon review, Ecology agreed that this was an unintended error and that the agency would correct in a future rulemaking. These amendments return the descriptions to their original intent and improve the ability for the public to apply the SWQS appropriately.

Chapter 173-201A WAC total dissolved gas criteria, temperature criteria, toxics criteria, and aquatic life use designations are different from federal criteria. Chapter 90.48.035 RCW provides clear and direct authority to the Washington State Department of Ecology's (Ecology) to revise the water quality standards. Additionally, 40 CFR 131.20 requires states and tribes (with primacy for clean water actions) to periodically review and update the Water Quality Standards.

Differences Between the Proposed Rule and Adopted Rule

RCW 34.05.325(6)(a)(ii) requires Ecology to describe the differences between the text of the proposed rule as published in the Washington State Register and the text of the rule as adopted, other than editing changes, stating the reasons for the differences.

There are some differences between the proposed rule filed on July 30, 2019 and the adopted rule filed on December 30, 2019. Ecology made these changes for all or some of the following reasons:

- In response to comments we received.
- To ensure clarity and consistency.
- To meet the intent of the authorizing statute.

The following content describes the changes and Ecology's reasons for making them.

Change to WAC 173-201A-200(1)(c)(ii)

We edited to retain the intent of the section as it applies to individual point source activities, in response to public comment.

Proposed rule language

(ii) When the background condition of the water is cooler than the criteria in Table 200 (1)(c), ~~((the allowable rate of warming up to, but not exceeding, the numeric criteria from human actions is restricted as follows:~~

~~(A)~~)) incremental temperature increases resulting from individual point source activities must not, at any time, exceed 28/(T+7) as measured at the edge of a mixing zone boundary (where "T" represents the background temperature as measured at a point or points unaffected by the discharge and representative of the highest ambient water temperature in the vicinity of the discharge)((~~; and~~

Final Rule Language

(ii) When the background condition of the water is cooler than the criteria in Table 200 (1)(c), ~~((the allowable rate of warming up to, but not exceeding, the numeric criteria from human actions is restricted as follows:~~

~~(A)~~)) incremental temperature increases resulting from individual point source activities must not exceed the numeric criteria and must not, at any time, exceed 28/(T+7) as measured at the edge of a mixing zone boundary (where "T" represents the background temperature as measured at a point or points unaffected by the discharge and representative of the highest ambient water temperature in the vicinity of the discharge)((~~; and~~

Change to WAC 173-201A-200(1)(f)(ii)

We made edits to the proposed rule language in response to public comments.

Proposed rule language

(ii) The TDG criteria may be adjusted to aid fish passage over hydroelectric dams ((~~when consistent with a department approved gas abatement plan. This plan must be accompanied by fisheries management and physical and biological monitoring plans~~)) spilling for anadromous juvenile fish passage as of the 2020 spill season.

Final Rule Language

(ii) The TDG criteria may be adjusted to aid fish passage over hydroelectric dams that ((~~when consistent with a department approved gas abatement plan. This plan must be accompanied by fisheries management and physical and biological monitoring plans~~)) spill~~ing~~ for anadromous juvenile fish ~~passage~~ as of the 2020 spill season.

Change to WAC 173-201A-200(1)(f)(ii)(B)

We made edits to the proposed rule language in response to public comments.

Proposed rule language

(B) To further aid fish passage during the spring spill season (generally from April through June), spill may be increased up to a maximum TDG saturation level of one hundred twenty-five percent calculated as an average of the two highest hourly TDG measures in a calendar day. This TDG criteria may be applied in place of (f)(ii)(A) of this subsection during spring spill operations when applied in accordance with the following conditions:

Final Rule Language

(B) To further aid fish passage during the spring spill season (generally from April through June), spill may be increased up to the following levels as measured at the tailrace fixed site monitoring location:

- a maximum TDG saturation level of one hundred twenty-five percent calculated as an average of the ~~two~~ twelve highest hourly TDG measures in a calendar day, and;
- ~~at the tailrace fixed site monitoring locations.~~ a maximum TDG saturation level of one hundred twenty-six percent calculated as an average of any two consecutive hourly TDG measures.

~~This~~ These TDG criteria may be applied in place of (f)(ii)(A) of this subsection during spring spill operations when applied in accordance with the following conditions:

Change to WAC 173-201A-200(1)(f)(ii)(B)(I)

We made edits to the proposed rule language in response to public comments.

Proposed rule language

(I) In addition to complying with the requirements of this chapter, the tailrace maximum TDG criteria applied at dams operated by the U.S, Army Corps of Engineers must be in accordance with legally valid Endangered Species Act consultation documents on Columbia River system operations, including operations for fish passage.

Final Rule Language

(I) In addition to complying with the requirements of this chapter, the tailrace maximum TDG criteria ~~applied~~ at hydropower dams ~~operated by the U.S. Army Corps of Engineers~~ shall be applied in accordance with ~~legally valid~~ Endangered Species Act consultation documents associated with spill operations on the Snake and Columbia ~~R~~rivers ~~system operations~~, including operations for fish passage. The Endangered Species Act consultation documents are those by which dams may legally operate during the time that the adjusted criteria in (f)(ii)(B) of this subsection are in use.

Change to WAC 173-201A-200(1)(f)(ii)(B)(II)

We made edits to the proposed rule language in response to public comments.

Proposed rule language

(II) Application of the tailrace maximum TDG criteria must be accompanied by a department approved biological monitoring plan designed to measure impacts of fish exposed to increased TDG conditions. Beginning in the year 2021, plans must include monitoring for nonsalmonid fish species and must continue for a minimum of five years, and thereafter as determined by the department.

Final Rule Language

(II) Application of the tailrace maximum TDG criteria must be accompanied by a department approved biological monitoring plan designed to measure impacts of fish exposed to increased TDG conditions throughout the spring spill season. Beginning in the year 2021, plans must include monitoring for nonsalmonid fish species and must continue for a minimum of five years, and thereafter as determined by the department.

Change to WAC 173-201A-200(1)(f)(ii)(B)(III)

We made edits to the proposed rule language in response to public comments.

Proposed rule language

(III) TDG must be reduced to allowances specified in (f)(ii)(A) of this subsection if the calculated incidence of gas bubble trauma in salmonids (with a minimum sample size of fifty fish required weekly) or nonsalmonids (with a minimum sample size of fifty fish required weekly) exceeds:

• Gas bubble trauma in nonpaired fins of fifteen percent; or

• Gas bubble trauma in nonpaired fins of five percent and gas bubbles occlude more than twenty-five percent of the surface area of the fin.

If gas bubble trauma exceeds these biological thresholds, additional monitoring must demonstrate the incidence of gas bubble trauma below biological thresholds before TDG can be adjusted to allowances specified in this subsection.

Final Rule Language

(III) TDG must be reduced to allowances specified in (f)(ii)(A) of this subsection if the calculated incidence of gas bubble trauma in salmonids (with a minimum sample size of fifty fish required weekly) or nonsalmonids (with a minimum sample size of fifty fish required weekly) exceeds:

• Gas bubble trauma in nonpaired fins of fifteen percent; or

• Gas bubble trauma in nonpaired fins of five percent and gas bubbles occlude more than twenty-five percent of the surface area of the fin.

If gas bubble trauma exceeds these biological thresholds, additional monitoring must demonstrate the incidence of gas bubble trauma below biological thresholds before TDG can be adjusted to allowances specified in this subsection. Gas bubble trauma monitoring data shall be excluded from comparison to biological thresholds when higher than normal river flow contributes to excess spill above the ability to meet (f)(ii)(B) of this subsection. This monitoring data exclusion shall apply for one full calendar day after reduced river flow allows attainment of subsection (f)(ii)(B).

Change to WAC 173-201A-210(1)(c)(ii)

We edited to retain the intent of the section as it applies to individual point source activities, in response to public comment.

Proposed rule language

(ii) When the natural condition of the water is cooler than the criteria in Table 210 (1)(c), ~~((the allowable rate of warming up to, but not exceeding, the numeric criteria from human actions is restricted as follows:~~

~~(A)~~)) incremental temperature increases resulting from individual point source activities must not, at any time, exceed 28/(T+7) as measured at the edge of a mixing zone boundary (where "T" represents the background temperature as measured at a point or points unaffected by the discharge and representative of the highest ambient water temperature in the vicinity of the discharge)((~~; and~~

Final rule Language

~~(ii) When the natural condition of the water is cooler than the criteria in Table 210 (1)(c), ((the allowable rate of warming up to, but not exceeding, the numeric criteria from human actions is restricted as follows:~~

~~(A)~~)) incremental temperature increases resulting from individual point source activities must not exceed the numeric criteria and must not, at any time, exceed 28/(T+7) as measured at the edge of a mixing zone boundary (where "T" represents the background temperature as measured at a point or points unaffected by the discharge and representative of the highest ambient water temperature in the vicinity of the discharge)((~~; and~~

List of Commenters and Response to Comments

Individual Comments Received	
Affiliation **Commenter Name**	**Page numbers where comment shows with related response**
(Action Agencies) Corps, Bonneville, Reclamation	*27, 37, 41, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 64, 66, 67, 69, 70, 71*
(Beckstead), Elizabeth	*77*
(Birch), Gerald	*24*
(Bluefish).org Levy, Scott	*35*, *36*
(Bogaard), Joseph	*21*, *27*, *30*
(Chelan County PUD) Erickson, Justin	*34, 36, 38, 54*
(Colton), Tim	*21, 77*
(Columbia Riverkeeper) *Johnson, Miles*	*28, 31, 64*
(Dal Porto), Danna	*24*
(Deen), Michael	*25, 29, 68*
(Defenders of Wildlife) (rehbiel, Robb	22, 33, 38, 39, 40, 64, 65
(Douglas County PUD) -Ivory, Gary	23, 34, 39, 40, 41, 42, 66, 67
(Everett) Public Works Department -Miller, James	*74, 75, 76, 78*
(Filardo), Margaret	*30, 31, 37, 44, 64*
(Fish Passage Center) -DeHart, Michele	*31, 42, 58, 62*
(Flynn), John	*22*, *28*
(Good Stefani), Giulia	*23, 24, 29, 33, 78*
(Grant County PUD) -Hendrick, Ross	*35, 36, 39, 40, 61, 65*
(Hamilton), Liz	*28*
(Holder), Lehman	*22, 24*
(Johnson), Miles	*22*
(Joint Customers) -PPC, PNGC Power, NRU	*25, 27, 36, 38, 41, 66, 67, 68*
(Jones), Tucker	*32, 63*
(Miller), Kurt	*25*, *28*
(Moran), Angela	*21*
(Nez Perce Tribe)	*22*, *27*, *31*, *44*, *45*, *68*, *73*

-Wheeler, Shannon F.	
(NOAA Fisheries) -Conder, Trevor	*34, 41, 59, 65, 72*
(Northwest Environmental Advocates) **-**Bell, Nina	*75, 76, 77*
(Northwest RiverPartners) -Miller, Kurt	*25, 27, 36, 68*
(NSIA) -Hamilton, Liz	*22, 28, 31, 42*
(Orca Salmon Alliance) -Good Stefani, Giulia	*28, 32*
(Oregon DFW) -Jones, Tucker	*22, 28, 32, 65, 69*
(Port of Seattle) -Cox, Sara	*75*
(Roh), Marian	*77*
(Salakory), Rudy	*22*
(Save Our Wild Salmon Coalition) -Bogaard, Joseph	*28, 32, 34, 41, 42, 59, 60*
(Seattle City Light) -Best, Lynn	*25, 42, 43, 60, 66*
(US EPA) -Guzzo, Lindsay	*75*
(Vermeeren), Dirk	22

Multiple Commenters using Similar Comment Language

	Page numbers of comment/response for Form Letter
(Form Letter A – Multiple Commenters)[1]	*23, 24, 29, 33*
(Form Letter B – Multiple Commenters)[2]	*23, 24, 29*

[1] Individual names of people who submitted Form Letter A comments are included below under Multiple Commenters (Form Letter A – Multiple Commenters).
[2] Individual names of people who submitted Form Letter B comments are included below under Multiple Commenters (Form Letter B – Multiple Commenters).

Multiple Commenters using Similar Comment Language

(Form Letter A – Multiple Commenters)

Adams, Marsha
Adams, Jenny
Aegerter, Bob
Aiello, Claire
Albert, Kathy
Albright, Gary
Aldrich, Marcia
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Willson, Kevin

Wilson, Sandra Fuller

Winger, Michael

Wisel, Cathy

Witt, Diane

Wood, Sylvia

Woodbridge, Jennifer

Woodfield, Marion

Woods, Nikki

Wright, Lisa

Wyatt, Jennifer

Wynne, Janet

Young, William

Yudkovsky, Natalya

Zeff, Barbara

Zeigler, Bob

Zickefoose, Jessica

Ziebarth, Victoria

Zimmer, Cheryn

Zockoll, Peter

Zontek, Ken

(Form Letter B – Multiple Commenters)

Adams, James
Adams, Catherine
Agard, Lisa
Albright, Gary
Alexander, Donna
Anderson, Sharon
Anderson, James
Arbess, Saul
Ashley, Mark
Ashley, Judith
Atkins, Gail
Attemann, Rein
Aymond, Laura
B, Shary
Bahr, Dennis
Baird, Chrystal
Baker, Norman
Ballew, Louann
Baltin, Brian
Bancroft, Deborah
Barnes, Noel
Barnett, Tod
Bartlett, Tina
Bates, James
Baum, M
Becker, Ralph
Benedict, Derek
Bensinger, Irene
Benson, Paul
Bentzel, Jen
Bergner, Richard
Berlin, Sharon
Berlow, David
Betourne, Susan
Bhakti, Sara
Bigelow, Paul
Bisset, Diane
Blackwood, Barbara
Blair, Wendy
Blitzer, Mark
Bogan-Kirk, Sally
Boguske, Matthew
Bonfield, Barbara
Bordelon, Tika
Boreen, Jai
Bradley, Mark
Brainard, Stacy
Brandt, Carol
Breckenridge, Nancy
Britton, Craig
Brix, Vicki
Brock, Barbara
Brown, Tina
Bruno, Raemie
Buchan, William
Burton, Patricia
Bussing, Lenore
Byrnes, Coleman
Campbell, Carrie
Canright, Rebecca
Capan, Cigdem
Carlson, Joel
Carman, MS
Carodiskey-Wiebe, Jenna
Carroll, Linda
Carter-DuBois, Sally
Cassato, Candice
Castle, Victoria
Chiu, Kevin
Christ, M'lou
Christensen, Carrie
Clark, Aaron
Cohen, Judith
Colangelo, Annapoorne
Colgan, Joseph
Collins, Randall
Colony, Stephanie
Compton, Pete
Conrad, Norm
Cook, Karen
Cooper, Ying
Cordero, David
Cormier, Mary
Corpus, Robert
Couture, Ray
Cowan, Keith
Cox, Thomas
Cox, Lanie
Crimbring, William
Croasdale, Kathlene
Cronin, James
Cross, Anne
Crowley, Marty
Crystal, Lakota
Culbert, Laurette
Daggett, Johanna
Dague, Michael
Dale, Felicia
Davidson, Heather
Davis, Beth
Davis, Connie
Davis, Candace
Davis, Meredy
Dawson, Patricia
Day, Denise
DeBolt, Eric
DeMaris, C
Denton, Gregory
Devliln, Felicity
Dickinson, Amanda
DiGiacomo, Ron
Dils, Laurie
Dodge, Tiffany
Dong, Diane
Dryja, Sherry
Dudley, William
Durnell, Tim
Eckels, Alison
Edmison, Sean
Eggers, K
Ehle, Lisa
Ehler, Noah
Elledge, Vicki
Ellenberger, Charles
Ellingham, Nancy
Ellison, Pat

Elohim, Shemayim
Emerson, Lynn
Engler, Pam
Englund, Klaudia
Erickson, Lynda
Erickson, Linda
Ericson, Hilarie
Espe, Greg
Evans, Coleman
Faber, Hilke
Falcon, Ruth
Falk, Diane
Fanestil, Abigail
Farhoud, Aisha
Farrant, Roy
Fasnacht, Sharon
Faste, Andrea
Feit, James
Feit, James
Feldman, Maxwell
Feletar, Linda
Ferraris, Alfred
Fetter, Sharon
Finch, Carolyn
Fink, Charles
Flank, Joel
Flesher, Erika
Fortier, Karen
Fortman, Scott
Foster, Becky
Franko, Glenn
Franks, Larry
Fravel, Maris
Freeman, Rhonda
Freitag, L
French, Nina
Frisbie, Sasha
Fristoe, Barbara
Frye, Dr
Futterman, Sanja
Gairaud-Hinkley, Victoria
Gale, Maradel
Gandolfo, Deborah
Garbi, Sam
Gardner, Joy
Gardner, Joy
Gehri-Bergman, Sandra
Gentz, William
Gerecke, Harry
Gerell, Sherril
Gero, Bernadette
Gigliotti, Robert
Gindt, Jennifer
Gish, Edith
Gleim, Nancy
Gogic, Laurie
Goodwin, Greg
Gordon, Eve
Gould, Yvette
Grajczyk, Joyce
Grassl, Richard
Gray, Susan
Green, Catherine
Gregory, Barbara
Groepper, Cindy
Guillory, Chris
Gunn, Gerri
Gyncild, Brie
H, Carole
Hagen-Lukens, Deborah
Haley, Stacia
Hall, Victoria
Hamer, Suzanne
Hamilton, Aimee
Hance, Judith
Hansen, Nola
Hansen, Amy
Hanson, Lois
Harmell, Jack
Harper, Gwendolyn
Hartmann, Lorraine
Hartsell, Paula
Harvey, Jo
Hathaway, Nancy
Hauksdottir, Anna
Heavyrunner, Mia
Hedger, Lloyd
Heidel, Ed
Heller, Brent
Heller, Margie
Hemphill, Patricia
Hendrickson, Thomas
Henry, Carole
Hensley, Douglas
Hepfer, Anne
Hernandez, Richard
Heron, Carrie
Herzberg, Greg
Hickey, Jennifer
Highland, Patti
Hill, Michael
Hiller, Carol
Hills, Jim
Hirst, David
Hodson, Sally
Hooper, Ruth
Houghton, Abigail
Houston, Carol
Howard-Lloyd, Kim
Howe, Jared
Huang, Virginia
Hughes, Kevin
Hungerford, Chasity
Hunner, Walter
Hurt, Wesley
Husser, Norman
Iluna, Mana
Jackson, Dean
James, Virginia
Jamieson, Robert
Jamison, Vanessa
Jarrard, Sue
Jeter, Randal
Johansen, Penelope
Johnson, Lorraine
Johnson, Angeline
Johnston, Darlene
Jones, Kaija
Kahn, Onie
Keefer, Kelly

Kelly, Joanne
Kelly, Danielle
Kemp, Kindy
Kennedy, Cathy
Kenoyer, Melanie
Kildall, William
Klein, Charna
Klooster, Kristen
Klunder, Christine
Knoll, Chris
Knoth, Lorrie
Korneliussen, Vivian
Lackland, Edith
Lague, Rich
Lambert, John
Lambert, John
Lambros, Kathryn
Lane, Barbra
Larsen, Jennifer
Larson, Gary
Lasuk, Tanya
Leavitt, Jane
Lee, Kathleen
Lengel, Elizabeth
Lennon, Matthew
Levine, Adam
leviten, alisha
Lewis, Nancy
Leyda, Denise
Libbey, Thomas
Lindberg, Robert
Link-New, Virgene
Liska, Collum
Livingston, Ken
Lockwood, George
Loehlein, Ken
Loeser, Karen
Loomis, Susan
Lorey, Jeanene
Loynd, Kylie
Ludden, david
MacDonald, Susan
MacGuire, Mike
Madrid, Storie
Madsen, Ellen
Magallon, Andrew
Magana, Maria
Mager, Melissa
Mahlis, Larry
Maki, Linda
Mann, Danelle
Mann, Billie
Manning, Joseph
Marchand, Megan
Markley, Shannon
Marks, Diane
Marquart, Frances
Masters, Mary
McCarter, Earl
McClintock, Gloria
Mccullough, Serena
McDonough, Rebecca
McGunagle, William
McLaughlin, Julia
McMahon, Nancy
McMillen, Joanne
McNeil, Mona
McRae, Susan
Michaels, Brenda
Michaels, Megan
Miller, Nancy
Miller, Sharon
Mizuki, Michelle
Moore, Ben
Moore, Larisa
Morency, Claire
Mortinson, Shelley
Mulcare, James
Mullein, Tui
Musgrave, Lee
N, Melodie
Nagyfy, Desiree
Neary, Sally
Nedeff, Elizabeth
Nielsen, Diana
Nolasco, Chris
Nordby, Pat
Norris, Gordon
Norvell, Chelsea
Obert, Leonard
O'Connell, Mary-Margaret
Odell, Brian
O'Donnell, J
O'Grady, William
O'Halloran, Dr
Onufer, Jerome
Opalinski, Carol
Osmun, Richard
Ostrander, Lucy
Papadakis, Lara
Pape, Robyn
Parhar, Pawiter
Pariseau, Julie
Parriott, Maureen
Parshall, Sharon
Parsley, Adina
Patterson, Roni
Pauley, Jean
Pavcovich, Michelle
Payton, Fay
Payton, Fay
Penchoen, Gregory
Perkins, Sandra
Peskind, Art
Petersen, Sherry
Phillips, Cheryldene
Pierot, Dave
Pinc, Michael
Platt, Amy
Popik, Lezlie
Porter, Jennifer
Potts, Paul
Powers, Jessica
Price, Carol
Pslmrt, Judy
Puff, Sally
Quackenbush, Nancy
Quackenbush, Nancy
Rabenstein, Lynn

Radmer, Elaine
Rall, Ben
Ray, Rene
Reading, Toniann
Reed, David
Rees, Melissa
Reich, Bianca
Reilly, Linda
Richman, Dore
Riddle, Charles
Riley, Mary
Riordan, Janet
Robert, Leon
Roberts, Jim
Robeson, Ernest
Robinson, Robby
Robinson, Russell
Rogers, Don
Romero, Joseph
Rooney, Sue
Rose, Diane
Rueckel, James
Ruhl, Kathy
Rumiantseva, Elena
Russell, Sandra
Russell, Wanda
Russell, Mark
Ryan, Kathryn
Saarinen, Tamara
Sanchez, Emiliano
Sandvig, Daniel
Sarnoski, Michelle
Saunders, Michael
Scavezze, Barbara
Schneider, Dan
schuyler, linda
Schwab, Judith
Schwinger, Francis
Scott, Mark
Seater, Kim
Severtson, Laurence
Seward, MaryAnn
Seymour, Marilee
Shapiro, Steve
Shaver, Donna
Shia, Karris
Shouse, Susan
Showell, Sada
Shurgot, Michael
Siptroth, Michael
Skantze, Vanessa
Skerlec, Ernetta
Smith, Sandra
Smith, Betty
Sneiderwine, William
Snyder, Dan
Song, Emma
Sosin-Rocha, Madeleine
Spagnoli, Cathy
Spear, Debbie
Speed, Andrea
Springer, John
Sprute, Mary
Staats, Alycia
Stanley, Carol
Stansfield, Jack
Starbuck, Judith
Steinke, Alona
Stepp, Michelle
Stevens, Bradley
Stiffler, Tonya
Stocks, Lawrence
Stohlman, Julie
Stone, Judith
Street, Kergan
Studley, Linda
Sugarman, David
Sullivan, Diane
Sutherland, Dolly
Sutor, Molly
Swanson, Angela
Swanson, Doug
Swoffer, Thomas
Szper, Rebecca
Tandoo, James
Tate, Caryn
Taylor, Polly
Taylor, Karla
Taylor, Ron
Taylor, Ron
Teraberry, Kimberly
Thiel, Susan
Thomasson, Gary
Thompson, Mike
Thompson, John
Thompson, TJ
Thomsen, Don
Thorn, Debbie
Treadway, Carolyn
Trimble, Nathan
Tullai, Patrice
Tyson, Carole
Urias, Victoria
Utigard, Caryl
Uyenishi, Steve
Uzuner, Selim
Van Alyne, Emily
Vatne, Sharon
Vaughan, Carolyn
Vital, Sybille
Vossler, Susan
Walchenbach, Peter
Wallace, Nadine
Wallace, Nadine
Wallblom, Charlie
Warming, Patricia
Warner, Cherie
We, Barbara
Webster, Frederic
Weinstein, Elyette
Weinstein, Diane
Weir, Thomas
Weisel, Jan
Weiss, Paul
Weiss, Elizabeth
Wendler, Dorothy
Wesley, James
Westra, Jennifer
Wheeler, Kathleen

White, Nancy
White, Virginia
White, Virginia
White, Elizabeth
Whitehurst, Carol
Wight, Barbara
Wilfing, Janice
Wilkins, Mary
Williams, John
Williams, James
Williams, Don
Williams, Morris
Willis, Peggy
Willms, Thomas
Willoughby, Emily
Wilson, Patricia
Wilson, John
Wilson, Steve
Wilson, Sandra
Wineman, Marian
Wolf, Deborah
Wollman, Jill
Woo, Vickie
Wood, R
Wright, Linda
Wright, Teri
Yang, Alice
Yost, Barb
Zarrell, Vicki
Zhuo, Cindy
Zickefoose, Jessica
Zimdars, Eric
Zimmer, Cheryn

Organization of Comments and Responses

Comments and Responses are grouped together and organized by topic. Under each topic heading you can see all the comments Washington State Department of Ecology received for that topic followed by Washington State Department of Ecology's single response to all the similar comments on that topic.

Washington State Department of Ecology used the following topics to group similar comments together:

Total Dissolved Gas (TDG) 125% Rulemaking Comments

- Support for 125% rulemaking
- Support Orca and salmon recovery
- 125% TDG rule should not be permanent
- Concerns about TDG 125% 2 hour averaging
- Draft "legally valid" language
- Specific comments on TDG rule language changes

Other Considerations for Proposed TDG Rule Changes

- Removing the 115% forebay criteria
- The need to base rule decisions on science
- Support for aligning with Oregon
- Specific comments related to Mid-Columbia dam operations

Draft Environmental Impact Statement Comments

- Comments on EIS Alternative 4
- EIS-Use of Comparative Survival Study
- Specific comments on EIS document language

Rule Implementation Plan and Biological Monitoring

- Biological monitoring for Gas Bubble Trauma (GBT)
- Number of samples for GBT monitoring
- Sample count locations in Implementation Plan
- Costs of new GBT Monitoring
- The need to monitor adult fish
- Accounting for involuntary spill
- Specific comments on Rule Implementation Plan

Comments on Preliminary Regulatory Analysis

Other rulemaking comments:

- Deleting Temperature provisions
- Clarification of Toxics footnote 'dd'
- Clarifying Marine Use definitions
- Other Miscellaneous comments

Comments and Responses

Comments are verbatim excerpts from comments received except for slight variations for readability or minor grammar edits. To see the full length comments we received visit http://ws.ecology.commentinput.com/comment/extra?id=EHijZ.

Similar comments have been grouped together under each topic. All similar comments on a topic are listed first, followed by one response from the Department of Ecology. Specific comments that are individual and do not fall under a group topic are responded to directly under the specific comment.

Total Dissolved Gas (TDG) 125% Rulemaking Comments

Comments on support for 125% rulemaking

(Bogaard) While bigger changes are urgently needed to truly protect and recover wild salmon and steelhead populations and the benefits they deliver to our region, increasing the TDG water quality standard to 125% is a critical near-term action in order to allow expanded spill and to increase juvenile salmon survival and adult returns in the next several years.

(Bogaard) We strongly support a rule change by the Department of Ecology in time for the spring 2020 juvenile salmon and steelhead migration that allows total dissolved gas at 125%. We request that the Department finalize this rulemaking adjusting allowable total dissolved gas to 125% for the Columbia and Snake rivers this fall or in time for the 2020 migration on a permanent and year reason round basis.

(Colton) I am in favor of amending the rule to allow for increased spill and TDG at lower Columbia and Snake River dams in order to improve juvenile fish passage in the spring.

(Flynn) I support Alternative #3, in the Draft Environmental Impact Statement that provides for a 125% total dissolved gas standard. This standard should be set so it can be employed any time during the year as need may dictate and with no conditions attached. This action must be in place for the 2020 juvenile out-migration season in order to better support salmon survival and more adult salmon returns. I oppose alternatives 1, 2 and 4 which are temporary and too restrictive.

(Flynn) I encourage the Department of Ecology to adopt this rule change in Washington Water Quality Standards to increase the Total Dissolved Gas Standards to 125% for the lower Snake and Columbia River dams. I believe that increasing spill over dam spillways would significantly improve the survival rate of out migrating salmonids with the anticipated benefit of increased adult returns.

(Flynn) I am here today in support of increased spill volumes to facilitate outmigrating salmon and steelhead in their perilous journey down the Snake and Columbia River. Increased spill volumes would serve multiple benefits to outmigrating smolts. It would reduce the number of powerhouse encounters and reduce mortality rates. It would increase currents through the stock water reservoirs behind the dams, improving travel rates and decreased predation on juvenile smolts. It would decrease the water temperatures through the reservoir created by the dams to improve survival rates. I encourage the Department of Ecology to adopt this rule change in Washington water quality standards to increase the total dissolved gas standards to 125% for lower Snake and Columbia River dams.

(Moran) Adjusting the Total Dissolved Gas allowance to 125% to increase spill over the dams would provide significant benefits to Chinook salmon, and therefore increase the prey available to the Southern Resident orca. Although increasing spill levels does not come without its risks to salmon, these have been deeply analyzed and the benefits of spill have been found to greatly outweigh them. I am in

favor of this ruling for the protection of orca, salmon, and the communities that are dependent upon them.

(Vermeeren) I support the Washington Department of Ecology's proposed water quality rule on dissolved gas in the Columbia and Snake rivers. The new rule will allow more water over the dams and create better conditions for baby salmon. I appreciate your leadership on this important issue and your Department's work to restore salmon, orcas, and salmon fishing!

(Nez Perce Tribe) The Tribe is among those who have requested a modification to Ecology's water quality criteria to provide for voluntary spill of up to 125% TDG. The Tribe is supportive of the proposed rule, so long as three refinements necessary to increase precision and avoid confusion are incorporated, as suggested in the letter.

(Defenders of Wildlife) Increasing the water spilled over dams in the Columbia Basin is one of the few actions the state can take that will increase salmon available to orcas in the near-term. Alternative three, Ecology's preferred alternative, would allow all eight dams on the lower Columbia and Snake Rivers to spill up to 125% TDG. We urge Ecology to adopt an amended and strengthened alternative three to provide important near-term relief for orcas.

(Douglas County PUD) Given the plethora of data that Douglas PUD has collected over the years, coupled with field data collected at other hydroelectric projects, we believe that the proposed adjusted TDG standards should not result in consequential biological impacts to migrating salmonids. Further, having more fish travel through spill routes at U.S. Army Corps and at non-federal projects will likely reduce the percentage of fish that use turbine routes at these facilities. Taken together, the biological information collected to date is supportive of Ecology modifying WAC as proposed.

(NSIA) We appreciate the work of Ecology leadership and staff to adjust the standard to 125% TDG to benefit outmigrants, which will lead to greater abundance of adult returns.

(Oregon DFW) The Oregon Department of Fish and Wildlife submits these written comments in response to the State of Washington' s proposed rule amending the total dissolved gas (TDG) criteria in portions of the Snake and Columbia rivers. This amendment is vital for the successful implementation of the Columbia River Flexible Spill and Power Agreement (Agreement) supported by all regional, state, tribal, and federal management partners.

(Holder) Water spills over dams stay at about 125%, it's very positive at ensuring safer upmigration of juvenile salmon and other species by directing them away from turbines at dams. Higher levels of TDG, 130% or above result in negative impacts such as gas bubble disease, much like a diver getting the bins. Lower levels of TDG, 110 to 115%, do not provide enough flow to pull salmon away from turbines; 125% TDG, the currently standard being proposed, is good and is supported by Sierra Club.

(Salakory) I'm here to support the proposed revisions to total dissolved gas criteria in the Snake and Columbia Rivers so that the flexible spill agreement can be moved forward as part of the longer timeline here. We have an opportunity here to move through in a quick time fashion of a way to increase juvenile smolt survival on the Columbia River that's not going to take years to decades. While concurrently I keep doing the work that I'm doing. These proposed rule changes will give us a chance to increase smolt survival on a much shorter timeframe.

(Johnson) I'm here today because more spill is going to mean better survival for juvenile fish through the system. And better fish returns as adults. What we need to do right now is take bold action to correct the trajectory that Snake River and Columbia River salmon and steelhead are on. The levels of spill that we're contemplating simply do not produce meaningful population level problems for juvenile salmon and steelhead. What is meaningful at a population level is increasing the amount of spill going through

the system. This is a baby step. It's a necessary first step. We support what Ecology is doing here. But at the same time it's difficult to watch Ecology take a half step towards what we need to do while tying that to things like the sufficiency of the BiOp consultation or a short duration of monitoring for spill like just two hours out of the day.

(Good Stefani) I am in full support of raising the total dissolved gas limits to 125. You know, short of lower Snake River dam breaching, that is the alternative that has been shown to have -- through decades of empirical evidence, through the CSS studies, to have the greatest impact on outmigrating juvenile salmon survival.

(Form Letter A – Multiple Commenters) I strongly support Alternative #3 with its language amended as noted below. I oppose all other Alternatives 1, 2 and 4. I strongly support Alternative #3 to allow TDG levels up to 125% of saturation in the tail race of each of the eight dams on the lower Snake and lower Columbia Rivers beginning in 2020 provided, however, that Ecology make two modifications.

(Form Letter B – Multiple Commenters) I support Alternative #3, in the Draft Environmental Impact Statement that provides for a 125% total dissolved gas standard. This standard should be set so it can be employed any time during the year as need may dictate and with no conditions attached. This action must be place for the 2020 juvenile out-migration season in order to better support salmon survival and more adult salmon returns. I oppose alternatives 1, 2 and 4 which are temporary and too restrictive. I urge the Department of Ecology to adopt this as a permanent, year-around standard that can be safely implemented on a 24/7 basis during the juvenile salmon migration season.

Response to support for 125% rulemaking

We appreciate your support for this rulemaking to provide additional adjustments to TDG levels in the Snake and Columbia rivers in order to improve fish passage for downstream migrating salmon and steelhead during the spring spill season.

We understand there are concerns regarding the conditions surrounding the utilization of the TDG criteria up to 125% (12 hour) average. Particular conditions are included in the final rule language to satisfy a number of requirements. This rule is restricted to spring spill season because the majority of juvenile salmonids are outmigrating to the ocean at this time. During spring, there are large inputs of water available for spill. The spring period represents the best available time to maximize fish passage past hydropower projects. During the summer, the lower adjusted TDG levels (115% forebay/120% tailrace/125% maximum) are applicable for fish spill.

Biological monitoring for gas bubble trauma is necessary to ensure the protection of aquatic life that may be exposed to elevated TDG levels during spill. As part of the EPA approval process, an assessment will be made on aquatic life protection. Monitoring is vital to the EPA approval process as it acts as a safety net to ensure both salmonids and non-salmonids are being protected during spill season. We are using the National Oceanic and Atmospheric Administration biological thresholds for the gas bubble trauma. These biological thresholds for gas bubble trauma are considered adequate to protect salmonids and if exceeded, will require reduced spill levels.

The utilization of the TDG criteria up to 125% average in the Snake and Columbia rivers will be dependent on also adhering to Endangered Species Act requirements for spill as a limiting and necessary component to protect endangered salmonids.

Comments on support Orca and salmon recovery

(Birch) This might sound crazy, but I think to help the Orcas we humans need to cut back on eating wild salmon. If everyone cutback on the eating of salmon I think the salmon population would increase dramatically over time.

(Dal Porto) As recommended, the adjustment of flow downstream at critical times will help move salmon and steelhead juveniles on their trip to the Pacific. I am very alarmed that individuals are opposing these efforts to help salmon recovery. The salmonids have no options except the altered and damaged river systems. No one should be proud of their efforts to cause the extinction of an important cultural symbol and valuable food source. I support the adjustment of regulations to facilitate salmon migration.

(Holder) None of us want to see Southern Resident Orcas disappear. They are an iconic species in the Northwest, and they need our help. Your support of 125% TDG would be a very positive step in insuring their survival, by helping juvenile salmon reach the ocean safely. 24,000 Sierra Club members in Washington state ask you to take that step.

(Good Stefani) I'll just end by saying that I recognize spill is a small step in the right direction. I think this is an important step to take. I encourage Washington to work with Oregon and all of the other stakeholders to maximize outmigration salmon survival. And that that should be the first consideration here above all others.

(Form Letter A – Multiple Commenters) I believe that we must restore the abundant Chinook salmon populations in the Snake River and Columbia River Basin. This is an especially urgent need in order to help the Southern Resident orcas survive and recover. Rebuilding these salmon runs will also benefit tribal and non-tribal fishing communities across Washington State and the Pacific Northwest. I support the Department of Ecology proposal to change its water quality standards for total dissolved gas (TDG) to allow TDG up to 125% in the tailrace of dams on the Columbia and Snake Rivers on a permanent and year-round basis. I agree with the immediate need to get this in place in time for the Spring 2020 juvenile out-migration to the Pacific Ocean. Increasing the TDG water quality standard to 125% is a critical near-term action in order to allow expanded spill and to increase juvenile salmon survival and adult returns in the next several years.

(Form Letter B – Multiple Commenters) I believe that we must restore the Snake River and its abundant Chinook salmon for the Southern Resident orca to survive and recover. Restoring these salmon runs also benefit sport, commercial and tribal fishing and the economies and communities they support. Salmon need more spill now! Spill is an essential near-term action to benefit salmon and orca while we work on stronger long-term actions to recover our wild salmon and steelhead. Restoring abundant salmon runs is essential for our critically-endangered Southern Resident orcas.

Response to support Orca and salmon recovery

We appreciate your support for this rulemaking to provide additional adjustments to TDG levels in the Snake and Columbia rivers to improve fish passage for downstream migrating salmon and steelhead.

Comments on 125% TDG rule should not be permanent

(Joint Customers) There remains significant uncertainty regarding the biological impacts of extended operation at 125% TDG. The record developed in this proposed rulemaking does not convincingly address Washington's own prior conclusions and, if challenged, is not likely to support a legally-defensible permanent rule change.

***(Northwest RiverPartners*)** Revisions should take into consideration Ecology's findings from its 2009 TDG evaluation. Any changes in TDG standards should be based well supported science. If Ecology is not aware of new information or science that causes it to change its previous conclusion, then Ecology should consider a temporary rule waiver, instead of a change in the permanent rule to reduce the risk to aquatic life, until additional data become available.

(Seattle City Light) Seattle City Light does not support a permanent rule change at this time. We encourage Ecology to continue with the initially envisioned three-year FSA to resolve significant uncertainties associated with the impacts of high TDG from increased spill. The lessons to be learned from this period of flexible spill should provide the guidance for appropriate policy implementation in the future, including a potential permanent rule change. The permanent rule change currently considered brings too many uncertainties associated with a high risk of harm and narrow margin of safety.

(Miller) Also, we believe that it's important to acknowledge that these higher spill levels really do need to be tested before being made permanent. Ecology's own 2009 findings indicated spill above 115% has a detrimental effect on aquatic life. This is the first year we have seen months of sustained spill at the level of 120%. And it will literally take years to determine what the effect of that has been on the overall salmon survival. As a result, we encourage this process actually to look more at a temporary waiver process than a permanent process. But in lieu of that, again, it becomes very critical that it is tied to a legally valid ESA consultation. And lastly we would just like to note that the Governor Inslee's Task Force suggested this as a test to help determine what the best available science was. And that was noted in Page 5 of the EIS document.

(Deen) As it's been discussed previously a key basis of this proposed rule change is the 2019 to 2021 flexible spill agreement. With the goal of finding creative solutions to support benefits for endangered species as well as carbon-free generation from the Federal hydro system and as a bridge during the completion of the Columbia River system operation process. So I would like to briefly touch on three key areas here. One is the temporal scope of the rule change. We believe that should be linked to the underlying flexible spill agreement as a mechanism to not get ahead of the ongoing CRSO process, which we believe is the appropriate venue for consideration of long-term mitigation strategy, including spill levels.

Response to 125% TDG rule should not be permanent

We agree that there is uncertainty associated with biological impacts at sustained TDG levels of 125% average for some aquatic life. In a historical analysis of data collected by the Fish Passage Center from 1995-2018, the 15% gas bubble trauma criterion has been exceeded in only 37 instances of 2,870 samples and 28 of those instances occurred when TDG was greater than

125%. The risk of TDG levels up to 125% TDG is considered relatively low for salmonids when considering depth compensation and in situ data. That said, monitoring for salmonids will continue as done in previous years to assess impacts of elevated TDG levels. In addition to salmonid monitoring, the application of a 125% (12 hour)/126% (2 hour) TDG criteria will now require biological monitoring for non-salmonids for the purpose of assessing biological impacts at higher TDG levels than previous allowed. This condition is required to ensure aquatic life protection for all fish species. In instances where biological thresholds are exceeded, spill will need to be reduced.

A temporary waiver is a tool that Oregon has written into their water quality standards and was approved by EPA that allows them to temporarily modify TDG criteria for fish spill. Washington does not have such a tool in our water quality standards. Washington previously used a short-term modification to modify the 115% forebay criterion in the Snake and Columbia rivers. However, the short-term modification tool is not applicable to the 125% average TDG level because it is limited to scenarios when "[d]egradation of the water quality if the degradation does no significantly interfere with or become injurious to existing or designated water uses or cause long-term harm to the environment." We cannot support a determination that the 125% TDG average does not significantly interfere or become injurious to aquatic life species in the Snake and Columbia rivers because we have not allowed fish spill to these levels previously and do not have sufficient data for relevant fish species for long durations at this level of TDG. The Environmental Impact Statement for this rule highlights data gaps on the impacts of TDG levels up to 125% for some species. To address uncertainties in the science, Ecology is requiring the approval and implementation of a biological monitoring plan. The short-term modification was appropriate for the removal of the 115% forebay criterion because TDG levels were restricted by the already existing 120% average tailrace and the 125% hourly maximum criteria. The rule to remove both the 115% forebay and 120% tailrace criterion and set a 125% (12 hour)/126% (2 hour) tailrace criterion allows for higher TDG levels than previously allowed in the water quality standards, thereby precluding the allowance of a short-term modification.

A temporarily TDG rule or a rule with a sunset date is not appropriate for modifying TDG levels to 125% because the EPA approval process determines whether this rule is protective of all aquatic life. If that determination is made, and the rule is determined to be protective of aquatic life, then there is no need for a sunset. Also, a formal rule change is intended to be set to protect aquatic life, not to simply mirror a regional agreement; one that includes consideration for economic impacts, which is not the basis for this TDG criteria. The flexible spill agreement is an economically based spill regime that balances fish and hydropower benefits. The water quality standards, under the Clean Water Act, set water quality standards based on aquatic life protection. The seasonal TDG criteria during spill season on the Snake and Columbia rivers are intended to benefit downstream fish passage while minimizing impacts to other aquatic life. This adjusted TDG allowance is in place to mitigate impacts of the hydropower projects.

The adopted rule coincides with the Orca Task Force recommended to test different spill levels to determine the best available science surrounding fish passage and biological impacts. The adopted rule allows for TDG levels up to 125% (12 hour)/126% (2 hour) but does not compel hydropower operators to spill to a maximum of 125% (12 hour)/126% (2 hour). Spill levels may be less than 125% if that is deemed most appropriate through data collected on fish passage survival and biological impacts of TDG.

Comments on draft “legally valid” language

(Action Agencies) The Action Agencies strongly support the inclusion of the requirement in the draft rule change that operations must be in accordance with "legally valid Endangered Species Act consultation documents on Columbia River System operations, including operations for fish passage." This language is important because of required Environmental Protection Agency reviews under the Clean Water Act and associated coordination with the National Marine Fisheries Service (NMFS) and the U.S Fish and Wildlife Service (the Services) under the Endangered Species Act (ESA) that accompany a permanent rule change. Without a legally valid consultation document on Washington's revised standards, Washington cannot ensure that promulgating the revised standards and attendant administration of the Clean Water Act complies with the ESA.

(Joint Customers) Joint Customers strongly support inclusion of section WAC 173-201A-200(1)(f)(ii)(B)(I) requiring the tailrace maximum TDG criteria to be in accordance with a legally valid Endangered Species Act consultation for the operation of federal projects on the Columbia River System. This language is crucial to the long-term protection of aquatic life and habitat given the current scientific uncertainty around the benefits and risks of 125% TDG for hydro operations on the Columbia River System.

***(Northwest RiverPartners*)** The revisions must be part of a legally valid Endangered Species Act consultation. To ensure that Washington's electricity customers are held harmless from Ecology's proposed rule change, we were pleased to see language in the proposal that links compliance with the State standard to federal environmental standards such as those required by the Endangered Species Act ("ESA"). Specifically, we support retention of language in the proposal that requires the TDG criteria applied at dams operated by the U.S. Army Corps of Engineers to be in accordance with legally valid Endangered Species Act consultation documents on Columbia River system operations, including operations for fish passage.

(Bogaard) While we support Alternative #3, we oppose the following language that it includes and request its removal: "In addition to complying with the requirements Of this chapter, the tailrace maximum TDG criteria applied at dams operated by the U.S. Army Corps of Engineers must be in accordance with legally valid Endangered Species Act consultation documents on Columbia River system operations, including operations for fish passage" We strongly support Alternative #3 to allow TDG levels up to 125% Of saturation in the tail race of each of the eight dams on the lower Snake and lower Columbia Rivers beginning in 2020 provided, however, that Ecology also eliminates the language in its proposed rule as noted.

(Bogaard) We ask that any and all conditional language in the EIS considering a legally -- quote, legally valid Endangered Species Act consultation, end quote, be removed from this rule in its final form.

(Flynn) While I support Alternative #3, I oppose the language that makes implementation conditional on the federal agencies having a legal biological opinion. Our salmon and orca need higher spill regardless of whether the federal agencies have legally valid plan, particularly since the agencies have historically shown little ability to develop such a plan. The proposed language would undermine the permanent modification of the total dissolved gas standard. This conditional language should be removed. Our salmon and orca thank you for taking action today.

(Nez Perce Tribe) The Tribe requests Ecology to revise WAC 173-201A-200(1)(f)(ii)(B)(I) by striking the word "valid" and replacing with "operative. This revision accurately describes the interface of Ecology's water quality authority and criteria to the distinct federal ESA consultation process. This revision also ensures consistency with a valuable element of the consideration in the 2019-2021 Spill Operation Agreement that provides that "No Party"--including Washington, Oregon, and the Nez Perce Tribe--

"makes any concessions regarding the legal validity ... of any biological opinion NOAA issues on the Columbia River System."

(Columbia Riverkeeper) Additionally, tying the 125% TDG standard to the validity of the next CRSO Biological Opinion (BiOp) remains extremely problematic. Given the federal family's long-standing inability to produce legal CRSO BiOps, this language would likely defeat Ecology's stated goal of a permanent move to 125% TDG.

(Defenders of Wildlife) Defenders is concerned with language in alternative three. As written, the proposed TDG standards would only be valid if the long-term biological opinion (Bi-Op) for the Columbia River System Operations (CRSO) is legally valid. Should the Bi-Op be found to be illegal, the state's TDG standards would revert to the overly conservative TDG standards of 115% in the forebay and 120% in the tailrace. Defenders supports an amended alternative three that does not include language tied to the Bi-Op. Defenders strongly recommends striking this language from the new rule.

(NSIA) As we have discussed with Ecology staff earlier this year, we remain concerned with the following language: "the tailrace maximum TDG criteria applied at dams operated by the U.S. Army Corps of Engineers must be in accordance with legally valid Endangered Species Act consultation documents on Columbia River system operations, including operations for fish passage. We suggest Ecology work with the State of Oregon to find language that covers the intent of the sentence that is less problematic.

(Hamilton) As we discussed with Ecology earlier this year, we remain concerned with the language that matches with the legally valid -- I've got the quotes here of what it says. But we're hopeful that Ecology is going to work with the other -- with the State of Oregon and others to find language that covers the intent of the sentence that is less problematic.

(Orca Salmon Alliance) Strike the language in the proposed rule that states: "In addition to complying with the requirements of this chapter, the tailrace maximum TDG criteria applied at dams operated by the U.S. Army Corps of Engineers must be in accordance with legally valid Endangered Species Act consultation documents on Columbia River system operations, including operations for fish passage." The Alliance recommends striking this language to avoid confusion, uncertainty, and unintended negative consequences for salmon and orcas.

(Oregon DFW) Oregon requests that Ecology revise WAC 173-201A-200 (1)(f)(ii)(B)(I) to replace the word "valid" with the word "operative". This revision is necessary to ensure consistency with the Agreement, which provides that no party—including Washington, Oregon, and the Nez Perce Tribe — "makes any concessions regarding the legal validity...of any biological opinion NOAA issues on the Columbia River System."

(Save Our Wild Salmon Coalition) We strongly support permanent modification of Washington State's water quality standard to allow levels up to 125 percent TDG, using a 12-hour average TDG criterion, at any time that will aid juvenile dam passage survival. We support the language of the proposed rule (Alternative 3) with one critical exception – the language requiring a "legally valid Endangered Species Act consultation" must be eliminated to avoid any unintended consequences in the future. This language is neither necessary nor appropriate in this water quality standard.

(Miller) First of all, the point of fidelity to the flexible spill agreement principles. First of all, ecology acknowledges that the decision to begin the exploration of TDGs up to 125% was born from the flexible spill agreement entered into by key stakeholders, including the State of Washington and the Bonneville Power Administration. That agreement was based on three objectives. One, provide additional spill for fish. Two, manage power system costs. And three, preserve the hydro system's flexibility. It's therefore critical that the fidelity to all three objectives are maintained in this rulemaking. This fidelity can only be

maintained if the rule is tied to a legally valid ESA consultation. Without this accordance, spill could be increased without any consideration of the costs to Washington's electric customers.

(Deen) We strongly support continued inclusion of language that links this rule change to legally valid Endangered Species Act consultation where applicable.

(Good Stefani) The language around the consultation and having this tied to being legally valid, as an attorney I would say vague is probably going to get you into trouble and make this rule also vulnerable to being quickly invalidated.

(Form Letter A – Multiple Commenters) I strongly support Alternative #3 to allow TDG levels up to 125% of saturation in the tail race of each of the eight dams on the lower Snake and lower Columbia Rivers beginning in 2020 provided, however, that Ecology remove language suggesting the standard is contingent on a legally valid federal BiOp.

(Form Letter B – Multiple Commenters) While I support Alternative #3, I oppose the language that makes implementation conditional on the federal agencies having a legal biological opinion. Our salmon and orca need higher spill regardless of whether the federal agencies have legally valid plan, particularly since the agencies have historically shown little ability to develop such a plan. The proposed language would undermine the permanent modification of the total dissolved gas standard. This conditional language should be removed. Our salmon and orca thank you for taking action today.

Response to draft "legally valid" language

Ecology appreciates the comments concerning this language in the proposed rule. As presented by Ecology in public hearings on the proposed rule, Ecology has a specific intent for including a reference to compliance with Endangered Species Act (ESA) requirements.

All Clean Water Act approved water quality standards must be evaluated to determine impacts to endangered species. In particular any numeric criteria that Ecology adopts to protect aquatic life must be evaluated by EPA. In most cases EPA must also consult with U.S. Fish & Wildlife Service and National Marine Fisheries Service (Services). As this consultation is a requirement of Section 7 of the ESA for final EPA approval, states commonly do not include language specific to this action in their standards; because the ESA consultation action is implicit in the EPA approval. However, it is Ecology's intent to adopt a rule that assists juvenile fish passage, is protective of aquatic life, and can be approved by EPA in a timely manner to adhere to Washington State's agreed responsibilities in the 2019-2021 Spill Operation Agreement. Ecology believes that with the proper biological monitoring program and protective thresholds, EPA can approve this rule to allow increased spill in the Snake and Columbia rivers in 2019-2021—and into the future. Ecology included the condition within the rule language to assist EPA's ESA consultation process to ensure that EPA can rely on the current analysis conducted by the Services regarding increased TDG levels for the application of these criteria. With this language Ecology and EPA can be assured that all relevant biological requirements set by the Services associated with spill volumes and durations shall be met when utilizing the spill criteria up to 125% (12 hour average) TDG. Additionally, this requirement provides for a durable rule into the future as more information on juvenile and adult passage becomes available and is incorporated into future ESA section 7 consultations. This provision requires that any future use of this alternate spill criteria must adhere to any and all contemporaneous ESA consultation requirements associated with prescribed spill volumes and duration, if those operations utilize TDG criteria up to 125% (12 hour)/126% (2 hour*). To meet these intentions, Ecology has decided to adopt the language into rule.*

Ecology also considered comments requesting this language be modified. Revisions were made to the rule language based on comments when the changes continued to meet the intentions described above. Specifically, Ecology agreed with the request to remove the term 'legally valid' from the proposed rule language. Ecology agrees with suggested comments that this language is not necessary to meet Ecology's intent, and may have unintended consequences regarding the 2019-2021 spill agreement. That said Ecology did not agree that the simpler modification of changing "legally valid" to "legally operable" was a sufficient change. Rather than introducing a term that may require further definition in the future, Ecology decided to explicitly state the intent of this language in the rule as follows:

"In addition to complying with the requirements of this chapter, the tailrace maximum TDG criteria at hydropower dams must be applied in accordance with Endangered Species Act consultation documents associated with spill operations on the Snake and Columbia rivers, including operations for fish passage. The Endangered Species Act consultation documents are those by which dams may legally operate during the time that the adjusted criteria in (f)(ii)(B) of this subsection are in use."

Ecology believes that this language provides clarity on Ecology's intent, meets the intended purpose, and minimizes any unintended implications that were present in the previously proposed rule language.

Comments on concerns about TDG 125% 2 hour averaging

(Bogaard) We strongly support Alternative #3 — with its language amended as noted in our comments. We oppose all Other Alternatives — 1, 2 and 4. We ask the Department of Ecology to change its water quality standards for total dissolved gas (TDG) to allow TDG up to 125% in the tailrace of dams on the Columbia and Snake Rivers on a permanent and year-round basis, using a 12-hour average TDG criterion and in time for the Spring 2020 juvenile out-migration in order to better support juvenile salmonid passage survival and subsequent adult salmon returns. The best available science shows that this TDG standard is biologically appropriate for both the spring and summer voluntary spill seasons.

(Bogaard) We want to communicate our strong support that this rule specify that total dissolved gas be calculated on a 12-hour average as it has in the past rather than on the average of the two highest hourly measures in a given day. We're afraid that the proposed two-hour measurement would lead to significant lower levels of spill than would otherwise occur and thus reduce essential much needed benefits to imperiled salmon and steelhead populations in the basin.

(Filardo) Alternative 3 suggests that total dissolved gas supersaturation (TDG) criteria be increased to 125% on the Snake and Columbia rivers during the spring spill season. However, in the Draft EIS compliance with the criteria is based on the calculation of the two highest hourly TDG measurements in a calendar day. However, there are no evaluations presented in the Draft EIS, nor are there existing analyses, of fish survival supporting the implementation of a 2-hour average criterion. This 2-hour average criterion is inconsistent with the way that TDG has been measured and evaluated relative to fish survival since routine monitoring was implemented in 1995. If a similar 2-hour average secondary requirement to the 125% 12 hour average was set to 130% within the calendar day, it would be more appropriate since it would likely allow for the expected 125% spill levels to be implemented. All biological analyses are based on the presently implemented TDG monitoring criterion. To change from the average of Adoption of this 2-hour average requirement would likely preclude the increase in spill levels needed to improve fish survival rates to a level capable of approaching the Northwest Power and Conservation Commission 2-6% Smolt to adult survival objective (CSSOC, 2017).

(Filardo) First thing is the issue of the Alternative 3 TDG measurements. This suggests that the total dissolved gas supersaturation criteria be increased to 125%. However, compliance with that criteria is going to be based on the calculation of the two highest hourly TDG measurements in a calendar day. I applaud that Ecology is going back to the calendar day rather than the rolling average. However, this two-hour criteria presents an issue. There are no technical or biological information that should be used for this -- that can be used to defend this two-hour criteria. Recognizing that there are a number of physical reasons why dissolved gas measurements change on an hourly basis, including changes in project operation that cannot be predicted, such as tail race elevations and fore bay elevations as well as turbine capacities and marketing limitations. In addition, you have some kind of accuracy associated with the measurement of the TDG meters themselves in the range of plus and minus 1%. Therefore, we went to a 12-hour average to ensure that we were not going to go much out of the target range of 115, 120 the upper standard of the one hour 125% was implemented. There are no evaluations in the draft EIS as to why you would go to a two-hour average. And it's inconsistent with how TDG has been measured for the past 25 years.

(Nez Perce Tribe) TDG criterion should target average TDG that meet but not exceed the standard based on the average of the 12 highest hourly TDG measures in a calendar day. The proposed new "2 hour" method for calculating TDG criteria is overly restrictive for implementation of the 2019- 2021 Spill Operation Agreement (it would diminish the predicted benefits of 125% flex spill operation), is inconsistent with historical methods, and further diverges from Oregon' s criterion.

(Columbia Riverkeeper) Riverkeeper requests that the Department of Ecology (Ecology) reconsider using the maximum daily two-hour average approach to calculate TDG at times when the water quality standard is 125% of saturation. Riverkeeper therefore requests that Ecology use a 12-hour average approach to calculating TDG when the water quality standard is 125% of saturation.

(Fish Passage Center) Our overall recommendation is that the implementation criteria for 2020 at the 125% TDG standard remain the same as what was implemented in 2019, with an average TDG to meet, but not exceed the TDG standard based on the average of the 12 highest hourly TDG measures in a calendar day.

(Fish Passage Center) There is no technical scientific data, or fish survival data, supporting the implementation of a 2-hour average criterion for Flex Spill in 2020. The 2-hour average is a significant change from historical spill implementation over the past decades and no technical rational is provided to support that change from historical implementation.

(Fish Passage Center) The Draft EIS proposed to modify historical spill implementation criteria to utilize a 2- hour average TDG criterion, instead of a 12-hour average TDG criterion, without any technical or analytical rationale. We interpret several statements in the DEIS to mean that the "primary" criterion of targeting a TDG level that could be met, but not exceeded, will now be based on an average of the two highest hourly TDG measures in a calendar day and not a 12-hour average. Furthermore, this new target TDG level will be 125% in the tailrace, during spring operations. Because the new TDG standard will be 125% TDG in the tailrace, the "secondary" criterion of a TDG maximum is, effectively, eliminated. This could have been maintained by proposing a new maximum for which to implement a 2-hour average (e.g., 126%).

(NSIA) Although we are disappointed in a spill test that does not meet the needs of the fish, Orca, and fishing dependent communities, we understand that the region has agreed to a spill test to use 125% TDG at least 16 hours per day during outmigration. Therefore, we strongly object to the language in the proposed rule that reads: "A maximum TDG ((one hour average)) saturation of one hundred twenty-five percent ((must not be exceeded)) calculated as an average of the two highest hourly TDG measures in a

calendar day during spillage for fish passage. For decades the state of Washington held spill levels below what the State of Oregon and the collaborative science in CSS indicated was needed for outmigrants_ We fear that requiring a 'two highest hourly measures in a calendar day" will have the same affect. Furthermore, this varies from the 12-hour average used in 2019 and used as a study design for the spill test. Simply put: we believe this language constrains spill, destroys the spill test, and will put more baby salmon and steelhead through the powerhouses. We trust this will be corrected for the benefit of the fish and for the integrity of the spill test.

(Orca Salmon Alliance) Our second proposed modification is that the TDG standard be based on the average of the 12 highest hourly TDG measures in a calendar day, not the proposed 2-hour average. Changing the implementation criteria from a 12-hour average in 2019 to a 2-hour average in 2020 will likely result in lower spill volumes, lead to reduced benefits to salmon, and undermine the purpose of the Flexible Spill Agreement and its adaptive management experiment, i.e. the ability to learn from comparisons of results from the injunctive order (2018), 2019 Flex Spill operations, and 2020 Flex Spill operations. A calculation based on the 2 highest daily hours is contrary to the intent of the Orca Task Force to bring Washington's and Oregon's water quality standards into alignment and to maximize salmon survival to benefit to the orcas.

(Oregon DFW) Oregon requests that Ecology revise WAC 173-201A-200 (l)(f)(ii)(A) (second bullet) by replacing "two highest" with "twelve highest" as follows: "TDG must not exceed... A maximum TDG saturation level of one hundred twenty-five percent calculated as an average of the twelve highest hourly TDG measures in a calendar day during spillage for fish passage." Oregon is concerned that using a two-hour average for calculating TDG saturation daily will effectively preclude implementation of the Agreement as intended (i.e.: spill to 125% TDG).

(Jones) As others have talked about in the past, the TDG cap at 120 has been calculated either as a 12-hour rolling average or the average of the 12 highest hours, with an allowance for short-term exceedances in order to maximize spill and therefore fish protections. In 2019 both states use the average of the 12 highest hours to calculate that. That proposal has not been moved forward. Instead it using a two-hour maximum language and this will not allow the same flexibility to maximize spill, and therefore, the fish benefits. Without this, the Corps of Engineers, without this flexibility, they will need to operate more conservatively to ensure they do not exceed this level. The potential spill reductions associated with changing the spill management approach will likely result in fish benefits significantly less than were anticipated and agreed to in the flexible spill agreement. And Oregon is concerned that as written could result in reducing those necessary benefits and the fish benefit principle of the flexible spill agreement. Without all three principles whole, Oregon is worried that the agreement itself may be in danger. We hope that this inconsistency can be corrected and that the management approach language used last year and that was the basis for the model fish benefits foundation of the agreement can be reinserted into ecology's draft EIS. Thank you, again, for your time.

(Save Our Wild Salmon Coalition) We believe the 125 percent TDG standard is biologically appropriate for both the spring and summer voluntary spill seasons, should be adopted as a permanent, year-around standard, measured on a 12-hour average, and could be safely implemented on a 24/7 basis during the juvenile salmon migration seasons without adverse effects, although the current proposed rule does not require spill to this level and would allow implementation of other more flexible spill regimes. 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.

(Save Our Wild Salmon Coalition) The DEIS proposes to base the TDG criteria on a 2-hour average, whereas all previous Flex Spill operations have been based off a 12-hour average. There is no technical rational to support this. The change will diminish the predicted benefits that spill to 125 percent will

have. To adequately evaluate the impacts of these adaptive management measures, it is critical that the TDG criterion calculation remains consistent with that of previous operations. We thus urge Ecology to adopt a modification of its water quality standard for TDG as proposed in DEIS Alternative 3 to eliminate any forebay TDG limit and allow TDG levels up to 125 percent of saturation based off a 12-hour average TDG criterion in the tail race of each of the eight dams on the lower Snake and lower Columbia rivers beginning in 2020.

(Good Stefani) I also share the concern that's being raised a number of times now about the calculation. I think some of those details are confusing. And I will admit to not being a biologist. But my understanding is, one, it's not consistent with Oregon, as you just heard. Using the two highest hours. And also you're going to get a lot less spill. And that's inconsistent with the flexible spill agreement. I would also encourage you to consider the purposes the reason the Washington State Task Force has this as a recommendation to raise the gas caps to 125. And that has nothing to do with the cost of repairs. And all of the economic and political considerations. That really has to do with meeting recovery goals and the prey that they depend on. So I recommend going to a 12-hour calculation.

(Form Letter A – Multiple Commenters) I strongly support Alternative #3 to allow TDG levels up to 125% of saturation in the tail race of each of the eight dams on the lower Snake and lower Columbia Rivers beginning in 2020 provided, however, that Ecology calculate the standard based on the 12 highest hourly TDG measures in a calendar day, not the proposed 2-hour average.

Response to concerns about TDG 125% 2 hour averaging

We understand that the Comparative Survival Study (CSS) Model predictions are based on a 12-hour average and thus, we have modified the averaging period from an average of the two highest hours in a calendar day to the twelve highest hourly TDG measurements in a calendar day. Furthermore, we are proposing a maximum TDG level of 126% with an averaging period of the two highest consecutive hours within a calendar day in alignment with suggestions provided by the Fish Passage Center during the public comment period. We recognize that to meet the target spill level of 125% TDG, a 125% maximum criterion would in some cases result in more conservative spill than 125% TDG due to the lack of spill precision. The addition of a 126% maximum criterion provides the ability to temporarily spill slightly above 125% TDG levels without exceeding the water quality standard, thereby providing more flexibility to meet the intent of the rule and the flexible spill agreement.

Specific comments on TDG rule language changes

(Douglas County PUD) Page five and six of the Implementation Plan acknowledges the differences between the regulatory criteria that govern federal and publically owned hydroelectric projects. While the Implementation Plan does a good job of explaining and noting these differences, the proposed rule change only acknowledges the federal regulator criteria, and is silent on the need for publicly owned dams to follow their own regulatory criteria. We suggested editing this rule to include similar language for PUD owned projects that is found in the Implementation Plan to the following effect, whereas, publically owned projects such as those owned and operated by public utilities must comply with FERC Licenses, Biological Opinions, Fishway Prescriptions, 401 Water Quality Certifications, Aquatic Settlement Agreements, and Habitat Conservation Plans.

Response: We acknowledge that non-federal project operations also need to be in accordance with the Endangered Species Act that may have different regulatory avenues than are in place for federal projects. We have decided to broaden the proposed rule language and adopt final

rule language to be inclusive of both federal and non-federal projects in terms of complying with the Endangered Species Act and other regulatory requirements such as a FERC license.

(NOAA Fisheries) Pg. 5, (f)(ii): Suggested edit to Draft language: The elevated TDG levels are intended to allow increased JUVENILE fish passage without causing more harm to ANADROMOUS fish populations than caused by turbine fish passage.

Response: While we agree that the original intent was for increased juvenile fish passage, studies have demonstrated that kelt steelhead also benefit from increased spill over dams for their downstream migration to the ocean (Wertheimer & Evans 2005). While the benefit of spill is for anadromous fish, elevated TDG levels should not cause additional harm to other fish populations. An adjustment of the TDG criteria should be evaluated based on protection for all fish species and populations in the Snake and Columbia rivers. For these reasons, we have decided not to make the suggested changes to the rule language.

(NOAA Fisheries) Pg. 6, (f)(ii)(B) Suggested Draft Language: To further aid JUVENILE ANADROMOUS fish passage AT THE LOWER SNAKE PROJECTS AND LOWER COLUMIBA RIVER PROJECTS during the spring spill season (generally from April through June), spill may be increased up to a maximum TDG saturation level Of one hundred twenty-five percent.

Response: While we agree that the original intent was for increased juvenile fish passage, studies have demonstrated that kelt steelhead also benefit from increased spill over dams (Wertheimer & Evans 2005). While the benefit of spill is for anadromous fish, elevated TDG levels should not cause additional harm to all fish populations. An adjustment of the TDG criteria should be evaluated based on protection for all fish species. For these reasons, we have decided not to make the suggested changes to the rule language.

This adopted rule is intended to apply to all hydropower projects that pass fish in the Snake and Columbia River system in Washington State. Limiting the scope of this adopted rule to the lower Snake and lower Columbia rivers would exclude the Mid-Columbia River dams. The Mid-Columbia River dams also pass fish and therefore should be included within the scope of the rule. We have decided not to make the suggested changes to the rule language.

Other Considerations for TDG Rule Changes

Comments on removing the 115% forebay criteria

(Defenders of Wildlife) Defenders is also concerned that any dam operator not submitting a biological monitoring plan will default to the state's current, overly conservative TDG standards, which includes a forebay standard of 115%. Oregon removed its forebay standard of 115% years ago, finding it unreliable and unnecessary. Since then, Oregon has solely relied on a tailrace standard. We believe that Ecology should follow suit and eliminate the forebay standard entirely. This standard is overly conservative and unnecessarily limits spill regimes that could benefit salmon.

(Save Our Wild Salmon Coalition) As explained in prior letters and comments, there is compelling evidence and a sound legal basis for Ecology to eliminate the current 115 percent forebay TDG limit for dam operations and replace the existing 120 percent tailrace TDG limit with a limit of 125 percent.

(Chelan County PUD) Implementation of a new TDG standard will have implications for hydropower operators in the Columbia and Snake River systems. From a compliance perspective, we encourage

Ecology to clarify that downstream projects will not be held accountable for TDG introduced by upstream projects utilizing the spring spill fish exemption.

(Grant County PUD) The removal of a forebay standard poses a regulatory risk to downstream dam operators. As described in the draft Environmental Impact Statement (draft EIS), the forebay standard serves as a river wide safety factor, safeguarding dams from exceeding the tailrace standard during the spill season. From the draft EIS: "The forebay requirement of 115% primarily serves as a safety factor to ensure dams will not reach or exceed 120% TDG during the hydropower spill season. If TDG enters the forebay at 115%, then the hydropower project is provided a 5% TDG addition as part of hydropower operations as measured in the tailrace downstream of the project (i.e.120% TDG tailrace requirement). Furthermore, the forebay requirement requires hydropower projects to consider impacts of their operations on downstream projects. " Ecology is acknowledging that a forebay criteria provides an allowance for normal hydropower and spill operations to add TDG to the river and that the forebay requirement obligates dam operators to consider their downstream neighbor.

Response to removing the 115% forebay criteria

The forebay requirement of 115% TDG primarily serves as a safety factor to ensure dams do not exceed the 120% TDG tailrace criterion during spill season. If TDG enters the forebay at 115%, then hydropower projects are allotted a 5% TDG addition in the downstream tailrace of the project as a result of spilling operations. The final adopted rule allows for an adjusted TDG allowance of 125% (12 hour)/126% (2 hour) in the tailrace and removes the next downstream forebay compliance point. When a hydropower project is utilizing the 125% (12 hour)/126% (2 hour) tailrace criterion, the 115% next downstream forebay criterion is not in place; therefore it will not limit spill regimes set to spill up to 125%.

Removal of the 115% forebay criterion has the potential to increase spill volumes and potentially gas bubble trauma. There are data gaps regarding impacts of longer spill duration at higher TDG levels that will need to be addressed through biological monitoring. Biological monitoring for non-salmonids and salmonids will be required for hydropower projects implementing the 125% (12 hour)/126% (2 hour) tailrace criteria. Biological monitoring for salmonids will continue through the Fish Passage Center during spring and summer spill season.

We understand that some hydropower operators are concerned that if upstream projects utilize the 125% (12 hour)/126% (2 hour) TDG tailrace only criterion it may result in elevated TDG levels that could impede downstream projects from meeting the 115% forebay/120% tailrace criteria. As accounted for in Chapter 90.48.422 RCW, hydropower projects are not responsible for noncompliance due to high incoming TDG. The relevant excerpt from this law is; "With respect to federal energy regulatory commission licensed hydropower projects, the department may only require a person to mitigate or remedy a water quality violation or problem to the extent there is substantial evidence such person has caused such violation or problem." In accordance with the intent of this language in Chapter 90.48.422 RCW, Ecology will use its discretion when determining project compliance with the standards, accounting for all factors contributing to in situ TDG levels. We have added a section to the implementation plan to clarify this issue.

Comments on the need to base rule decisions on science

(Bluefish) I learned two weeks ago while meeting with BPA's Jason Sweet and Administrator Elliot Mainzer, that no biological monitoring occurred last year when %TDG levels were held high by court order for the entire juvenile migration season. I am hearing that not a single biologist walked the shorelines of America's greatest river to observe and record what damage might have arisen from last

year's spill regime. That is incomprehensible. If the 115% TDG standard truly was to protect "other aquatic species", and not to protect abundant hydropower production, then one would expect some science -- any science -- to have taken place during last season's court ordered spill. Moreover, it is incomprehensible to now race to 125% TDG, without any scientific findings from last year's flow experiment at 120% TDG.

(Bluefish) Is this proposed change in Water Quality standards a political move or science-based? Considering the aforementioned, Ecology's holding fast to standards of 115% TDG appear to have been for political reasons, not for scientific reasons. Washington receives the bulk of BPA's power, AND at a price that is near the lowest electricity rates in the nation. Businesses come to Washington with these low power rates in mind. Was it science that insisted on keeping the 115% TDG standard over the past decade? I remain skeptical.

(Bluefish) Why is Ecology rushing forward to raise % TDG water quality standards? It really makes no sense to me, especially because Ecology has not added in findings to the science literature beyond what they reported in their "Evaluation of the 115 Percent Total Dissolved Gas Forebay Requirement" of January 2009.

(Chelan County PUD) Chelan PUD has an interest in monitoring all risk factors in the Upper Columbia River that may impede the recovery of the Upper Columbia River spring Chinook ESU. When weighing the potential benefits of increased spill, Ecology should give appropriate consideration to the risks associated with sustained exposure of increased TDG on juvenile migrants and increased spill on adults returning to spawn through the entire Columbia River system. In fact, increased spill is often not the most effective tool to pass fish, as demonstrated by the successful survival numbers at Rocky Reach and Rock Island during periods of zero or minimal spill. All dams are different, but successful alternatives to spill, where available, should be preferable and encouraged by regulators.

(Joint Customers) Finally, it would also provide electricity consumers in Washington with greater assurance that costs of higher spill will not be borne without sound biological benefits balanced with the multiple purposes of river operations. As the Draft EIS acknowledges, spill can cost BPA, and therefore, the Joint Customers, tens or hundreds of millions of dollars.

***(Northwest RiverPartners*)** RiverPartners advocates for the balanced use of rivers, for the benefit of communities and the environment. We are supportive of measures that have proven scientific benefit for salmon and that consider the effect that the decisions have on the many users of the river system. With this mission in mind, we ask that Ecology maintain fidelity to the Spill Agreement principles upon which Ecology's rule change proposal is based. It is critical that the three objectives outlined at the Spill Agreement's outset are adhered to – provide additional spill for fish, manage power system costs, and preserve hydro system flexibility.

(Grant County PUD) We are concerned that Ecology's proposed rule change may result in chronically high TDG in the Columbia River harming both juveniles and adults originating from the Upper Columbia Basin. For example, Methow River spring Chinook, an ESA-listed population that Grant PUD has invested heavily in, migrates through 524 miles of the Columbia River as juveniles and adults during the springtime when TDG will be at its highest. We encourage Ecology to monitor the potential negative effects to salmon identified in the draft EIS closely and to rely on empirical data for its decision making.

(Defenders of Wildlife) Many of the studies Ecology cites when discussing the negative impacts of spill are decades old and were conducted using cages and nets, which do not allow the fish to compensate for higher levels of TDG with depth or moving down-river. These studies expose salmon to continuous and prolonged levels of high TDG and do not reflect natural conditions that the fish experience. Many of these studies also suggest that TDG levels are safe for native species up to 125%.

Response to the need to base rule decisions on science

The forebay requirement of 115% TDG is a criterion that must be met by the upstream dam and primarily serves as a safety factor to ensure the downstream dam does not exceed the 120% TDG tailrace criterion during spill season. The removal of the 115% forebay for the 2019 spill season was implemented through a short-term modification of the criteria. This did allow for slightly more spill during the 2019 spill season. However, spill levels in 2019 continued to be limited by a 120% tailrace / 125% maximum criteria similar to previous years. During the 2019 spill season, the Fish Passage Center monitored salmonids for gas bubble trauma as they have in previous years. Survival estimates for juvenile salmonid fish were also measured during the 2019 spill season.

The existing 115% forebay/120% tailrace TDG criteria for the Snake and Columbia rivers is a deviation from what is considered full protection of aquatic life (i.e. 110% TDG). An adjustment of the TDG criteria was implemented to increase survival of downstream migrating fish, where the benefits of fish passage outweighed the relatively low risk of TDG related impacts at the 115% forebay/120% tailrace TDG level. The balance between benefits for fish passage and impacts from TDG levels up to 125% (12 hour)/126% (2 hour) is unknown. While risk to salmonids is considered relatively low up to 125% TDG, data gaps exist for non-salmonid fish species. To address uncertainties in fish passage benefits versus impacts at 125% TDG, we will require a biological monitoring plan that will evaluate both salmonids and non-salmonid fish during spill up to 125% TDG. The biological monitoring required as part of utilizing the 125% (12 hour)/126% (2 hour) tailrace only criterion is intended to evaluate the impacts of elevated TDG levels to aquatic life. If biological thresholds are exceeded at the 125% (12 hour)/126% (2 hour) TDG level, TDG applicable criteria will return to the 115% forebay/120% tailrace/125% maximum criteria.

The intent of the final adopted rule criteria of 125% (12 hour)/126% (2 hour) tailrace criterion is to provide increased benefits for downstream fish passage in order to increase salmonid survival. This adopted rule has the potential benefit of salmon recovery and increased prey for the southern resident orcas. Developing a TDG rule that only adheres to the objectives of the flexible spill agreement without a review of aquatic life protection is not congruent with Section 303c of the Clean Water Act and therefore would not be approvable by the Environmental Protection Agency. The flexible spill agreement is an economically based agreement that considers power generation alongside fish passage. Water quality standards are based on the protection of aquatic life. The proposed and final adopted rule allows for the implementation of the flexible spill agreement, but more importantly serves as an action that may increase salmonid survival through the Snake and Columbia River system. To ensure aquatic life is protected at these increased TDG levels, aquatic life will be monitored for gas bubble trauma.

Comments on support for aligning with Oregon

(Filardo) I appreciate that Ecology is suggesting using the measurements within a calendar day, rather than the "rolling average TDG" currently required by Ecology. This makes sense and is consistent with the calendar day methodology used by the Oregon Department of Environmental Quality.

(Action Agencies) The Action Agencies support Washington's continued efforts to ensure consistency with the state of Oregon's calculation methodology for TDG in the Columbia River. Washington is proposing to calculate a maximum TDG saturation level as "an average of the two highest hourly TDG measures in a calendar day during spillage for fish passage", while Oregon's current standard modification for TDG in the Columbia River utilizes a different methodology. Having a consistent

methodology between the two states would streamline implementation and reporting for the Action Agencies.

(Joint Customers) PPC supports alignment of measurement of tailrace TDG concentrations between the states of Washington and Oregon. As a practical matter, the specific details of measurement criteria under consideration are unlikely to have a substantial impact on actual operations. The Corps of Engineers must manage an array of forecast uncertainties and operational constraints in real time. These realities are more impactful on actual operations than retrospective comparisons of measurement criteria with perfect hindsight. Washington's proposal for measurement criteria is reasonable and does not undermine the potential scientific value of measuring the effects of higher spill levels on aquatic species.

(Douglas County PUD) The proposed adjusted TDG standard will bring an end to the rolling 120 high standard that was calculated irrespective of calendar day. This has been a long standing concern of Douglas PUD and our colleagues. The new adjusted standard will allow for the computation of a 12-C high during the summer months that will be specific to a calendar day rather than straddling two days when spill occurs in overnight hours. We support this proposed rule change because the biological information collected downstream of the Wells Project supports the proposed standard instead of the current, overly restrictive TDG standard.

Response to support for aligning with Oregon

One of the primary goals of this rulemaking is to align the TDG criteria in the Snake and Columbia rivers with the State of Oregon. We have collaborated with Oregon throughout the rulemaking process to minimize inconsistencies in the TDG criteria for the purpose of implementation for these shared waterbodies.

Specific comments related to Mid-Columbia Dam operations

(Chelan County PUD) Further, we ask Ecology to bear in mind that Mid-Columbia habitat conservation plans govern spill decisions at the Rocky Reach and Rock Island projects. These HCPS have been highly successful for fish, in part because they avoid unnecessary spill.

Response: We understand that the proposed rule language linked Endangered Species Act (ESA) consultation with only the federal projects and that the non-federal projects have other governing documents, such as within their federal energy regulatory commission (FERC) license, that govern the management of endangered aquatic life. We have broadened the final rule language to be inclusive of both federal and non-federal projects and their associated ESA consultation documents for managing aquatic species. Furthermore, we would like to acknowledge that the utilization of the 125% (12 hour)/126% (2 hour) tailrace criteria is optional and is dependent on approval of a biological monitoring plan, meeting biological thresholds, and conforming to ESA governing documents.

(Chelan County PUD) In accordance with Washington State water quality standards and attainment methods, a hydropower operator is only responsible for TDG levels created by the operation of their project. Specifically, Section 90.48.422 of the Revised Code of Washington (RCW) states: "With respect to federal energy regulatory commission licensed hydropower projects, the department may only require a person to mitigate or remedy a water quality violation or problem to the extent there is substantial evidence such person has caused such violation or problem." This raises an important question. If an upstream licensed hydroelectric project is utilizing the special fish passage exemption for spring spill and the next downstream hydroelectric project is not, how will Ecology determine compliance with the water quality standards at the downstream licensed project? The proposed rule

should be modified to make it clear that Ecology will only consider TDG associated with the downstream project when measuring compliance with the standard.

Response: We understand that hydropower operators are concerned that if upstream projects utilize the 125% (12 hour)/126% (2 hour) TDG tailrace criteria, it may result in elevated TDG levels that exceed the TDG criteria for downstream projects implementing the 115% forebay/120% tailrace criteria. As accounted for in Chapter 90.48.422 RCW, hydropower projects are not responsible for noncompliance due to high incoming TDG. In accordance with the intent of the language in Chapter 90.48.422 RCW, Ecology will use its discretion when determining project compliance with the standards, accounting for all factors contributing to in situ TDG levels. Additionally, Ecology will work with downstream operators to evaluate annual TDG data with respect to concerns of TDG accumulation above the 125% criteria, to determine if degassing between dams is not providing the next downstream dam with the ability to maintain tailrace TDG at or below 125%. We have added a section to the implementation plan to clarify this issue.

(Douglas County PUD) Public Utility District No. 1 of Douglas County (Douglas PUD) has a dedicated history of providing safe, timely, and effective passage for anadromous and resident fishes at the Wells Hydroelectric Project (Wells Project). Likewise, Douglas PUD worked closely and collaboratively with Ecology to meet Washington State Water Quality Criteria in order to remain complaint with Clean Water Act Section 401 Water Quality Certification (401 Certification) for the Wells Project including the associated TDG standards for those areas downstream of the Wells Project. Because of our commitment to water quality compliance, Douglas PUD is keenly interested in how the proposed rule change could positively or negatively affect the aquatic resources within the Wells Project and how the proposed rule changes could change how Douglas meets its 401 Certification TDG requirements.

Response: We appreciate the ongoing effort that the Wells project has made toward fish management and water quality. The newly adjusted TDG criteria of 125% (12 hour)/126% (2 hour) in the tailrace is an optional set of criteria and is contingent upon biological monitoring for the protection of aquatic life. The biological monitoring and associated thresholds required to implement the 125% (12 hour)/126% (2 hour) TDG tailrace criteria are intended to serve as a safety net to protect the aquatic resources. If monitoring indicates that aquatic life is experiencing adverse impacts, then spill and TDG levels will be ramped down.

(Grant County PUD) The removal of a forebay standard poses a biological risk beyond 125%. Without a forebay standard under Section 200(1)(f)(ii)(B) of the proposed rule change, TDG may accumulate without a 'reset' to ensure that TDG levels do not exceed 125%. In the Mid-Columbia, where there are multiple dam owners and operators and therefore no inherent interest in managing TDG for downstream projects, TDG could accumulate downstream and cascade beyond 125%. Ecology should consider the risks to fish in the absence of a TDG reset.

Response: We anticipate there will be some degassing between hydropower projects that will result in incoming TDG levels that are less than 125% for downstream projects. The higher the TDG levels in the water column, the faster degassing will occur because of the higher gradient between gases in the atmosphere and the water column and the closer the gasses will be to maximum solubility. That said, we understand that downstream projects may be impacted by upstream projects spilling at higher TDG levels. As accounted for in Chapter 90.48.422 RCW, hydropower projects are not responsible for noncompliance due to high incoming TDG. In accordance with the intent of the language in Chapter 90.48.422 RCW, Ecology will use its discretion when determining project compliance with the standards, accounting for all factors contributing to in situ TDG levels. Additionally, Ecology will work with downstream operators to evaluate annual TDG data with respect to concerns of TDG accumulation above the 125%

criteria, to determine if degassing between dams is not providing the next downstream dam with the ability to maintain tailrace TDG at or below 125%. We have added a section to the implementation plan to clarify this issue.

(Grant County PUD) Without any forebay standard under Section 200(1)(f)(ii)(B) of the proposed rule change, Ecology may be putting downstream dam operators in a position where compliance is unfeasible. Ecology should consider how the removal of a forebay standard would affect the operations and compliance of downstream dams and how Ecology will regulate an upstream project's affect to the incoming TDG of the next downstream dam.

Response: We understand that hydropower operators are concerned that if upstream projects utilize the 125% (12 hour)/126% (2 hour) TDG tailrace criteria, it may result in elevated TDG levels that exceed the TDG criteria for downstream projects implementing the 115% forebay/120% tailrace criteria. As accounted for in Chapter 90.48.422 RCW, hydropower projects are not responsible for noncompliance due to high incoming TDG. In accordance with the intent of the language in Chapter 90.48.422 RCW, Ecology will use its discretion when determining project compliance with the standards, accounting for all factors contributing to in situ TDG levels. Additionally, Ecology will work with downstream operators to evaluate annual TDG data with respect to concerns of TDG accumulation above the 125% criteria, to determine if degassing between dams is not providing the next downstream dam with the ability to maintain tailrace TDG at or below 125%. We have added a section to the implementation plan to clarify this issue.

(Douglas County PUD) The proposed adjusted TDG standard is written to include the months of April through June but is denoted as a general time frame. We support the use of the word "generally," because the juvenile anadromous fish outmigration at the Wells Project takes place throughout the spring and summer and is a defined operating period outlined in the Wells Anadromous Fish Agreement and Habitat Conservation Plan and in the Juvenile Fish Bypass Operating Plan Allowing the benefits of additional spill during a later or even earlier outmigration period is important to preserve the intent of the proposed adjusted TDG standard.

Response: We are maintaining the term 'generally' to ensure that this is inclusive of some years when outmigration in the upper Columbia River reaches begins in later March. The 125% (12 hour)/126% (2 hour) tailrace criteria should be applied only during the spring spill season and not during summer spill. We recognize that summer spill may occur in some years due to higher flows continuing later in the season. However, the 125% (12 hour)/126% (2 hour hour) tailrace criteria are intended to occur during spring spill season when the majority of salmonids are outmigrating downstream to the ocean. Once late spring/early summer flows begin to subside and the bulk of juvenile salmon have passed downstream, the 115% forebay/120% tailrace/125% maximum criteria will then apply.

(Douglas County PUD) Allowing the TDG standards to approach 125% rather than 120% in the tailrace and 115% in the forebay of the subsequent hydroelectric project will increase Douglas PUD flexibility to make economically prudent decisions, that also benefit anadromous fish, when it comes time to decide whether to send water through turbines or spillway during low or negative price periods. The proposed change is likely to reduce much of the unnecessary generation that can occur during the juvenile fish outmigration. We welcome the proposed change in the TDG standard because it makes environmental, operational and economic sense.

Response: Comment noted. As stated in your comment, implementation of the 125% TDG tailrace criteria would remove the downstream forebay compliance point while maintaining the tailrace compliance point.

Draft Environmental Impact Statement

Comments on EIS Alternative 4

(Action Agencies) The Action Agencies believe that Washington should align the proposed rulemaking with the scope of the 2019-2021 Spill Operation Agreement (Agreement). As described in the DEIS, Alternative 4 is the alternative that best aligns With the Agreement and is most responsive to the uncertainties of impacts of long term implementation of higher spill to aquatic species. The Action Agencies would like to make clear the Agreement does not contemplate 125% TDG spring spill on a 24-hour, 7-day basis simultaneously at all lower Columbia River projects and lower Snake River projects, as the proposed preferred alternative (Alternative 3) described in the DEIS does. Instead, the Agreement is aligned with Alternative 4, which provides for up to eight hours of performance standard spill in order to balance the impacts to hydropower production from the higher levels of spill during the rest of the day. Because of this and the reasons described below, the Action Agencies recommend Washington select Alternative 4 as the preferred alternative. The Action Agencies recommend that Washington reconsider its conclusion that Alternative 4 only partially meets Recommendation 8 of the Southern Resident Orca Task Force Final Report (Final Report). In fact, all four bullets under Recommendation 8 align with Alternative 4.

(Joint Customers) Based on review of the proposed rule revisions and their underlying purposes, and the Draft Environmental Impact Statement, we urge you to adopt Alternative 4 because it is the most prudent approach. Alternative 4 also is fully consistent with the implementation of Recommendation 8 of Washington Governor Inslee's Southern Resident Orca Task Force final report. This recommendation calls for the flexibility to adjust spill regimes using the best available science and for new spill levels to be monitored and adaptively managed to minimize any negative effects. Alternative 4 supports this goal by allowing spill up to 125% TDG for 2020 under the Flexible Spill Agreement. It will also allow consideration of future, longterm rule changes that align with the outcomes of the CRSO EIS and ESA processes, fulfilling the goal of adaptive management using the best available science into the future.

(NOAA Fisheries) DEIS pg. 55 text states "Ecology's proposed decision is to allow for an adjusted tailrace criterion of 125% (Alternative 3) that may be applied at any time during the spring spill season in the Snake and Columbia rivers." Given the uncertainty with effects to resident and anadromous fish residing at 125 percent TDG for long durations as described in this DE'S, we feel it would be appropriate from a biological perspective to select Alternative 4. Alternative 4 meets the objectives stated in the DEIS reduces the potential duration of higher TDG exposure, and is an operation covered by a legally valid consultation document for spring 2020. Additionally, Alternative 4 more closely aligns with the Flexible spill operation agreement.

(Save Our Wild Salmon Coalition) While Alternative 4 may be consistent with the Interim Spill Agreement, it is both temporary and needlessly restrictive.

Response to comments on EIS Alternative 4

Alternative 4 aligns with the flexible spill agreement that will end in 2021. We cannot justify aligning a permanent rule with the flexible spill agreement that uses a paradigm that is based primarily on economics. Development of water quality standards need to be based on aquatic life protection.

The final adopted rule is considered a permanent rulemaking that will be submitted to EPA for Clean Water Act approval. Swim Rules submitted to EPA will be evaluated for protection of aquatic life in perpetuity and not for temporary protection. If temporary protection can be

assumed for 2020 and 2021, then protection in perpetuity should be assumed. The daily application duration of the 125% (12 hour hour)/126% (2 hour) TDG tailrace criteria will rely on the impacts to aquatic life as determined in the Endangered Species Act (ESA) consultation. Any spill daily spill frequency and volumes that employ the 125% TDG criteria must be in accordance with ESA consultation requirements for spill and fish passage. Furthermore, Ecology has been clear that neither of the adjusted TDG criteria applied in the Snake and Columbia rivers for fish passage actively requires spill to the maximum allowable levels. Rather, TDG levels are allowed up to 125% (12 hour)/126% (2 hour) to provide flexibility for dam operators to optimize spill frequency volumes for fish passage and other regional needs, while maintaining a biological monitoring program to ensure aquatic life remain protected

We agree that there are some data gaps regarding risk levels to aquatic life at 125% TDG. Additional biological monitoring up to the 125% (12 hour)/126% (2 hour) TDG level would be necessary regardless of whether EIS Alternative 3 or 4 was selected for this rule. It is unknown whether minor decreases in TDG levels for 8 hours per day as outlined in Alternative 4 would result in biological impacts that could be delineated from Alternative 3. Regardless of these unknowns, Alternative 4 was not selected for the reasons outlined in the paragraphs above. The adopted rule will need to be approved by EPA, and is designed to collect data to ensure aquatic life remains protected where the alternative criteria are implemented.

Comments on EIS-Use of Comparative Survival Study

(Fish Passage Center) DEIS Comment: In response to recommendations from the Independent Scientific Advisory Board, the Comparative Survival Study Annual Report included an analysis of total dissolved gas and instantaneous mortality. This analysis, which was reviewed by the Independent Scientific Advisory Board, provides additional scientific basis for the EIS. This reference will provide further support for the proposed action and the EIS should include this analysis.

(NSIA) Decades of empirical data compiled and analyzed in the Comparative Survival Study (CSS) demonstrate that smolt to adult survival rates (SARs) increase when spill is utilized to help smolts avoid passage through the powerhouses. Without breaching the four Lower Snake River dams, only spill at 125% TDG 24 hours per day even approaches the four percent average SARs needed for long term recovery.

(Save Our Wild Salmon Coalition) The long-running Comparative Survival Study (CSS) provides a sound biological basis for setting a TDG standard of 125 percent of saturation during voluntary spill operations at the dams. Ecology's description of this extensive study and analysis in the DEIS (and the FEIS for the current short-term modification), however, understates the level of support the CSS analyses provide for a 125 percent tailrace TDG standard in potentially significant ways. The CSS analyses are based on decades of empirical evidence about the effects of spill and TDG levels on juvenile spring migrants, including effects at TDG levels well above 125 percent (during, for example, frequent periods of involuntary spring spill).

(Seattle City Light) The proposed rule change evaluated in the DEIS is based on numerous assumptions inherent in the Comparative Survival Study (CSS) model conducted by the Fish Passage Center which concludes that increased spill will substantially increase SAR. While the model appears robust for several empirical measures input into the model, conclusions of limited risk appear to be based, at least in part, on the assumption that salmonid smolts will behaviorally adjust to high TDG through depth compensation. This presumption is not consistently supported in the literature. The presumption of

directional depth compensation in response to elevated TDG levels should not be a basis for minimizing the potential for an adverse effect.

(Seattle City Light) As the rule would apply to all 8 federal dams in the lower Columbia and lower Snake rivers, and potentially the five mid-Columbia dams, the cumulative effects from exposure need to be fully evaluated. Smolts outmigrating from upper river locations could potentially be exposed repeatedly to excessive levels of TDG. It is not clear if the CSS model has considered the effect of repeated exposure to supersaturated TDG. This exposure represents, in essence, a chronic or sub-chronic exposure profile for which increased injury does not appear to be fully considered. The effects of repeat or chronic exposure to elevated TDG is discussed in the DEIS to only a limited degree, and not to a level to support the conclusion that such repeat exposure would not result in adverse survival outcomes.

(Seattle City Light) The CSS model focuses on salmonid smolts and does not appear to evaluate information for all life-stages of salmonids in the entirety of the river systems potentially affected. While most young salmon in the mainstem Snake and Columbia Rivers are derived from tributary spawners, this is not an absolute (e.g., Hanford Reach Chinook). Early life stages of such salmonid populations in mainstem habitats—as well as other non-salmonid native fish—will be disproportionately exposed to higher levels of TDG as they will preferentially use shallow water habitats for rearing where TDG levels will be highest. As the rule change could theoretically allow surface waters between dams to accommodate TDG levels as high as 125% (i.e., as the criteria would apply to both the tail races and forebays), it is entirely possible that early life stages of fish of many different species will experience prolonged exposure to TDG levels that have been shown to elicit GBT. This outcome appears counter to the intent of increased spill.

Response to EIS-Use of Comparative Survival Study

The draft Environmental Impact Statement (EIS) referenced the CSS Annual report from 2015-2017. While the concept of instantaneous mortality and powerhouse passages is discussed in the draft EIS, we have added an additional sentence regarding the instantaneous mortality rate results from the 2018 CSS Annual Report (McCann et al. 2018) under the "Potential Positive Impacts of Increased Spill" section.

We have dedicated an entire section, "Potential Positive Impacts of Increased Spill", that provides a high-level summary of the CSS model. We have referenced documents relevant to the CSS model analyses and monitoring results for those that are interested in more details. The CSS model and studies include large amounts of information. Our intention was to provide an overview of the CSS model results and provide relevant references for those interested in modeling and supporting data.

In regard to the comments on understating the potential indirect effects of increasing spill, we added a sentence in the draft EIS of this rulemaking that explicitly states the potential indirect benefits from additional spill. In the "Potential Positive Impacts of Increased Spill" section it states: "Potential indirect effects of increasing spill, although not quantified, include reduced predation of out-migrating juvenile salmonid in reservoirs from faster migration travel time and reduced holding times and water temperature." We believe the existing explanation included in the draft EIS adequately characterizes the potential indirect benefits.

The conclusions of limited risk to juvenile salmonids at 125% does not rely on behavioral adjustments to high TDG levels. Rather, the statement of limited risk to juvenile salmonids is based on the mean migration depths that indicate traveling depths are adequate for depth compensation and thus, have limited risk. Furthermore, the Fish Passage Center has continued to

monitor gas bubble trauma from 1995 and have reported minimal impacts to salmonids at TDG levels up to 125%.

There is limited knowledge on the potential for sub-chronic and chronic TDG related effects at higher spill levels. Given this information, we are requiring a biological monitoring plan that includes both salmonids and non-salmonids. The purpose to the biological monitoring plan is to ensure that aquatic life is protected. If TDG related impacts exceed biological thresholds, then fish spill will be reduced to lower levels to reduce TDG levels.

We agree that there are data gaps that exist surrounding the potential risks associated with TDG levels up to 125%, specifically related to non-salmonid fish. The biological monitoring plan that is required to implement the final adopted 125% (12 hour)/126% (2 hour) tailrace criteria will be key in identifying potential risks to salmonids and non-salmonid fish species. During the spill season, higher than normal river flow contributes to excess spill that often exceeds 125% TDG. Data from Comparative Survival Studies suggest that there are increased risks above 125% TDG to salmonids but low risk below 125% TDG.

Specific comments on EIS document language

(Filardo) In general, I find the Draft Environmental impact Statement for the proposed changes to Water Quality Standards for Surface Waters of the State of Washington (Draft EIS) to be well written and comprehensive. I fully agree with the proposed decision to allow for an adjusted tailrace criterion of 125% (Alternative 3) except for the proposed calculations methods for compliance.

Response: The department appreciates the support for adjusting TDG criteria to aid fish passage over the Columbia and Snake River dams. We have revised the calculation method for the averaging period at the 125% TDG level from the 2 highest hourly measures to the 12 highest hourly measures and added a maximum criterion of 126% that is calculated as a two highest consecutive hour average. The maximum criterion of 126% was added to allow for spill levels to 125% without exceeding the 125% TDG tailrace criterion.

(Filardo) Efficacy of the Biological Monitoring Program p 44: It is implied in this section that there is some uncertainty associated with the monitoring program adequately capturing GBT symptoms due to the pressurization of the holding tanks for sampled juvenile salmon leading to an underestimation of the prevalence and severity of GBT. This implication is based Montgomery Watson, 1995 and Elston et al., 1997. The text of the EIS should be reworded to reflect that fish are sampled at the separator and thus avoid pressurization of the holding tanks as a way of reducing the uncertainty in GBT monitoring.

Response: We have made the suggested changes.

(Nez Perce Tribe) Add definition for the clause "relative to atmospheric pressure" associated with calculation of TDG values on page 6 of the Amendatory Section document and in the Draft EIS CR102 pages 6, 1 7, and 18. As written, several interpretations are possible relative to site specific elevation and/or standardization for barometric pressure.

Response: The term "relative to atmospheric pressure", address the fact that atmospheric pressure should be accounted for in TDG measurements. Atmospheric pressure is measured using a barometer and thus, barometric and atmospheric pressure are considered synonymous. In reference to the TDG criteria, the term "relative to atmospheric pressure" is appropriate because we are broadly speaking about the influence of atmospheric pressure has on TDG measurements rather than a site-specific measurement. Specific details regarding the

measurements of TDG are typically reserved for quality assurance project plans (QAPPs) rather than rule language. These details can be explained in the required biological monitoring plan. We have decided not to make any changes in regard to this comment.

(Nez Perce Tribe) Change description of fall Chinook salmon spawning on page 27 of the Draft EIS (Document (19-10-022) from "Chinook salmon are not known to spawn in the area encompassing the lower eight federal dams on the Snake and Columbia rivers but are known to spawn in the Hanford reach Of the Columbia River, above the mouth of the Snake River. " to "Fall Chinook salmon predominately spawn in the Columbia River, above the mouth of the Snake River, and in the Snake and Clearwater rivers above the Lower Granite reservoir. A few redds have been observed in tailrace are "of the Snake River projects."

Response: The intention of the statement was to include spawning areas specific to Washington State. However, the suggested changes were made due to the connectivity between upstream spawning fish outside of Washington and their progeny's passage through hydropower projects located in Washington. We have updated this section to include the "Snake and Clearwater rivers above Lower Granite Reservoir."

(Action Agencies) DEIS, pg. 7: Such a significant change to the standard should be based on additional sources rather than just the CSS model. We recommend including additional information such as results from COMPASS modeling and in-river GBT data from a limited period operation as described in Alternative 4.

Response: The CSS model predicts that increased spill up to 125% TDG will increase fish passage and overall survival of outmigrating salmonids. The COMPASS model is less optimistic regarding benefits of increased spill and has not been reviewed by the Independent Scientific Advisory Board (ISAB). We have added a short section that briefly describes the results of the COMPASS model.

(Action Agencies) DEIS, pg 17: The referenced "technical analysis" needs a citation.

Response: We have added a citation for this statement: https://www.bpa.gov/efw/FishWildlife/SpillOperationAgreement/doc/ECF-2298_Spill-Notice-and-Agreement.pdf.

(Action Agencies) DEIS, pg 30: The Fish Passage Center data related to instances of GBT observed when gas levels exceed 125% is misleading. The statistic in the following statement should be clarified: "In a historical analysis of data collected by the Fish Passage Center from 1995- 2018, the 15% GBT criterion has been exceeded in only 37 instances of 2,870 samples and 28 instances occurred when TDG was greater than 125%." The projects were not operated at 125% for the years analyzed (the historic juvenile fish passage spill regime was lower spill levels, significantly below 125% TDG). The statement should clarify how many samples occurred when TDG was greater than 125% and what portion of those samples met the 15% GBT criterion as it would be a better representation of the GBT impacts from the proposed change in WQS

Response: The 2,870 sample events stated includes all years TDG and gas bubble trauma data were collected that met sample size requirements. We have changed 2,870 samples to "sampling events" to clarify that one sample event may represent many different individual samples. Data is summarized to provide context on spill impacts over long-term monitoring and trend analysis.

(Action Agencies) DEIS, pg. 27: In the "Early Development" section, the document states that Chinook salmon are not known to spawn in the area encompassing the lower eight dams. However, historically there have been Chinook redds below Bonneville Dam on the Washington shore during winter and

spring. Their emergence is later than Chum, so they are more likely to be impacted by high TDG in spill season, especially if the river is held low, as it was in April 2019. Chum, conversely, tend to out-migrate before spring spill season.

Response: We have added information regarding Chinook spawning below Bonneville Dam in the "Early Development" section of the EIS.

(Action Agencies) DEIS, pg. 35: With the overwhelming amount of information documenting the adverse impacts associated with TDG more research is needed before to verify aquatic species are protected at 125 % TDG. It is not clear that the proposed biological monitoring under the Implementation Plan will cover all the species explored in the DEIS (invertebrates, lamprey, salmonids and resident fish).

Response: The biological monitoring plan is not intended to examine all aquatic species. We have identified fish species as the most vulnerable to TDG related impacts based on the hydrological conditions of the Snake and Columbia rivers and organism life histories. In the environmental impact statement, all aquatic species were examined. Salmonids are known to be one of the most sensitive organisms to changes in water quality and drive the biological thresholds for the conventional water quality standards. In the review of literature, data suggests that non-salmonid fish may be equally sensitive to TDG related impacts and thus, more data regarding their health during elevated TDG levels is necessary. The EIS summarized data gaps in regard to risk of TDG levels up to 125% to non-salmonid fish.

While lamprey is of concern, the physiology of lamprey suggests that they would be less sensitive than other fish. Lamprey do not possess a swim bladder. Fish without swim bladders have been identified as potentially having less sensitivity to gas bubble trauma (Brown et al. 2012; Colotelo et al. 2012). However, we recognize that the available literature is limited and therefore, have decided that the biological monitoring program associated with spill levels to 125% TDG should be inclusive of lamprey. The implementation plan will be updated to be inclusive of fish without swim bladders including the lamprey.each year

(Action Agencies) DEIS, pg 36: WDOE's conclusion regarding effects on lamprey of 125% TDG spill appears to be based on one article (Colotelo et al. 2012) that discusses impacts from barotrauma not TDG (in fact all testing during the study was done at a TDG level of 102%). This analysis on lamprey appears lacking and more analysis seems appropriate in order to avoid putting a disproportionate amount of risk on lamprey. Significant adverse impacts to lamprey could result from decision-making without appropriate analysis.

Response: While the current literature suggests that lamprey are less sensitive than fish with swim bladders, we recognize that the literature is very limited. For this reason, we are modifying the implementation plan to be inclusive of lamprey in the biological monitoring program associated with spill up to 125% TDG. The implementation plan will be updated to be inclusive of fish without swim bladders including the lamprey.

(Action Agencies) DEIS, pg 36: States "...Colotelo et al (2012) notes the lack of swim bladder may account for the reduced sensitivity to TDG." This sentence is contextually inaccurate regarding the Colotelo et al 2012, please see https://www.sciencedirect.com/science/article/pii/S0165783612001737. Colotelo et al 2012 does not evaluate the effect of TDG on lamprey. In this research the only reference to TDG was in reference to TDG as a water quality parameter not in any relationship to effects on lamprey. Colotelo et al 2012 was about barotrauma associated with juveniles passing through turbines not effects of TDG on lamprey. The conclusions and statements made with respect to this citation should be examined

Response: We have decided that the limited literature does not fully characterize impacts of TDG up to 125% to lamprey and that the biological monitoring associated with the 125% TDG level should be inclusive of lamprey. The implementation plan was updated to be inclusive of fish without swim bladders, including the lamprey.

(Action Agencies) DEIS, pg 36: This statement suggests high risk to daphnia magna by increasing TDG to 125%, is WDOE approving these types of impacts? "Daphnia magna were affected by supersaturated waters above 110%. The mean LC50 for Daphnia magna was 122.5% when fed and held in static water. When Daphnia were not fed in flowing water the 96 h LC50 was 114%. The 7-d LC50 was 120% and the 10-d LC50 was 117.5%." The potential negative impact on invertebrates, with several additional citations listed under "Aquatic Invertebrates" section of the DEIS, were not assessed for secondary impacts to the larger ecosystem if the invertebrate population is depleted due to high TDG exposure. Suggest this discussion be added to the DEIS.

Response: The Daphnia magna studies referred to within this comment are laboratory studies that contain several discrepancies from real-world exposure scenarios. The study by Nebeker (1976) indicates that Daphnia magna were transferred directly from test solutions in control tanks to treatment tanks containing TDG from 110 to 150%. In the field environment, instantaneous changes in TDG levels to the degree experienced in the laboratory studies are unlikely. Furthermore, laboratory studies are known to preclude depth compensation due to limited depths within the test chambers. Daphnia magna and other cladocerans are likely afforded movement in the water column that provides additional protection from TDG related impacts. Cladocerans are known for their diel movement within the water column and are unlikely to be exposed to TDG levels and durations commensurate with those tested in laboratory studies. Cladocerans prefer conditions of limited light and prefer deeper darker waters during the daylight hours, affording them some reprieve through depth compensation.

Additional studies not highlighted within this comment and pertinent to the Snake and Columbia River conditions include the field studies that have found minimal impacts to cladocerans and other invertebrates using robust sample sizes over a range of TDG conditions (Dawley 1996; Schrank et al. 1997; Toner and Dawley 1995; Dawley 1995). These field studies indicate there is low risk to invertebrates over a large range of TDG levels.

We have added sentences at the end of the "Alternative 3" section that describes the shortcomings of relying strictly on laboratory data to evaluate risk.

(Action Agencies) DEIS, pg. 36: The DEIS should consider the effects of 125% TDG for the duration of the spring spill season (Apr 3 – Jun 20). The literature and studies cited to address effects in the DEIS generally contain observations obtained during shorter duration studies e.g., "2.7 days..." The significant duration of the proposed change in WQS to an unprecedented high saturation level has not been tested before. Consider if WDOE should conduct additional research, monitoring, and evaluation to evaluate the impacts on species with the proposed change in criteria.

Response: We included all literature and studies to our knowledge that were pertinent and described TDG risk to aquatic life in the EIS. The existing and proposed TDG criteria are an up to value, such as up to 125% TDG and does not require maximum allowable TDG level to be attained. The additional biological monitoring associated with the adopted rule is intended to capture any impacts that longer duration and/or higher TDG levels may have on salmonids or non-salmonids.

(Action Agencies) DEIS, pg 37, Johnson et al (2005) cited on DEIS pg 37, states, "The authors concluded that there was minimal potential for GBT on adult spring and summer Chinook salmon under average

river conditions, despite the fact that fish tissues were likely supersaturated with dissolved gases." This citation is problematic because it omits the following key finding from the research, "However, additional research over a broader range of dissolved gas conditions is needed to confirm that short, but frequent, exposure to conditions conducive to gas bubble formation does not affect survival and reproductive potential." Additionally the magnitude of the operation is not captured in this citation nor the vast majority of all the literature cited.

Response: The author's conclusion of "minimal potential for gas bubble trauma for Chinook under average river conditions" is based on the findings of the study related to migration depth and depth compensation. The statement describes the inherent limitations of evaluating migration depth under average conditions. This research falls under the evaluation of migration depth in terms of risk to TDG levels, but did not include a section that evaluates survival and reproduction potential. For information regarding survival and reproduction, please refer to sections and literature cited under "Potential Negative Impacts of Total Dissolved Gas." Studies in the "effects" sections evaluate the available literature on different life stages of salmonids and non-salmonids from both laboratory and field studies.

The magnitude of TDG levels is often not included because of the highly fluctuating conditions in field studies. When it was feasible, attempts were made to include a range or mean TDG levels and associated effects within the EIS. The Johnson et al. (2005) findings were primarily used to evaluate migration depth in terms of depth compensation. Risk can be inferred by integrating migration depth and applying depth compensation.

The data gap noted in Johnston et al. (2005) more appropriately resides in the uncertainty section. These uncertainties are captured within the "Effects of Repeated Exposures to High TDG Levels" and "Recovery from Gas Bubble Trauma" sections.

(Action Agencies) DEIS pg 43. The DEIS cites several documents that emphasize the uncertainty of repeated and chronic exposure to supersaturated water conditions. Reading the McGrath et al. (2006) citation directly emphasizes this point even more: "These areas of concern are 1) sensitive and vulnerable species or life stages, 2) long-term chronic or multiple exposure, 3) vulnerable habitats and reaches, 4) incubating fish in hyporheic habitats, and 5) community and ecosystem impacts." An additional quote from McGrath et al. (2006) is also informative: "Long-term chronic exposure to levels as low as 110 to 115% TDG may produce serious sublethal effects and signs of GBD (Lutz 1995; Mesa et al. 2000; Beeman et al. 2003)." Implementing Alternative 4 for 2 years would provide WDOE time to evaluate and assess biological impacts under the proposed WQS.

Response: A temporary TDG rule to modify TDG levels up to 125% or a rule with a sunset date would likely not be approvable by EPA. During the EPA approval process under the Clean Water Act, determinations will need to be made on whether this rule is protective of aquatic life for perpetuity. Furthermore, a formal rule change is intended to be permanent rather than mirror an economically based regional agreement that balances fish and hydropower benefits. The water quality standards, under the Clean Water Act, set water quality standards based on aquatic life protection. The seasonal TDG criteria during spill season on the Snake and Columbia rivers is intended to benefit downstream fish passage while minimizing impacts to other aquatic life. This adjusted TDG allowance is in place to mitigate impacts of hydropower projects and strike a balance between water quality and fish passage benefits.

(Action Agencies) DEIS, pg 45 and 46: Research has indicated that fish not exhibiting signs of GBT may still die from acute toxicity. Monitoring for non-GBT impacts related to TDG is not outlined in the

implementation plan. Consider how WDOE will assess potential impacts to aquatic species that may not be detected through proposed GBT monitoring.

Response: Gas bubble trauma (GBT) is a known symptom of high TDG levels. NOAA has set GBT biological thresholds for endangered salmonid species that they deem protective and that incorporates a margin of safety based on studies finding significant mortality does not occur in test fish until approximately 60% of a population is showing signs of GBT (Maule et al. 1997a, 1997b). We are open to receiving refinements or improvements to the widely accepted biological monitoring methods, standards, and protocols. These refinements to monitoring methods may be discussed during the development of biological monitoring plans.

(Action Agencies) DEIS, pg. 46. The DEIS states, "Finally, several studies have suggested that GBT may not be an appropriate metric to measure TDG related effects. Some researchers found poor relationships between GBT observations and elevated TDG conditions that result in mortality (Meekin and Allen 1974; Weitkamp et al. 2003b). This further brings in question, the efficacy of biological monitoring programs at hydropower projects and whether observations of GBT accurately depicts the health of aquatic life passing through dams or the resident species residing above or below dams." It is not clear with this statement how WDOE proposes to move forward with the given uncertainty. The Implementation Plan proposes to use GBT monitoring solely as the mechanism for adjustment to the TDG levels in season.

Response: We have reworded this sentence to better align with the conclusions from these two studies that gas bubble trauma (GBT) monitoring may not be an appropriate metric during very high acute TDG exposure events. Meekin and Allen (1974) state that fish exposed to sublethal TDG levels generally showed external symptoms of GBT but fish exposed to lethal levels in shorter exposure periods did not always show external symptoms. Similar results are demonstrated by Weitkamp et al. (2003b) in which fish exposed over two days had evidence of GBT but those that succumbed to acute toxicity showed only minor signs of GBT.

In the natural environment, depth compensation reduces the likelihood that TDG levels will reach acute levels that result in mortality. The Fish Passage Center has monitored GBT incidence in salmonids since 1995 during involuntary and voluntary spill levels and have reported relatively low risk up to 125% TDG. However, we recognize that during involuntary spill or uncontrolled spill that TDG levels can reach very high levels. During uncontrolled spill, GBT incidence data collected will not be compared with biological thresholds. The biological monitoring required as part of this rule proposal will only require GBT incidence to be compared to biological thresholds during controlled fish spill at TDG levels up to 125%.

While we recognize there are uncertainties in GBT monitoring, the best available science suggests that GBT is a symptom of exposure to high TDG levels and that it may represent the best available method to capture TDG related effects. The TDG levels that aquatic species are exposed to during the spill season are relatively constant and therefore effects should manifest as gas bubble trauma. We welcome further input that the Action Agencies can provide regarding monitoring methods or protocols.

(Action Agencies) DEIS pg 46 and 47. WDOE recognizes conflicting data regarding depth compensation. The DEIS (pg. 46) states "Several studies have demonstrated that depth compensation is a mechanism that protects aquatic life from TDG related effects. However, there is controversy whether fish can detect supersaturated waters and purposely depth compensate or if they move through the water column in a less intentional manner to a preferred foraging or migration depth. Moreover, some studies suggest that depth compensation is more efficient for some fish than others. Significant differences in

mortality for different fish at the same water depths and TDG levels, suggest that coping mechanisms for high TDG conditions may differ depending on the species." Despite this uncertainty regarding the ability of all species to depth compensate, the DEIS cites Aquatic Life Depth Compensation as a mitigation measure (pg. 47) for high TDG impacts. It is not clear in the DEIS or the Implementation Plan how biological monitoring will be used to reduce this uncertainty and verify this key assumption.

Response: Depth compensation mitigates for the harmful effects that high TDG levels would otherwise have on aquatic life. For salmonids, adequate data is available that demonstrates that their traveling depths should protect them from elevated TDG levels through depth compensation. One of the data gaps presented in the EIS is the lack of information on non-salmonids, including life history and depth compensatory information.

The biological monitoring will not generate specific information regarding depth compensation or behavioral preferences for individual aquatic species. However, monitoring may provide insight to life history information if the same aquatic species demonstrate high gas bubble trauma (GBT) incidence due to increased TDG levels. The expansion of the biological monitoring to include non-salmonids is aimed at determining if TDG levels are affecting those fish for which we have less information regarding their behavioral tendencies in the water column. If the biological thresholds for GBT are exceeded for salmonids or non-salmonids, then spill will be reduced to protect aquatic life.

(Action Agencies) DEIS, pg 55: In the summary of Alternative 3, it should be clarified that there is an increased risk of GBT occurrence in aquatic species as described throughout the DEIS.

Response: The sentence referenced was not intended to pertain only to gas bubble trauma (GBT) risk but rather a broad statement regarding risk to aquatic life. GBT is a symptom of high TDG levels that demonstrate an effect is occurring but other sub-lethal effects may co-occurring at elevated TDG levels. GBT is the easiest symptom to measure that is indicative of risk but not the only risk. We have decided not to make any changes in regard to this comment.

(Action Agencies) DEIS, pg 5 and pg 12: Regarding Recommendation 8 from the SRKW Task Force "Governor Jay Inslee includes a recommendation encouraging testing the potential of higher TDG standards and attendant spill to improve salmon survival and abundance, while also considering ways to minimize impacts on the BPA's Fish and Wildlife Program." If the recommendation is a test, then Alternative 4 for a two year period TDG standard change is appropriate. Because this is a Washington recommendation for testing, the state should ensure that its monitoring of surface waters (Draft Implementation Plan, pg 14) is appropriate to capture the results of operations to this level.

Response: The adopted rule will allow for test operations that may benefit the southern resident orcas and meet recommendations by the Orca Task Force. The adopted rulemaking allows for test spill up to 125% but does not require spill up to a particular TDG level. We are responsible for developing standards but it should be understood that TDG criteria sets the maximum allowable level and any TDG level below the maximum would meet the water quality standard. The further adjusted TDG allowance up to 125% (12 hour)/126% (2 hour) is optional and conditioned by requiring approved biological monitoring and biological thresholds.

(Action Agencies) DEIS, pg 7 and 53: Alternative 4 is titled "removal of the 115% forebay criterion..." but the description describes returning "to the more stringent forebay and tailrace...". This is inconsistent.

Response: We have made the suggested corrections to state that during 8 hours a day spill would be set at lower 2014 BiOp levels.

(Action Agencies) DEIS, pg 53: Alternative 4 states that the 125% criterion would be applied to approximately 16 hours per day and would return to the more stringent forebay and tailrace 12-hour average criteria for approximately 8 hours a day. It would be impossible to comply with a more stringent standard for 8 hours a day. A more stringent forebay criteria would be impossible to meet for only portions of each day as travel time is between projects is variable and degassing rates are dependent upon environmental factors. Also, this does not align with the Attachment I 6 flex spill agreement, which does not specify a lower TDG during performance standard hours. Instead, it is anticipated that the same criteria will apply during the gas cap and performance standard hours and we recommend removing language regarding the more stringent standard for those 8 hours.

Response: We have made the suggested corrections to state that during 8 hours a day spill would be set at lower 2014 BiOp levels.

(Action Agencies) DEIS pg 56: Remove the phrase "and would ease spill operations" at the top of pg 56 as this is not true.

Response: We have modified the sentence to state that matching Oregon's averaging period would ease the implementation of water quality standards.

(Action Agencies) DEIS, general comment: Replace "voluntary spill" to "juvenile fish passage spill", which more accurately represents the purpose of the spill operations.

Response: We have modified this phrase to read "fish passage spill."

(Action Agencies) DEIS general comment: The DEIS repeatedly refers to the dams as "hydropower projects" or the Columbia River System as "the hydrosystem." It would be worth clarifying that the DEIS is referring to the 14 dams that are operated in a coordinated manner for multiple congressionally authorized purposes, including hydropower generation, but also for flood risk management, irrigation, navigation, municipal and industrial water supply, fish and wildlife conservation, recreation, etc. in order to provide a better context for all of the authorized purposes for these projects. (this comment was also made for the Draft implementation Plan).

Response: In the executive summary, we state: "an additional adjustment to the TDG surface water quality standard that could be applied at the lower eight federal dams on the Snake and Columbia rivers and the five public utility district dams on the middle Columbia River." This statement provides context for the application of the adopted rule. Furthermore, Figure 1 depicts the hydropower projects that this rule has the potential to impact. In the fourth paragraph of the executive summary the EIS states: "The Spill Agreement seeks benefits to salmonid survival in concert with managing the Columbia River system for multiple congressionally authorized purposes, including power generation to ensure the Pacific Northwest of an adequate, efficient, economical, and reliable power supply." We believe that further information is beyond the scope of the EIS and have decided not to make any changes in regard to this comment.

(Action Agencies) DEIS, p. 4 and 16: states that the Spill Agreement also intends to provide a pause in "litigation over the impact of the federal dams on ESA-listed salmon and steelhead...." The ongoing litigation is regarding the impacts of the operations and maintenance of the federal dams on ESA-listed salmon and steelhead.

Response: We have made the suggested changes.

(Action Agencies) DEIS, pg 5 and 16: Describes Flex Spill as applying to "times of peak energy demand (early morning and late afternoon/evening)...." And pg 16 talks about "early morning and late afternoon/evening" and a lot of detail on the "Duck Curve." Since the Action Agencies are able to do 8

hour blocks at most projects during 2020 we would like this language to reflect that. See Attachment A to the Agreement.

Response: We have added the word "generally" in context to applying performance spill during times of peak energy demand.

(Action Agencies) DEIS, pg 7 and 53: States that July 1, 2021 is the end date for flex spill operations. Please revise the date to June 20.

Response: We have revised the sunset date in the EIS.

(Action Agencies) DEIS pg 7 and 26: The DEIS states that "[t]he CSS model considers minimizing powerhouse encounters through measures such as spill or dam removal as critical to reducing 'delayed mortality' from hydro system passage and ultimately increasing adult salmon and steelhead returns." Since dam removal is not within the scope of the DEIS, Washington should explain how CSS results are being used for its conclusions on the impacts of higher levels spill.

Response: The CSS model predictions indicate additional benefits for fish passage for spill levels up to 125% TDG. While TDG impacts have been characterized up to 125% for salmonids, some data gaps exist in regard to non-salmonids. We are addressing the uncertainties surrounding impacts to aquatic life, not in relation to the CSS model, but rather the evaluation of available scientific literature. Biological monitoring of salmonids and non-salmonids will be required to ensure the protection of aquatic life. No changes were made in relation to this comment.

(Action Agencies) DEIS pages 7 and 53: Clarify why the language "return to more stringent forebay" criteria is included on Alternative 4, if the alternatives all state removal of the 115% forebay criteria, or remove this language.

Response: We have clarified this statement to say that performance spill would be applied at a lower 2014 BiOp spill level for 8 hours per day.

(Action Agencies) DEIS, pg 8: Language should be added to link the 125% criterion during spring spill to juvenile ESA-listed anadromous fish.

Response: We have made the suggested changes in context of the Flexible Spill Agreement. In regard to the adopted TDG rule, the scope of the changes apply in a broader context to all anadromous fish passage.

(Action Agencies) DEIS, pg 18: "Standard modification and criteria adjustment" should be reversed.

Response: We have deleted the text in parentheses because it does not provide any additional insight and the two terms can be interchanged.

(Action Agencies) DEIS, pg 23: Replace "negative market" with "lack of market". Spilling due to lack of market does not necessarily present a negative market condition, consequently, we recommend revising the following sentence "Operational spills occur when the ability to pass water through the turbine is limited or in a negative market when power demand is low" to read: "Operational spills occur when the ability to pass water through the turbines is limited or lack of market when power demand is low."

Response: The recommended changes within this comment were made in the EIS.

(Action Agencies) DEIS, pg 20: 3rd paragraph under "Proposed Rule change for Increased Spill" section, the 120% should be 125% so it reads "Given the dam and salmon managers have not previously provided voluntary (fish passage) spill to 125%...", not 120% because spill has occurred to 120% to date under the current TDG standard.

Response: The recommended changes within this comment were made in the EIS.

(Action Agencies) DEIS, pg 20: #2 identifies objectives of the EIS but focuses only on the Flex Spill agreement's fish benefit objective rather than the three objectives, power and operational feasibility. Recommend including all three objectives.

Response: When evaluating changes to the water quality standards, power and operational feasibility is not considered. The focus of water quality standards is on aquatic life protection. An increase is spill is predicted to increase fish passage benefits. The goal of the adopted rule is to increase fish passage benefits without causing harm to other aquatic life. Sensitive aquatic life will be monitored to ensure they are protected. We have decided not to make changes in regard to this comment.

(Action Agencies) DEIS, pg 22: It would be beneficial to have results/references from NOAA Fisheries Compass modeling in addition to CSS modeled results. Washington could utilize analysis in the 2019 NOAA Fisheries Columbia River System Biological Opinion.

Response: We have provided a brief summary of COMPASS model predictions based on information provided in the 2019 FCRPS Biological Opinion.

(Action Agencies) DEIS, pg 22: Should clarify that the modeled results were only for spring spill. Also, the modeled scenario differs from the spill regime outlined in the Spill Agreement for 2020- 2021. The scenario modeled in the CSS included 24 hours of spill to the 125% gas cap. Improvements to the powerhouse encounter rate, if provided, should be based on the spill regime in the spill agreement.

Response: We have clarified that model predictions are for the spring spill season. Within the CSS model section, it is acknowledged that flexible spill operations would have less predicted benefit than 24 hours of spill. The development of the TDG water quality criteria will not specify a particular duration of spill and therefore, 24 hours of spill is appropriately included in the analysis (although 24-hour durations of spill is not anticipated to be implemented and would be dependent on ESA consultation).

(Action Agencies) DEIS, pg 23: Suggest removing language about involuntary spill as it is not related to the 125% criteria.

Response: The explanation of voluntary and involuntary spill scenarios is important for providing context to fish passage and hydropower dam operations. We have decided not to make the suggested changes.

(Action Agencies) DEIS, pg 48: Change "since 2018" to "in 2018".

Response: We have made the suggested change.

(Action Agencies) DEIS, pg 49: Change "hydropower spill season" to "juvenile fish passage spill season".

Response: We have changed the wording to "fish spill season."

(Action Agencies) DEIS, pg 49: Change "hydropower operations" to "spill operations".

Response: We have changed the wording to "hydropower dam spill operations."

(Action Agencies) DEIS, pg 49 and 54: Change "The removal of the forebay criteria of 115% may slightly increase the risk of TDG related impacts to aquatic life by increasing the duration of exposure at 120% TDG level." to "The removal of the forebay criteria of 115% will slightly increase the risk of TDG related impacts to aquatic life by increasing the duration of exposure at 120% TDG level."

Response: We believe that definitively stating that risk will increase with the removal of the forebay criterion is not warranted. While the duration of exposure at 120% TDG would likely increase with the removal of the 115% forebay criterion, that does not translate to effects to aquatic life. Depth compensation may afford aquatic life protection at 120% TDG at all exposure durations. We do not know the impacts of a longer duration of exposure to 120% TDG on risk and therefore, we have decided not to make changes to this sentence.

(Action Agencies) DEIS, pg 50: Change "The Spill Agreement calls for ramping down spill at each dam well below the spill levels creating 120% TDG for eight hours a day every day during the spring spill season" to "The Spill Agreement allows for ramping down spill at each dam well below the spill levels reducing TDG below 125% for up to eight hours a day during the spring spill season."

Response: The sentence cited in the comment is within Alternative 2 that examines the removal of the 115% forebay criterion and maintaining the 120% tailrace criterion. We found this statement outdated given that the 2019 spill season is past and that 16:8 flexible spill operations at 120% is no longer expected to occur. Starting 2020 and 2021, the flexible spill agreement outlines implementation of flexible spill operations at 125% TDG. We have decided to delete this sentence under Alternative 2 given that it is no longer relevant.

(Action Agencies) DEIS, pg 50: Define "prolonged" as it relates to exposure to higher TDG levels.

Response: We have revised the wording of this sentence.

(Action Agencies) DEIS, pg 51: Clarify that Chum salmon spawn below Bonneville Dam prior to the early spill season, not during.

Response: We have revised the sentence as suggested.

(Action Agencies) DEIS, pg 54: States "The removal of the forebay criteria may increase the duration of exposure to higher TDG levels but would not necessarily change the maximum allowable TDG level." This language is unclear. Spill levels did impact the maximum TDG at 5 out of the 8 projects (for those projects that the downstream forebay had the more restrictive criteria).

Response: We have clarified the sentence to read that the removal of the forebay criterion does not change the maximum allowable TDG level in the tailrace. The tailrace criterion will not change with the removal of the forebay criterion.

(Action Agencies) DEIS, pg 55: In the summary of Alternative 4 on, the alternative is qualified as "less desirable than a rule that provides flexibility on implementation of different spill configurations that is offered by Alternative 3." The subjective language "less desirable" should be removed from this statement.

Response: We agree that this is subjective language and have revised the sentence.

(Chelan County PUD) Finally, in preparing its final environmental impact statement, Ecology should consider whether increased spill and higher TDG standards are the best scientific decision for salmon and steelhead.

Response: The intent of the adopted rule is to increase downstream fish passage while minimizing impacts to aquatic life. To ensure the protection of the most vulnerable aquatic species, we will require biological monitoring of salmonids and non-salmonids and implement biological thresholds for the 125% (12 hour)/126% (2 hour) TDG tailrace criteria. The 125% (12 hour)/126% (2 hour) tailrace criteria will be optional. Hydropower projects may continue to implement the 115% forebay/120% tailrace/125% maximum TDG criteria. The TDG water quality

criteria represent a maximum allowable level, however, spill to the maximum levels is not required in the water quality standards.

(Defenders of Wildlife) Given the track record of the Army Corps, BPA, and NOAA Fisheries, we are skeptical of the agencies' ability to produce a legally valid Bi-Op. Every Bi-Op from 2001 to 2014 has been found to be illegal and in violation of the DEIS. This should be noted on page 21 of the DEIS, which discusses the history of Bi-Ops in the basin. It excludes from this history the illegality of these Bi-Ops. The current Bi-Op for the interim spill agreement has not been challenged, but it is a short-term opinion that is set to expire once the NEPA process concludes in 2020.

Response: We have added additional information regarding the invalidation of BiOps and the role the flexible spill agreement is playing in pausing litigation within the EIS. We have removed the rule language that links the use of the 125% (12 hour)/126% (2 hour) tailrace criteria to a legally valid BiOp. The rule language now specifies that the use of the 125% (12 hour)/126% (2 hour) tailrace criteria are dependent on Endangered Species Act consultation.

(Defenders of Wildlife) The DEIS spends two pages discussing the potential benefits of increasing spill and over ten pages discussing the potential negative impacts. When discussing the positive benefits of spill, there is only a brief mention of how it helps juveniles avoid powerhouse mortality. There is little to no mention of how spill reduces juvenile travel time and thus exposure to invasive predators. Increased TDG can also reduce populations of invasive salmon-predators. Williams (2006) documents multiple studies of how restoring natural processes in rivers, such as increasing flow rates via increased spill, aides in salmon restoration. Other recent studies show that management of freshwater systems, such as increasing spill, can affect smolt-to-adult returns, even when taking ocean conditions into account (Schaller et al., 2013; Petrosky and Schaller, 2010; Schaller and Petrosky, 2007; Haesecker et al., 2012).

Response: There are several aspects to examine when reviewing adverse impacts of TDG on aquatic life. There is much more data evaluating the risk of TDG to aquatic life than there is surrounding positive impacts of spill. The primary reason for this discrepancy is that the positive impacts of spill is based on model predictions and not empirical data. Empirical data serves as the basis for models but are not directly dependent upon it.

We specifically point out indirect benefits of increasing spill within the draft EIS: "Potential indirect effects of increasing spill, although not quantified, include reduced predation of out-migrating juvenile salmonid in reservoirs from faster migration travel time and reduced holding times and water temperature." These indirect benefits are not quantified and are not related directly to fish passage, which is the intent of this rule. While we agree that indirect benefits are important, more detail is not necessary given the scope of the rule. The draft EIS cites all of the references provided within this comment. We have decided not to make any changes in regard to this comment.

(Defenders of Wildlife) Throughout the DEIS, Ecology cited several studies suggesting that increasing TDG and prolonged exposure to saturated water is detrimental to aquatic life, particularly with regard to gas bubble trauma (GBT). However, the majority of these studies suggest that spill up to 125% is safe for most native aquatic species, particularly salmonids. The DEIS also fails to acknowledge the substantial mortality caused by the hydropower network in the Columbia Basin. Dams and their reservoirs kill as much as 70 percent of the out-migrating smolts and more than 15 percent of the returning adults. Some smolts die further downstream as a result of cumulative stress and injury (CSS, 2018). Dams have also reduced water velocity, increased water temperatures, exacerbated predation, prolong salmon migration, and increased salmon mortality and injury during dam passage (Budy et al., 2002; Scheuerell et al., 2009; Van Gaest et al., 2001). The DEIS fails to mention, analyze, or mitigate these impacts.

Response: The purpose of the adopted rule is to increase fish passage. The draft EIS explains that reduced powerhouse encounters and greater spill has been predicted to increase survival of outmigrating salmonids. The adopted rule does not mitigate for all of the impacts that hydropower dams may have on aquatic life in the Snake and Columbia rivers, but rather seeks improvement in fish survival while minimizing TDG effects under the current hydrological conditions. The draft EIS does address the potential indirect benefits of increased spill on temperature and predation. We have decided not to make any changes in regard to this comment.

(Defenders of Wildlife) Several times in the DEIS, Ecology notes that it expects increased salmon mortality due to GBT, but it does not note that other sources of salmon mortality are expected to decrease. As a result, the DEIS presents increased mortality from GBT as additive to existing mortality levels. Ecology should provide a more holistic assessment of mortality levels. While the rate of mortality from GBT may increase, overall mortality in the CRSO is expected to decrease, resulting in more salmon overall reaching the Pacific Ocean. It should also be noted that Ecology may be overstating the risk of increased mortality from GBT. On page 30, the DEIS cites the Fish Passage Center's GBT monitoring program. Of the samples taken since 1995, only 37 samples, 0.013% of the total samples, had GBT rates over 15%, which is the threshold criteria for GBT. Of those 37 samples where GBT mortality exceeded 15%, over three quarters of those occurred with TDG levels exceeded 125%. This shows that in a natural setting, native salmonids can withstand higher levels of spill than what the state currently allows.

Response: We anticipate that more spill resulting in higher TDG levels will increase the risk of potential impacts to aquatic life. Risk can be characterized as sub-lethal (e.g. gas bubble trauma) and lethal effects. We did not state there would be increased mortality due to gas bubble trauma. Some of the scientific literature may have indicated higher mortality at higher TDG levels but that information was not translated directly to the proposed rulemaking. An analysis that evaluates the risk of higher TDG levels on aquatic life against the potential indirect effects of higher spill such as reduced temperature and predation has not been completed to our knowledge. We are hesitant to speculate on such an analysis and therefore have decided not to make any changes.

(Defenders of Wildlife) Ecology defends its emphasis on protecting these invasive fish by citing the "recreational value for (anglers)2", but the DEIS never mentions the tribal treaty rights reserved by Native American tribes throughout the region. Treaties are the supreme law of the land, and the state of Washington has an obligation to honor these treaty rights. After European colonization, dams caused the collapse of salmon runs across the Pacific Northwest, altering life for countless tribes and flooding villages and spiritual sites in the process. Restoring salmon runs is a key part of the state's obligations to honor these treaty rights, and the DEIS should place a greater emphasis on honoring these treaties over providing recreational opportunities for a handful of (predominantly white) anglers.

Response: The adopted rule aims to benefit fish passage and result in greater survival for outmigrating salmonids. This rule has the potential to contribute to salmon recovery in the Snake and Columbia rivers for all interested parties. During this rule, we have reached out to tribes interested or affected and have received relatively positive responses. The link between invasive fish species and treaty rights is beyond the scope of this rulemaking. We have deleted the statement that non-native fish provide recreational opportunities.

(Defenders of Wildlife) It is also troubling that in the DEIS, the state is preoccupied with maintaining healthy populations of invasive salmon-predators, but the state is simultaneously expanding lethal removal efforts of native predators, including sea lions. Typically, ecologists advise that invasive species should be eradicated and contained while native species should be protected and managed. It is

disappointing to see the state take the opposite approach, particularly given the impact these invasive species have on our most iconic and economically important species.

Response: The draft EIS does not indicate or support maintenance of invasive species. In instances of sampling for non-salmonids, when native fish sample sizes are insufficient, non-native species may serve as an indicator of native fish species health. This is not to be construed with support for non-native fish species in the Snake and Columbia River system. We have decided to remove invasive species from being counted towards the weekly minimum sample sizes for biological monitoring associated with use of the 125% (12 hour)/126% (2 hour) tailrace criteria. Statements regarding removal of sea lions is beyond the scope of the rulemaking and water quality standards development.

(Defenders of Wildlife) The majority of studies cited in the DEIS show that the most sensitive species to higher levels of TDG are invasive, non-native, salmon predators. The DEIS should view this as a benefit to salmon and orca recovery. While the DEIS states that these invasive species may be "detrimental to native fish species," it fails to discuss the high level of juvenile salmon mortality from these invasive species. Reducing and/or eliminating populations of these invasive fish would be a benefit to salmon and orcas.

Response: When developing water quality standards all native aquatic life needs to be considered. Some studies have demonstrated that native non-salmonids are sensitive to TDG levels including largescale suckers, sculpin, and northern pikeminnow. While some native non-salmonids may be predators of salmonids, the Clean Water Act does not prioritize protections of particular native species over others but rather requires protection of all aquatic life including the most sensitive species. The impacts of invasive species on salmonids is beyond the scope of a rulemaking that proposes to modify allowable TDG levels in the Snake and Columbia rivers for the purpose of fish passage.

(Defenders of Wildlife) The DEIS also states that monitoring, which will inform adaptive management, will include nonnative salmonids. Defenders is concerned that this will allow dam operators to reduce spill if it is impacting non-native, invasive fish populations, even if the spill regime is benefiting endangered, native salmonids. The state should not curtail spill purely because invasive species are negatively impacted. The associated biological monitoring plan should explicitly note that, while invasive species will be monitored, adjustments to TDG levels will not be dictated by the health of invasive species, particularly if native species show either no signs of damage or show signs of recovery. Currently, the biological monitoring program could allow for spill levels to be curtailed if populations of non-native fish begin to decline. This would be inappropriate given the current orca and salmon crisis.

Response: We have decided to remove invasive species from being counted towards the weekly minimum sample size. However, we will require that any GBT monitoring that occurs, regardless of the species, be reported.

(Defenders of Wildlife) On page 22, the DEIS states that Snake River chinook and steelhead have "rebounded." This characterization is inaccurate and implies that these species are on track to being recovered. While these populations have increased from historic lows, they are a small fraction of what they were prior to dam construction.

Response: We deleted “rebounded” and replaced it with “increased” in reference to Snake River Chinook and steelhead populations since the 1990s.

(Defenders of Wildlife) On page 23, the DEIS states that natural processes can increase TDG, but it does not estimate TDG levels on the lower Snake and Columbia rivers prior to dam constructions. This

information would provide a helpful baseline of the natural TDG levels experienced by native fish and wildlife prior to dam construction and help managers set appropriate spill levels. These rivers had large rapids that would have increased TDG on the rivers. The DEIS should either estimate what TDG levels were prior to dam construction or at least acknowledge that native species in the Columbia Basin evolved with naturally higher TDG levels.

Response: We do not have available TDG data that predates the construction of the hydropower dams on the Snake and Columbia rivers. We welcome any information that can be provided. It cannot be assumed that aquatic life can develop tolerances to higher TDG levels. The EIS addresses repeated exposures and concludes: "The body of literature can be conflicting, where in some studies previous exposure to TDG followed by depth compensation prolonged mortality (Knittel et al. 1980; Fidler 1988; Antcliffe et al. 2002), while other studies suggest an increased susceptibility to gas bubble trauma (Ebel et al. 1971; White et al. 1991)." Based on this information, we have decided not to make changes in regard to this comment.

(Defenders of Wildlife) On page 27, the DEIS should acknowledge that much of suitable chinook salmon spawning habitat on the mainstems of the Columbia and Snake Rivers was lost due to flooding from dam construction.

Response: There are likely several reasons for the reduction of suitable Chinook spawning habitat since the development of hydropower dams. A detailed explanation of the numerous factors contributing to habitat degradation is beyond the scope of this EIS. The spawning habitat locations and explanation already included in the EIS are pertinent to evaluating different life stages of salmonids present within the geographical scope of this rule and potential exposures to elevated TDG levels. We have decided not to make the suggested changes.

(Fish Passage Center) DEIS comment: To avoid confusion, the EIS should specify that the objective of the experimental flex spill is to avoid powerhouse passage of juvenile salmonids.

Response: We have added these suggestions to the "Flexible Spill Agreement" section.

(Fish Passage Center) DEIS page 26: This section notes that the Comparative Survival Study (CSS) model predicts that the flex spill operation to 125% TDG would benefit salmon juvenile fish survival and adult returns, relative to the 2018 court-ordered operations and 2019 flex spill operations. To encourage a clear understanding of the experimental flex spill operation, we recommend that all references to CSS model predictions of potential benefits of the flex spill operations state that these predictions are based upon predicted reductions of juvenile salmonid powerhouse passage. CSS analyses indicate that reductions in powerhouse passage are associated with increased juvenile survival (McCann et al. 2018) and increased SARs (McCann et al. 2016, McCann et al. 2017).

Response: We dedicated a section within the draft EIS to the CSS model that includes explanation of reduced powerhouse encounters with increased spill. We find the current explanation adequate to describe the basis of the model. We have decided not to make changes in regard to this comment.

(Fish Passage Center) The Draft EIS provides a lengthy review of literature on the effects of total dissolved gas (TDG) on resident and anadromous fish. However, this review does not mention the recent analyses of TDG and instantaneous mortality (see Chapter 3 of McCann et al. 2018). Results from these analyses indicate that the Relative Variable Importance values for TDG variables (average TDG or maximum TDG) were low compared to other variables, indicating that the TDG variables were not consistently included in the top fitting models for explaining variation in instantaneous mortality. In addition, the model-averaged coefficients of the effects of TDG were all near zero and confidence

intervals overlapped zero for all species and reaches analyzed. This indicates that there was little association between TDG levels and instantaneous mortality rates. We recommend that WA DOE review Chapter 3 of the 2018 CSS Report (McCann et al. 2018) 3 and include this in their review of studies on the effects of TDG. A summary of these analyses should be included in the EIS.

Response: We have added a sentence in the "Model Predictions for Salmonid and Steelhead Survival" section in regard to instantaneous mortality and powerhouse passage.

(NOAA Fisheries) DEIS Pg. 21: There is reference to the 2008 FCRPS Biological Opinion (BiOp) and the 2014 Supplemental BiOp, but there is no mention of the 2019 CRS BiOp which has replaced previous versions. Some sections of the DEIS appear to have been written previous to the spring of 2019 and should be updated with recent information.

Response: We have updated the "Spill Operations" section to include the 2019 FCRPS BiOp.

(NOAA Fisheries) DEIS Pg. 22: We suggest updating the Final EIS language to represent the current data from 2019. The powerhouse encounter rates and BPA power revenue have been estimated for 2019. The Final EIS should be updated with this most recent info for the record.

Response: The updated 2019 CSS report is in draft form and has not been finalized. At this time, we will continue to rely on the latest finalized report from 2018.

(NOAA Fisheries) DEIS Pg. 28 text states "Of the routes available, studies have shown spillway passage is associated with the lowest mortality (Whitney et al. 1997; Muir et al. 2001)." This statement gives the impression that spillway passage is always associated with the lowest mortality. While it is often true that spillway passage has lower direct mortality than other routes, this is not always the case. We suggest correcting these statements in the Final EIS to accurately reflect this. The DEIS also fails to acknowledge that juvenile salmonids passing through surface passage routes generally have equal or higher survival rates than those passing through conventional spillways (NMFS — 2010 Supplemental FCRPS Biological Opinion; 2019 CRS Biological Opinion, Ploskey et al. 2012). Ploskey, G.R., M.A. Weiland and T.J. Carlson. 2012. Route-specific passage proportions and survival rates for fish passing through John Day Dam, The Dalles Dam, and Bonneville Dam in 2010 and 2011.

Response: We have added information regarding low mortality with surface passage routes to the EIS.

(Save Our Wild Salmon Coalition) Ecology still does not acknowledge in the DEIS the difference between laboratory studies with extended exposures and no depth compensation and field studies and other empirical evidence about the effects of spill and TDG levels up to 125 percent on salmonids or other aquatic life. This may leave the potentially misleading impression that there is considerably more uncertainty about the benefits and risks of spill than the data warrants. For example, in the past, Ecology has described a number of laboratory studies reporting high incidences of GBT but failed to discuss how these conditions relate to conditions juvenile salmon are likely to experience in the Snake and Columbia rivers during periods of voluntary spill. Many of these studies involve continuous exposure to elevated levels of TDG for extended periods and provide limited opportunities for depth compensation. It is not clear that this kind of continuous exposure to TDG in laboratory conditions is likely to occur during actual voluntary spill operations.

Response: In the draft EIS, we have a section dedicated to this very discussion of the advantages and disadvantages of laboratory versus field studies. The section is titled: "Total Dissolved Gas Studies: Laboratory versus Field." At the end of this section, we specifically note: "Both laboratory and field studies will be used in this review but limitations of both study types should be noted." We have decided not to make changes in regard to this comment.

(Save Our Wild Salmon Coalition) In the DEIS (and in its prior EIS for a short-term modification of the TDG standards), Ecology described a number of what it apparently considers relevant areas of uncertainty regarding the effects of allowing voluntary spill at levels of to 125 percent TDG. As with most areas of scientific inquiry, there are always areas of uncertainty that can be identified. The issue is how relevant are these uncertainties to the decision at hand. Ecology's prior discussion of uncertainty does not address this and similar questions, or describe the extent to which the CSS analyses (and other available information) indicate that the existing areas of uncertainty are not actually material to a decision about whether to adopt a 125 percent tailrace TDG standard. For example, Ecology has stated that "further research may be necessary" to determine whether current levels of TDG are having an adverse impact on mainstem salmonid spawning but Ecology fails to identify where such spawning occurs and how and why a modification of tailrace TDG limits would affect TDG levels in these areas. As noted above, one of the most significant such areas is chum spawning below Bonneville Dam where mitigation for potential TDG impacts is already in place.

Response: We agree that there are data gaps in many areas of research. These uncertainties are important to recognize when developing a rule under the authority of the Clean Water Act that requires the protection of aquatic life. In regard to salmonid spawning, we have identified the most relevant areas in the "Potential for Negative Impacts of Total Dissolved Gas" section within "Salmonids" and "Early Development." The first paragraph describes spawning that occurs in the Hanford Reach of the Columbia River, above the mouth of the Snake River, and below Bonneville Dam. These areas have been identified as potential areas of concern where there may be data gaps and highlights historical spawning habitat has been reduced significantly. The designated uses for the Snake and Columbia rivers is salmonid spawning, migration, and rearing. Given the designated use, we need to identify risks associated with these areas in regard to spawning. Given this information, we have decided not to make changes in regard to this comment.

(Save Our Wild Salmon Coalition) Ecology says in the DEIS that eliminating the 115 percent forebay TDG standard and implementing a 120 percent TDG standard for 2019 on a flexible basis as proposed in the Interim Spill Agreement would lead to a miniscule reduction in power house encounters (and hence presumably a miniscule improvement in survival) as compared to 2018 spill and TDG levels. At the same time Ecology reports that eliminating the forebay standard and allowing tailrace TDG up to 125 percent on a 24/7 basis would considerably reduce powerhouse encounters, a larger change that should lead to correspondingly larger survival improvements. In any event, the fact that the predicted improvement for 2019 was minor provides even more urgency to adopt a modification of the TDG standards to allow TDG levels up to 125 percent in the dam tailraces, and correspondingly increased spill at each dam, to better protect downstream migrating juveniles.

Response: We acknowledge your support for the 125% tailrace only criterion.

(Seattle City Light) Adaptive management is presumed to be exercised under the proposed action through biological monitoring. Unfortunately, the DEIS provides limited detail on the specifics of the monitoring program and, as described above, it does not consider all species and life stages that could experience exposure to high TDG levels. The region needs clear empirical information on the biological effects of TDG levels over 120% on all life stages of all aquatic species that inhabit the river system through each dam facility. This should include juvenile and adult salmonids and other native fish and invertebrates. Regional stakeholders need to determine if the benefits of higher amounts of spill provide more benefit than harm. It is perplexing that a permanent rule could be advocated in the absence of presenting the monitoring data from (at a minimum) the initial 2019 testing. To this end, we do not support removing the requirement for a TDG biological monitoring plan for T DG levels up to 120

percent, as presently proposed, until such time that initial results can be independently reviewed and verified.

Response: An adaptive management approach will be recommended in the implementation plan. The implementation plan serves as a guide for those hydropower operators that choose to submit a biological monitoring plan that will need to be approved by Ecology. The biological monitoring intends to focus on those aquatic species that are suspected to be the most vulnerable to TDG effects given their location in the water column, presence during the spring spill season when this rule will be applicable (April 4 through June 21), and are feasible to monitor.

Gas bubble trauma monitoring for salmonids occurs during involuntary and voluntary (controlled) spilling to TDG levels exceeding 125%. The biological monitoring in place has demonstrated relatively low risk to salmonids up to 125% TDG. The required biological monitoring as part of the adopted rule seeks to address data gaps regarding non-salmonids to ensure they are protected. Field studies have generally showed minimal impacts to invertebrates at a range of TDG levels (Dawley 1996; Schrank et al. 1997; Toner and Dawley 1995; Dawley 1995).

The Ecology approved gas abatement plan is not required in the adopted rule because most reasonable and feasible structural and operational improvements to reduce TDG have been implemented and we do not anticipate additional measures to be implemented. A biological monitoring plan has never been required by Ecology to utilize the 115% forebay/120% tailrace/125% maximum criteria. The fisheries, physical, and biological monitoring plan currently in place is implemented as part of the National Marine Fisheries Service Biological Opinions (http://pweb.crohms.org/tmt/wq/studies/wq_plan/wq200814.pdf), which began in 2000. The current monitoring for salmonids through the Fish Passage Center and TDG monitoring at hydropower projects will continue in a similar manner as previous years to ensure the protection of ESA-listed fish species.

(Grant County PUD) The draft EIS and rule change does not address how the standards would be applied if some projects remain at the existing/baseline special fish passage exemption (115%/120%) under Section 200(1)(f)(ii)(A) while other neighboring projects opt into the revised/additional option to the special fish passage exemption (125%) under Section 200(1)(f)(ii)(B) of the proposed rule change. For example, how would the rules be applied when a downstream project opts to remain at the baseline standard and a dam immediately upstream opts into the new standard? Would the upstream dam be required to meet the 115% forebay standard? If not, is it reasonable to expect the downstream project to meet a 120% standard when the upstream project is operating to 125% with no forebay standard?

Response: Any hydropower project that submits an approved biological monitoring plan will have the ability to implement a 125% (12 hour)/126% (2 hour) tailrace criteria effectively removing the forebay compliance point. We understand that hydropower operators are concerned that if upstream projects utilize the 125% (12 hour)/126% (2 hour) TDG tailrace criteria, it may result in elevated TDG levels that exceed the TDG criteria for downstream projects implementing the 115% forebay/120% tailrace criteria. As accounted for in Chapter 90.48.422 RCW, hydropower projects are not responsible for noncompliance due to high incoming TDG. In accordance with the intent of the language in Chapter 90.48.422 RCW, Ecology will use its discretion when determining project compliance with the standards, accounting for all factors contributing to in situ TDG levels. Additionally, Ecology will work with downstream operators to evaluate annual TDG data with respect to concerns of TDG accumulation above the 125% criteria to determine if degassing between dams is not providing the next downstream dam with the

ability to maintain tailrace TDG at or below 125%. We have added a section to the implementation plan to clarify this issue.

(Defenders of Wildlife) Defenders remains concerned with the emphasis that Ecology places on invasive species. Throughout the DEIS, Ecology cites concerns about the impacts of increased spill on non-native species found in the warm-water reservoirs created by the dams. Three species (smallmouth bass, largemouth bass, and northern pikeminnow) are regularly referenced. All three are major salmon predators. On page 32, the DEIS states, "Non-native species can be used as surrogates for native fish species, especially non-salmonids." This statement was not supported by any examples or scientific studies showing that the health of an invasive species can predict the health of a native species. In fact, most ecological studies state the exact opposite. Ecology provided no evidence that small mouth bass and northern pikeminnow (both warm-water adapted species) are suitable surrogates for cold-water-adapted salmonids. In fact, Ecology acknowledges as much on page 34 of the DEIS when it acknowledges that "relationships between TDG levels and GBT were difficult to establish, potentially due to the (high) variability in field studies and fish life history characteristics." This underscores the inappropriateness of using invasive species as surrogates, particularly given that these invasive species are major predators of salmon.

Response: Northern pikeminnow are native to the Columbia River system. The studies examining TDG related impacts to non-salmonid fish examined both native and non-native fish. We refrained from handpicking data from studies showing the prevalence of gas bubble trauma but rather included all of the data reported. Surrogate species are often used in toxicological testing when a particular species cannot be sampled (endangered) or it is infeasible to sample a particular species. Sensitivity of some non-native species have shown to be similar to other non-salmonids and thus, provide useful data in context of evaluating TDG related impacts to native fish species (Schrank et al. 1997; Schrank et al. 1998; Montgomery and Becker 1980; Dawley 1996). Behavioral differences are theorized to be a major factor in sensitivity of aquatic species to TDG (Weitkamp et al. 2008). For these reasons, we decided to continue with the inclusion of non-native species when evaluating TDG effects to aquatic life. In response to a previous comment, we have decided to remove non-native species counts towards meeting weekly minimum sample size requirements in the biological monitoring plan but support the inclusion of non-native species in the EIS.

(Fish Passage Center) The Draft EIS specifies that an Ecology approved biological monitoring program will be required to monitor GBT in salmonids and non-salmonids. The FPC believes that the GBT monitoring program through the SMP fulfills this monitoring requirement for salmonids and we offer our technical support to Washington DOE and others in the design and implementation of the biological monitoring program for non-salmonids. As is noted in the Draft EIS, the Smolt Monitoring Program has conducted the biological monitoring program for GBT in salmonids since 1995. Training, data collection, and data distribution from this program are managed by the Fish Passage Center (FPC), in conjunction with the Pacific State Marine Fisheries Commission, Washington Department of Fish and Wildlife, Oregon Department of Fish and Wildlife, and Chelan PUD. The Draft EIS specifies that an Ecology approved biological monitoring program will be required to monitor GBT in salmonids and non-salmonids. The FPC believes that the GBT monitoring program through the SMP fulfills this monitoring requirement for salmonids. In addition, we offer our technical support to Washington DOE, the U.S. Army Corps of Engineers, and others in the design and implementation of the biological monitoring program for non-salmonids.

Response: We concur that the current FPC biological monitoring satisfies the minimum requirements for salmonids. We support FPC current monitoring efforts and future efforts to incorporate non-salmonids into the monitoring program.

(Jones) It's Oregon's understanding that it is the intent of the Washington Department of Ecology when considering this rule change to be consistent with the flexible spill agreement that was entered into by many regional sovereigns last December. That flexible agreement, to my knowledge, is the first time in decades that basically every regional sovereign and stakeholder was either a signatory or in support of an agreement with regard to hydro system. We believe that there is an inconsistency in the draft Environmental Impact Statement that needs to be corrected in order to keep it consistent with the flexible spill agreement. Namely, how the total dissolved gas cap is calculated.

Response: We have revised the averaging period calculations and duration for the adopted rule to align with previous used averaging periods by the State of Washington and Oregon.

Rule Implementation Plan and Biological Monitoring

Comments on biological monitoring for Gas Bubble Trauma (GBT)

(Action Agencies) The Corps expects that Washington would monitor, track, and inform the Corps if biological or Gas Bubble Trauma (GBT) thresholds identified in the rule were exceeded during spill operations up to 125% TDG as well as communicate modified TDG levels either system-wide or at specific projects to bring incidence of observed GBT back in compliance with the thresholds established in the rule.

(Columbia Riverkeeper) Riverkeeper applauds Ecology's desire to make 125% TDG a permanent water quality standard. However, the benefits of the proposed rule seem unlikely to survive the end of the Flex Spill Agreement. In part, this is because the 125% water quality standard will only take effect if the Army Corps both submits and carries out a biological monitoring plan. Given the Army Corps' decades of resistance to spill, I questioned this approach at the hearing. Mr. Bryson Finch responded that the Army Corps was motivated by the Flex Spill Agreement. If so, what will motivate the Army Corps to take actions that will enable spill to 125% TDG after the Flex Spill Agreement expires?

(Douglas County PUD) Douglas PUD is supportive of monitoring resident fish during the implementation of the new 125% standard. Little data is available on how resident fish are or are not influenced by TDG conditions that are above current water quality criteria. Ecology appears to be targeting native resident fish. We support this emphasis since nonnative fish have long been documented to predate and disrupt the ecosystems occupied by native fishes of the Columbia River. Ecology appears to be targeting shallow water areas for resident fish monitoring. We are supportive of this technical recommendation because fish occupying shallow water will be the most impacted fish because they cannot sound to depth and use the extra water pressure that depth provides to reduce their susceptibility to GBT.

Response to biological monitoring for Gas Bubble Trauma (GBT)

The biological monitoring requirement will be conducted by the hydropower operator that wishes to utilize the 125% (12 hour)/126% (2 hour) TDG tailrace criteria. The biological monitoring plan will detail exact requirements when spill will need to be curtailed in response to biological monitoring. The implementation plan provides some guidance for an approvable biological monitoring plan but is subject to adaptive management.

The 125% TDG tailrace only criterion is optional and can only be utilized with an approved biological monitoring plan. During the spill season, the 115% forebay/120% tailrace/125% maximum will apply automatically. We cannot predict the spill regime after 2021. The TDG criteria are intended to be maximum allowable levels. The TDG criteria in the water quality standards does not dictate whether projects spill up to allowable TDG levels or some other level. This often falls upon regional agreements, biological opinions, or court ordered mandates.

Comments on number of samples for GBT monitoring

(Filardo) General Comments on Biological Monitoring: The Draft EIS proposes to continue the present monitoring for GBT under the Smolt Monitoring Program and suggests the need for additional monitoring of non-target species. This recommendation for non-target species monitoring is appropriate given the amount of time that the TDG will be at 125%. However, the only caution that I offer is to take wholly into consideration that biological monitoring often involves the collection of very large samples because of its need to be conducted over long periods of time. Biological monitoring is often not without detrimental impact to the population sampled. Significant modifications have been made over

time to the present GBT monitoring program to reduce the negative impacts while maintaining the significance and integrity of the data collected. I encourage Ecology to work with the Fish Passage Center when developing the non-target species monitoring efforts.

(Douglas County PUD) Ecology is requesting sampling of 50 resident fish weekly with the goal of obtaining 10 fish from 3 different native resident fish species. We have concerns with the feasibility of Ecology's proposed request. In spring months, the Columbia River water temperatures remain cool and littoral habitats are dominated by salmonid species in the Wells Project Tailrace. During this time of year, Pikeminnow, Suckers, Whitefish, Redside Shiners, and other native resident fishes are found in very low numbers in these littoral habitats. We expect beach seining and shallow water electrofishing to be rather ineffective at capturing these species at this time of year. These species are more abundant in littoral habitats in the summer when water temperatures are above 15.0 C. Further, if the current requirement of capturing 10 of 3 different native fish is maintained, biological staff may have to unnecessarily handle thousands of salmonids to meet target species numbers. Doing so, may apply unnecessary stress on migrating salmonids including, potentially, those that are ESA listed. We suggest that Ecology remove the 10 fish of 3 different species requirement and substitute in a more realistic requirement that requires that 50 fish made up of at least three species of resident and/or anadromous fish be sampled during the months of April through June.

(NOAA Fisheries) Draft language at Pg. 6,(f)(ii)(B)(II): We agree that the body of scientific information on effects to native and anadromous fish at 125% TDG warrants an effective Gas Bubble Trauma (GBT) monitoring plan. We would like to discuss the specifics of the plan to determine if it will meet expectations without resulting in additional ESA-listed salmonid take. Based on observations of individual native resident fish incidentally counted in bypass systems, we do not expect to meet the stated criteria of 50 native resident fish per week/per reach in the bypass systems alone using current sample rates. We are currently not planning for additional ESA -listed salmonid rake associated with a monitoring program and we understand funding additional monitoring could be a concern. We advise that WDOE expressly allow the use of native residents collected by other programs (in addition to those collected in the juvenile bypass systems) to contribute to achieving the stated criteria. Options to observe native fish without additional ESA -listed salmonid take may include slight modifications to Northern Pikeminnow dam angling program. and/or the electrofishing program to accommodate native fish GBT monitoring needs. More refinement on the monitoring plan among state and federal partners is necessary and we look forward to more discussion.

(Oregon DFW) Oregon requests that Ecology revise WAC 173-201A-200(1)(f)(ii)(B)(III) to require a minimum sample size of 100 fish daily (rather than 50 fish weekly). Oregon recommends any assessment of Gas Bubble Trauma be based on data collected as part of the Smolt Monitoring Program (SNP). The sampling goal under the SMP is 100 examinations per day; a far greater sampling rate than 50 fish per week. A sample rate of 50 fish per week would substantially increase the likelihood of a false-positive (i.e.: observations indicate a GBT threshold has been exceeded when it has not at the population-level).

(Grant County PUD) We encourage Ecology to remain flexible in developing the Implementation Plan and to work with project operators to design plans that meet Ecology's goals. For example, Ecology is asking hydropower projects that opt into 'Option 2 (tailrace-only criterion)' under Section 200(1)(f)(ii)(B) of the proposed rule change to include a minimum of three native nonsalmonids species with a minimum sample size of ten per species in weekly evaluations of gas bubble trauma. During the spring season, when these evaluations would be occurring, collecting three native species in addition to the collection of salmonids would be challenging. Grant PUD has been collecting fish in the project area for decades for both monitoring gas bubble trauma and predator management activities. Our experience

tells us that this requirement may be impracticable. We would look forward to the opportunity to design a site-specific biological monitoring plan that suits the needs of Ecology and is achievable.

Response to number of samples for GBT monitoring

The implementation plan serves as a guidance for the approved biological monitoring plan and is not a binding document. Ecology intends to work with hydropower project operators on a biological monitoring plan that is feasible. The hydropower operator conducting sampling efforts is anticipated to put forth their best effort in meeting minimum sampling requirements. We have removed the minimum sample size of 10 per species in weekly evaluations given the uncertainties associated with the sample collection of non-salmonids. We will retain the species richness requirement of 3 in the implementation plan.

We understand that a minimum sample size of 50 for salmonids and non-salmonids is low. This represents a minimum sample size and hydropower projects have the option of sampling more fish to evaluate the incidence of gas bubble trauma. Higher sample sizes are recommended but not required due to recognition that there may be limited opportunities to sample non-salmonids and to limit handling and stress to salmonids that may be inadvertently captured during non-salmonid sampling. We have changed the implementation guidance to a target of 100 fish each for non-salmonids and salmonids but will continue with a minimum sample size of 50.

Comments on sample count locations in Implementation Plan

(Action Agencies) Rule Implementation Plan, pg 8: Currently, the physical monitoring is performed and results are documented at each dam individually. The Plan allows for the samples to be collected as a combination from the dams to make up "the sample" that week. Historical records show higher GBT levels at some dams compared to others, along with varying levels of TDG levels at certain dams, so this approach may not capture impacts across all projects. The minimum sample size listed in this document is only 20% of what is currently done and spreading that sample size over four dams gives the opportunity to miss the problem location.

(Joint Customers) The TDG Biological Monitoring Plan must also be comprehensive and statistically sound. The Draft Implementation Plan allows fish data collected from multiple facilities within one segment of the river to be pooled to meet fish size samples. This potentially jeopardizes an effective GBT monitoring program because each project will be generating distinct TDG concentrations and measures to reduce TDG will be taken at each individual project. Therefore, GBT must be monitored at each project to assess the specific effects of TDG levels at that project, and then the effects of any corrective measures. It also should be further noted that in the implementation of the Flex Spill Agreement, certain immediate adjustments had to be made at John Day, The Dalles, and Lower Granite projects because of adverse impacts the heightened spill levels were having at these projects. This demonstrates why data collected at individual projects should not be pooled.

(Seattle City Light) It is our understanding that current sampling of smolts to determine whether they are affected with GBT is conducted in bypass systems at the dams. Entering most bypasses requires smolts to enter at elevations significantly below the surface and varies by dam. However, smolts using these bypass systems are not descending to avoid high TDG levels, but rather as a pathway to outmigrate. This descent greatly lessens the susceptibility to GBT. It is our understanding that the incidence of GBT in fish sampled in bypass systems is used to correlate spill-related TDG levels to GBT in exposed fish. As it is our understanding that TDG is actually measured in the surface waters of the forebay and tailraces of the dams, the empirical data used to forecast the effects of the action on GBT incidence appears based on faulty exposure assessment assumptions. In other words, the fish being

evaluated for GBT are not likely the same fish that would be spilled and exposed to the high levels of TDG experienced in spillways.

Response to sample count locations in Implementation Plan

Current sampling for salmonids does not occur at every hydropower project during the spill season in the Snake and Columbia rivers. The Fish Passage Center smolt monitoring program sampling for salmonids occurs at Bonneville Dam, Little Goose, Lower Monumental, Lower Granite, McNary, and Rock Island dams. The intent of the biological monitoring plan is to capture TDG impacts at TDG levels between 120-125%. The selected zones outlined in the Implementation Plan are based on their relatively homogenous hydrologic and geographic conditions. While we understand that hydropower projects TDG levels can vary, details on specific locations within the assigned zones will developed in the biological monitoring plans to best capture potential impacts of TDG to aquatic life.

Juvenile salmonids collected for TDG sampling are from a sample of fish that are guided away from turbines and enter juvenile bypasses systems (JBS) below the surface. Fish use depth compensation to avoid high TDG levels but TDG sampled fish from a bypass are representative of the fish experience in the reach above the dam as they have passed the spillway, turbines, and JBS at the previous upstream dam. To avoid bias in the sample, fish are sampled at the separator in the JBS and not held for long periods, where degassing could occur. TDG monitors are not at the surface but at ~50ft in depth in the forebay and at depth in the tailrace. However, TDG levels at monitors are reported to reflect surface TDG levels based on mathematical equations.

Comments on costs of new GBT Monitoring

(Action Agencies) Regarding the biological monitoring associated with the proposed rule change, consistent with the Agreement, the Action Agencies fully support appropriate monitoring performed by other parties, but have limitations on their ability to increase existing monitoring efforts or increase funding to support additional biological monitoring. In addition to these limitations, the Action Agencies have concerns that the monitoring as described in the proposed rule change is not tailored to the species that may be affected by TDG; the existing structural configuration of the Columbia River System; and the potential for additional "take" of species listed under the ESA that may result from expanded monitoring. Washington should fully account for these considerations because the Action Agencies cannot ensure prospective implementation of the revised standards that are dependent on the Action Agencies implementation of new monitoring procedures. Though the Action Agencies are supportive of enhanced GBT monitoring for resident species, the Action Agencies are not aware of existing monitoring of either TDG effects on resident species or the incidence of GBT in these species and do not have funding for creating such a program.. If the Ecology rule change is contingent on increased monitoring, the Action Agencies are not the appropriate funding source for these activities.

(Joint Customers) A robust and scientifically-sound fish monitoring program is necessary to correctly evaluate any effect of increased TDG on juvenile and adult fish in the Columbia River System during the period of increased spill. Further, as this rule change and the associated uncertainty result from a Washington state proposal, the State should be prepared to take on incremental costs associated with necessarily robust and scientific monitoring.

Response to costs of new GBT Monitoring

The biological monitoring will be the responsibility of the hydropower project operator that is seeking to utilize the 125% (12 hour)/126% (2 hour) tailrace criteria. The 125% (12 hour)/126% (2

hour) tailrace criteria are considered optional while the 115% forebay/120% tailrace/125% maximum is required during the spill season. Ecology will not require any dams to apply the 125% (12 hour)/126% (2 hour) tailrace criteria and the associated additional biological monitoring. If monitoring costs are infeasible to implement the criteria, dams may use the existing adjusted criteria.

Comments on the need to monitor adult fish

(Joint Customers) The current TDG monitoring is potentially inadequate to assess the incidence of Gas Bubble Trauma (GBT) in fish. Joint Customers support a GBT monitoring program that evaluates both adult and juvenile life stages of resident and anadromous fish occurring in the FCRPS. In addition to any forebay collections, fish must be collected from the tailrace of each project to assess the incidence of GBT. Also, fish must be sampled from each tailrace more frequently than the suggested weekly schedule. The levels of TDG can vary significantly throughout the day. Any biological sampling plan must adequately survey conditions experienced by fish in the FCRPS.

***(Northwest RiverPartners*)** RiverPartners is supportive of a robust monitoring program to be funded by the state that safeguards salmon and nonsalmonid fish from harmful TDG levels. We note also that it is critical that Washington's monitoring program not be merely applied to juveniles, but to adults as well. We note that for every 100 salmon smolts in the Columbia River Basin, roughly one or less successfully return to spawn as adults. Given the immense importance of the returning adults, they must be closely monitored to ensure their health is not being negatively affected by increased spill levels. The adult monitoring program should be applied to all impacts of increased spill—not merely on observed gas bubble trauma. We encourage Ecology to make sure that it is making the best scientific decision for salmon in its final conclusion and ensure adequate safeguards are in place for both juvenile and adult salmon.

(Deen) We support strongly robust monitoring of the effects of the spill operations, both on juveniles, returning adults salmon and steelheads as well other aquatic species. We believe this is important to prevent unintended consequences in the short term of these higher spill levels and to provide valuable information in the long term to support dynamic and effective management of the river for its multiple purposes.

Response to the need to monitor adult fish

The biological monitoring will be the responsibility of the hydropower project operator that is seeking to utilize the 125% (12 hour)/126% (2 hour) tailrace criteria. The 125% tailrace only criterion is considered optional while the 115% forebay/120% tailrace/125% maximum is required during the spill season. The TDG criteria are intended to be maximum allowable levels. The water quality standards do not dictate whether projects spill up to allowable TDG levels or some other level. This often falls upon regional agreements, biological opinions, or court ordered mandates.

Comments on accounting for involuntary spill

(Nez Perce Tribe) WAC 173-201A-200(1)(f)(ii)(B)(III) should be qualified in a way that exempts Gas Bubble Trauma (GBT) incidence levels resulting from uncontrolled (involuntary) spill conditions, including recovery time after voluntary spill conditions are restored. The following language should be added as a third sub-bullet: "Gas bubble trauma levels occurring during and seven (7) days post uncontrolled spill conditions (greater than 125% TDG) excluded". This language is also used in the Draft

Rule Implementation Plan (Document 19-10-024) page 8, and Preliminary Regulatory Analyses (Document 19-10-031) page 8, fourth bullet, and should be revised accordingly.

(Oregon DFW) Oregon requests that Ecology further revise WAC 173-201A-200(1)(f)(ii)(B)(III) to add language specifying that gas bubble trauma levels occurring during and seven (7) days post uncontrolled spill conditions (>125% TDG) are excluded. This additional language is necessary to account for incidence of GBT that occur under involuntary spill but are observed during periods of controlled conditions. Discounting this transition could overestimate the impact of increased spill resulting from implementation of the Agreement.

Response to accounting for involuntary spill

Ecology appreciates the comment and has added rule language to address gas bubble trauma (GBT) incidence influenced by involuntary spill. Research has found that gas bubbles in tissues dissipates relatively rapid (Hans et al. 1999; Knittel et al. 1980; Montgomery Watson 1995; Elston et al. 1997). When accounting for gas bubble dissipation, in conjunction with depth compensation, fish should be equilibrated to ambient river conditions within one calendar day. We have decided that GBT incidence data should not be compared to biological thresholds for one full calendar day following involuntary spill. However, GBT monitoring should continue to occur during involuntary and voluntary spill. Also note that the term 'involuntary spill' has different meanings depending on context, so Ecology has instead provided descriptive language to explain these high river flow events and excluding biological monitoring data one full calendar day following these events.

Specific Comments on Rule Implementation Plan

(Action Agencies) Rule Implementation Plan, pg 7: It is important to keep the statement in 'Species Richness Requirement' Section that 'All gas bubble trauma observations must be reported regardless of meeting the minimum sample requirements to calculate the incidence of gas bubble trauma.'

Response: Comment noted.

(Action Agencies) Implementation Plan, pg 7: See bottom, 'Gas Bubble Trauma Monitoring' section, Fish Passage Center is called out for establishing methods and protocols when FPC is a BPA contractor. Recommend that the language be updated to reflect that, for example: "Examination of fish for gas bubble trauma should follow the procedures similar to those detailed in the 2019 Gas Bubble Trauma Monitoring Protocol or as updated by the Action Agencies."

Response: We have replaced Fish Passage Center with Action Agencies as suggested.

(Action Agencies) General Implementation Plan question: Who is responsible for consolidating and evaluating the GBT data against thresholds and determining that a change in criteria has been triggered? How is this decision communicated?

Response: The responsibility for comparing gas bubble trauma incidence data to the biological thresholds will be on the hydropower project that submitted an application to utilize the optional adjusted TDG allowance of 125% (12 hour)/126% (2 hour) in the tailrace. This information will be detailed in the biological monitoring plan developed in conjunction with Ecology. We have added information regarding responsibilities in the implementation plan.

(Action Agencies) General Implementation Plan question: What are the reporting and data storage requirements for GBT data?

Response: Data submittals to Ecology and management of data will be the responsibility of the hydropower project. We anticipate that Ecology and the hydropower project will manage and store data using their own internal procedures. Details of data submittals will be described in the biological monitoring plans.

(Action Agencies) General Implementation Plan question: Are there examples where a water quality criteria can change instantly based on a biological data trigger? For example, if the TDG target changes it will take approximately 1-day to evaluate appropriate spill levels, communicate to BPA and the projects and then see a change in TDG.

Response: Although we do not have specific examples of the change on the basis of a biological trigger, dams have demonstrated the ability to modify spill as necessary to meet changes in water quality conditions. The process for modifying spill in a timely manner based on available monitoring data will be specified in the approved biological monitoring plans. We anticipate that once dam operators have knowledge of exceedance of the biological thresholds that spill levels will be reduced as soon as possible.

(Action Agencies) General Implementation Plan question: How should monthly and annual reporting evaluate TDG data when a criteria changes? For example, it could take days for TDG to decrease to the appropriate level.

Response: Monthly and annual reporting should evaluate TDG using metrics that demonstrate compliance with the water quality standard. If TDG criteria changes frequently during spill season (not anticipated), data should be summarized and analyzed on a weekly basis within the annual report. These details can be included in the biological monitoring plan.

(Action Agencies) General Implementation Plan question: Could the criteria be different for each of the eight projects, or, if high GBT rates are observed at one project, do the criteria change for all projects?

Response: If an exceedance of the biological thresholds occur within a defined zone, then all hydropower projects within a given zone will be required to reduce spill levels to the lower adjusted TDG allowance of 115% forebay/120% tailrace/125% max criteria. Zones were assigned due to similarities in hydrological conditions and relationships between hydropower projects and operations. This information has been added to the implementation plan.

(Action Agencies) Implementation Plan, pg 6: Clarify monitoring plan submission frequency requirement. Neither the DEIS or DRIP specify the party responsible for submitting the annual biological monitoring report to Ecology for review and approval. Clarification should specify whether or not this must be the AAs or whether one of our partners (i.e. WDFW) can compile necessary information and submit to WDOE.

Response: The implementation plan specifies that hydropower projects must submit an annual biological monitoring plan. The hydropower project may collaborate with partners in developing the biological monitoring plan but the plan shall be submitted by the hydropower operator each year.

(Action Agencies) Implementation Plan, pg 7: Clarify whether sample quantity listed is total quantity or per age group.

Response: The weekly minimum sample requirements is a total quantity of all life stages. We have clarified sample quantity in the implementation plan and changed guidance to state that it is preferable that species sampled will be of the same life stage to account for sensitivity differences.

(Action Agencies) Implementation Plan, pg 8: Clarify what kind of biological monitoring they are looking for? "A department approved biological monitoring plan is required from each hydropower project that intends to utilize the adjusted 125% tailrace only criteria." Is the intent to have a plan for each project or can the Action Agencies submit one plan for the entire Columbia River System?

Response: If multiple hydropower projects are operated by the same owner within an assigned zone, one biological monitoring plan may be submitted for that zone. If the same hydropower operator has projects in multiple zones, then a biological monitoring plan will need to be submitted for each zone but not for each individual project. We have clarified this information in the implementation plan.

(Action Agencies) Implementation Plan, pg 8: The implementation of the approach suggested on pg 8 of the Plan would be difficult in real time operations. Once additional monitoring demonstrates that the incidence of GBT is below biological thresholds, "Gas bubble trauma must be below biological thresholds over the next 7-day averaging period before the adjusted TDG criteria of 125% can be applied again." Could this technically continue in perpetuity (if the permanent adjustment is implemented)? The criteria used to set spill caps could change each week and would be dependent upon receipt of the previous week's biological monitoring results.

Response: If biological thresholds exceed the 125% (12 hour)/126% (2 hour) TDG tailrace criteria, then spill would be required to be reduced to the 115% forebay/120% tailrace/125% maximum criterion for the protection of aquatic life. The 125% (12 hour)/126% (2 hour) tailrace criteria can only be reinstated when gas bubble trauma (GBT) incidence is below biological thresholds over the next weekly averaging period. This weekly change in criteria could potentially continue through spring spill season. However, we do not anticipate that this will occur based on previous GBT monitoring. At the end of 5 years, Ecology will review monitoring data and will evaluate the effectiveness of the adopted TDG criteria in providing fish passage and any unforeseen risks that result.

(Action Agencies) Implementation Plan, pg 14: "Ecology monitors surface waters across the state to determine whether water quality conditions meet the designated uses set in the standards." This statement is not consistent with the draft rule change language assigning biological monitoring to other entities.

Response: This rule does not assign biological monitoring to entities but rather provides an option within the standards that may be used to aid in fish passage. The implementation of the 125% (12 hour)/126% (2 hour) TDG tailrace criteria is not required and thus, biological monitoring is not required. Furthermore, the TDG criteria statewide and in the Snake and Columbia rivers represent a maximum value that shall not be exceeded. TDG levels below the maximum values are still considered in compliance with the water quality standards.

(Action Agencies) Implementation Plan, general comment: In the DRIP, all instances of Army Corp of Engineers need to be corrected to Army Corps of Engineers.

Response: We have made the suggested changes.

(Action Agencies Implementation Plan, general comment: The Implementation Plan repeatedly refer to the dams as "hydropower projects" or the Columbia River System as "the hydrosystem." It would be worth clarifying that the Plan is referring to the 14 dams that are operated in a coordinated manner for multiple congressionally authorized purposes, including hydropower generation, but also for flood risk management, irrigation, navigation, municipal and industrial water supply, fish and wildlife

conservation, recreation, etc. in order to provide a better context for all of the authorized purposes for these projects. (this comment was also made for DEIS).

Response: The scope of the rule language defines the hydropower projects and operators that are potentially impacted by this rulemaking. The rule language specifically states that the "TDG criteria may be adjusted to aid fish passage over hydroelectric dams spilling for fish passage as of the 2020 spill season." This clarifies the scope of the rule.

(NOAA Fisheries) Comments on Draft Implementation Plan text at Pg. 7 regarding criteria for fish monitoring for gas bubble trauma: As stated previously, the current information indicates these criteria will not likely be met in the bypass system alone during most weeks, even if non-native resident fish are included in the sample. NMFS would like to understand if the expectation would be to accept a lower sample size, find fish from another sampling effort, or fund and implement additional studies. We are concerned that additional studies to observe TDG effects to native resident fish could result in additional take to juvenile and adult salmonids. It is uncertain what would occur to the spill program if GBT symptoms were observed in a high percentage of resident fish solely because of random sampling effects associated with low sample sizes (e.g. 3 Of 6 native fish exhibited GBT symptoms).

We encourage the WDOE to work with NOAA and other regional co- managers to settle on a monitoring plan that potentially utilizes current monitoring programs to meet the intent without resulting in additional take of ESA-listed salmonids.

Response: The details of biological monitoring will largely be included in the biological monitoring plan. We have built in flexibilities into the biological monitoring guidance that should assist with the projects to meet the minimum sample size of 50 and the goal of 100 non-salmonids and salmonids. For example, hydropower projects within an assigned zone may combine weekly data to meet minimum sample size requirements. Monitoring may need to occur at areas other than the fish bypass system such as within 1 mile downstream of the tailrace. An adaptive management approach will be used for biological monitoring as indicated in the implementation plan.

Comments on Preliminary Regulatory Analysis

(Nez Perce Tribe) Clarify statements describing potential increases of salmon (146,000) and steelhead (117,000). resulting from a 125% TDG mainstem Snake and Columbia river Operation, within the Preliminary Regulatory Analysis (19-10-031) pages Xi, 16, and 23.

> *Response: Please see responses to comments T-1-7 through T-1-10. We have also attempted to clarify language regarding the context of this benefit, in relation to cost analysis.*

(Nez Perce Tribe) In the Preliminary Regulatory analysis, Consider describing fish response as a range of possible percent change/improvements. Application Of the 2018 CSS report data would indicate Snake Basin population abundance may improve by 86 0/0 to 108%, under a 125% TDG operation. Alternatively, use the same language used in the Draft EIS (Document 19-10-022) on pages 7, 22, 26, and 50 (see letter).

> *Response: Thank you for your suggestion. We were not able accurately describe anticipated positive fish response as a percent as it is not possible to discern an appropriate baseline for comparison. While we do expect an annual increase of both Chinook Salmon and Steelhead Trout at 146 thousand and 117 thousand respectively, we cannot compare these estimates in good faith to year-to-year fish counts or even decadal averages because of the high variability in ocean conditions and marine survival. This is exhibited clearly in the high variability among WDFW's annual fish return counts.*

(Nez Perce Tribe) In the Preliminary Regulatory Analysis, if the actual Chinook abundance, described as an 146,000 fish increase, and steelhead abundance, described as 117,000 fish returning (lacks "increase" language) are retained then it would be helpful to describe baseline assumptions for both Chinook and steelhead abundance and add "increase" to steelhead language on pages xi and 23.

> *Response: We have updated the Final Regulatory Analyses per your suggestion. Regarding baseline total fish numbers, please see response to comment T-1-7.*

(Nez Perce Tribe) The content of footnotes 3 and 4 in the Preliminary Regulatory Analysis (Document 19-10-031) should be switched.

> *Response: We have confirmed the correct footnotes and included them in the Final Regulatory Analyses.*

(Nez Perce Tribe) Change "120" to "125" in the Preliminary Regulatory Analysis (Document 19-10-031) page 9, first bullet: "Allow USACE dams to operate spills based on the Flexible Spill Agreement and any future operating agreements that may require spill up to 120 percent. "

> *Response: We have updated the Final Regulatory Analyses with the correct percentage.*

(Nez Perce Tribe) Preliminary Regulatory Analysis (Document 19-10-031) Cost Analysis (Section 3.2), pages 13 and 14, should be expanded to include full 24 hour 125% TDG operation and not constrained to the Flexible Spill Agreement operation.

> *Response: This change allows flexibility for future agreements that might also need to utilize up to a 125% (12 hour) average TDG level. Ecology acknowledges that a future agreement could result in a 24-hour 125% TDG spill duration. For compliance with this rule, the alternate 125% (12 hour) average TDG criteria may be applied if the spill duration and TDG levels also met ESA protection requirements. Ecology believes future agreements will be similar to the current spill agreement which seeks to reduce economic impacts. Spill operations and management of TDG*

will be determined through the ESA consultation with the NMFS and USFWS, and dam operators. We have clarified this in the Final Regulatory Analyses.

(Everett) The City notes that on page 10 of the Preliminary Regulatory Analysis DOE states that the changes to the marine designated uses "more clearly differentiates between uses." Yet, the uses protected are identical and all-encompassing for Extraordinary, Excellent and Good. The wording presents many questions as to how to differentiate between the designations or uses, and why. The wording provides no clarity at all as to why 3 different classes are needed to support identical biota. The City of Everett concludes that the proposed additional wording to the different designated uses lacks any scientific-technical basis and should not be adopted.

Response: The change to the class descriptions revert to language that was lost during the transition from a class based to use based water quality standards that occurred during water quality standards revisions in 2003. This action is to correct the mistake made in 2003, and adds back in the descriptions from the previous 1997 water quality standards that were used to delineate between the previous classes and that is now applied to the use based system. The delineation between classes is an artifact of how the class system was developed previously. We do appreciate that the marine use designations could be better delineated. However, the level of effort required to revise the marine use designations would necessitate a separate rulemaking and public process.

Comments on Deleting Temperature Provisions

(US EPA) The EPA recommends that Ecology retains the language "up to, but not exceeding the numeric criteria" for the proposed language revisions to aquatic life temperature criteria at WAC 173-201 A-200(1)(c)(ii) for fresh waters and WAC 173-201 A-210(1)(c)(ii) for marine waters. Alternatively, the EPA suggests maintaining the intent of the previous rule language to ensure that the standard is protective of aquatic life and does not allow warming to exceed the numeric criteria when the natural condition of the water is cooler than the numeric criteria.

Response: We have added language back in to ensure that the allowed warming shall not exceed the numeric criteria when the water is cooler than the criteria.

(Northwest Environmental Advocates) We support the proposed removal of WAC 173-20 IA-200(1)(c)(ii)(B) and WAC 210(1)(c)(ii)(B). Removing this language from the standards is consistent with the U.S. Environmental Protection Agency Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards (April 2003).

Response: We appreciate your support.

Comments on Clarification of Toxics Footnote 'dd'

(Northwest Environmental Advocates) Ecology proposes to clarify in footnote 'dd' of Table 240 that any metals criteria that are proposed to be adjusted on a site-specific basis on the basis of a demonstration of the water effects ratio approach are "not in effect until they have been incorporated into this chapter and approved by EPA." As this represents the law and policy pertaining to the setting of water quality standards, we support the revision and appreciate Ecology's clarifying the intent of its rules to avoid confusion.

Response: Comment noted. We appreciate your support.

(Port of Seattle) The Port requests the site specific water quality objectives (SSWQOs) and respective copper and zinc effluent limitations established for STIA NPDES Permit #WA-0024651 be incorporated into Chapter 173-201A WAC (revisions) Water Quality Standards for Surface Waters of the State of Washington and approved by the U.S. Environmental Protection Agency (EPA), as stated in Section WAC 173-201A-240 Toxic Substances, Toxic Substances Criteria Table 240, Footnote 'dd'.

Response: As the footnote 'dd' indicates, addition of specific water effect ratios for metals, developed for a specific permit, would require a separate water quality standards rulemaking process and subsequent approval by EPA.

Comments on Clarifying Marine Use Definitions

(Everett) The City of Everett is pleased that Ecology is correcting the designated uses to take away the "salmon spawning" use for Extraordinary and Excellent marine waters. The City accepts that there is a sound scientific basis for eliminating salmonid spawning from marine waters, since that agrees well with salmonid behavior. The City agrees that removing salmonid spawning from the designated uses for marine water is scientifically correct.

Response: Comment noted. We appreciate the support.

(Everett) The City recommends that Ecology not include the new wording for levels of protection above or beyond what is needed for all the different species, as that is overkill. What is the basis for having such protection in our standards, especially when, for marine dissolved oxygen, the numeric criteria for the extraordinary and excellent uses are unattainable naturally? The additional wording just illustrates that the dissolved oxygen criteria are aspirational, yet the Clean Water Act does not work well with aspirational criteria. To say the wording is needed because it existed in earlier versions of our standards and was inadvertently left out in the last revisions to the water quality standards is not a sufficient reason to put it back in. Perhaps it would be, if the justification for originally including that wording 51 years ago was available for review. It wasn't. So, the onus is on Ecology to provide a scientific basis supporting this requirement now, especially since it links to specific marine dissolved oxygen criteria that in turn have no identifiable technical, scientific basis. Their basis should be subject to public review and comment.

Response: We appreciate the suggestions for how the marine use designations could be better delineated. However, the level of effort required to revise the marine use designations would necessitate a separate rulemaking and public process. The intent of the language revisions in this rulemaking was mainly to correct errors from an earlier rulemaking that had been pointed out to us from the City of Everett in a letter dated 12/21/17. In a response letter dated 3/2/18, Ecology committed to adding back in language in a future rule update that was inadvertently omitted during the 2003 rulemaking. Further adjustment of the marine use designations and any changes to the criteria intended to protect them would need to happen in a separate rulemaking. Further, to address your concerns regarding marine dissolved oxygen criteria, we developed a paper in 2018, "Washington State's Marine Dissolved Oxygen Criteria: Application to Nutrients", that provides the regulatory framework, history and rationale for the marine dissolved oxygen numeric criteria. Please see the paper at: https://www.ezview.wa.gov/Portals/_1962/Documents/PSNSRP/Marine%20DO%20Paper%20Guidance%20Updated%20July%202018.pdf.

(Northwest Environmental Advocates) Ecology proposes to amend WAC 173-20 IA-210: the designated uses for marine waters by adding and deleting language to the definitions of Extraordinary quality: Excellent quality: Good quality: and Fair quality waters. We agree that the revisions to remove the accidental inclusion of salmon spawning in marine waters should be made. It is, however, unfortunate that Ecology continues to use the "classification system" of use designation for marine waters many years after it changed from a classification to a use-based designation for fresh waters. The classification approach seeks to set goals for water quality that are based on current conditions and current pollution levels, rather than on what is biologically best for aquatic species and achievable. This is contrary to the Clean Water Act and EPA's implementing regulations (regardless of EPA' s acceptance of this approach) and Washington would better and more accurately protect its designated uses by making a change.

Response: We appreciate the suggestions for how the marine use designations could be better delineated. However, the level of effort required to revise the marine use designations would necessitate a separate rulemaking and public process. The intent of the language revisions in this rulemaking was mainly to correct errors from an earlier rulemaking that had been pointed out to us from the City of Everett in a letter dated 12/21/17. In a response letter dated 3/2/18, Ecology committed to adding back in language in a future rule update that was inadvertently omitted during the 2003 rulemaking. Further adjustment of the marine use designations and any change to the criteria intended to protect them would need to happen in a separate rulemaking.

(Northwest Environmental Advocates) For example: how does limiting the designation of Extraordinary quality uses to those marine waters that "markedly and uniformly exceed the requirements for all [aquatic life] uses," in Ecology' s proposed revision, conform to the requirement that criteria be "based on sound scientific rationale" and "support the most sensitive use"? See 40 C.F_R S 131.11(a). If a species is to be fully protected, it requires criteria that fully protect it. This proposed limit of the application of the most protective and biologically-based temperature, dissolved oxygen: turbidity: and pH criteria, and only those waters that are already of the highest quality ignores the fact that aquatic life species in other marine waters may require those most protective and biologically-based criteria. In some cases, such species may be threatened and endangered and yet they would still get a lower level of protection than Ecology believes is biologically necessary. In fact, it's possible that in some locations, those species are threatened or endangered because of the low quality of the water that Ecology seeks to perpetuate through its classification system.

Response: Comment noted. Please see response above.

(Northwest Environmental Advocates) In addition, it is peculiar for Ecology to propose revisions to a use classification system that is already subjective and backwards without removing that which is subjective and backwards. For example: the difference between Excellent quality and Good quality is that the water quality of the former must meet or exceed the requirements for "all uses" and the latter just for "most uses." The aquatic life uses that are enumerated are the same. The distinction of what constitutes "most uses" appears to be subjective and therefore is contrary to a method of applying the criteria that is based on sound science. It is also backwards. It states that the uses will be designated based on attainment of water quality that meets or exceeds the quality needed for aquatic life. In other words, the designation is based on the criteria, when the criteria are supposed to be based on the uses. The regulations do not state that states may limit the application of protective biologically-based criteria based on existing of pollution nor do they say that the uses shall be designated based on where the criteria are met or, more to the point, not met. The regulations also do not say that the state cam provide a level of protection to designated uses that is not based on science. The emphasis is on the sound scientific rationale, namely biologically-based protections, not based on how polluted Ecology has already allowed the waters to become.

Response: Comment noted. Please see response above.

Other Miscellaneous Comments

(Colton) Ultimately, however, we need to remove the four Lower Snake River dams and possibly some on the Columbia in order to improve conditions for Columbia basin salmon.

Response: The topic of dam removal is beyond the scope of this rulemaking. This adopted rule modifies TDG criteria to allow increased spill over dams to improve downstream fish passage and overall survival of salmonids to benefit salmon recovery and increase prey for the southern resident orcas.

(Roh) You know the definition of insanity, right? Doing the same thing over and over and expecting a new result. Personally, I want to live in a world full of diverse species. Our damn dams have just about killed our local salmon runs. And increased spill has been tried over and over, and guess what? Didn't fix anything. As my Granny used to say, "Don't stick with a mistake just because you spent a lot of time making it." Bring down the dams. Bring down the dams. Bring down the dams.

Response: The topic of dam removal is beyond the scope of this rulemaking. This adopted rule modifies TDG criteria to allow increased spill over dams to improve downstream fish passage and overall survival of salmonids to benefit salmon recovery and increase prey for the southern resident orcas.

(Beckstead) I am writing out of concern for the various proposals being considered for increasing the number of salmon in the Snake and Columbia Rivers in particular to increase the orca recovery in the south Puget Sound. As you know the orca are in good health around the world. It is just this particular pod that is struggling. It is very difficult to think that you really are willing to look at all possible ways to increase the salmon population when sea lions are allowed to eat to their fill for so many months of the year. Allowing just a few hundred of them to be killed each year is ludicrous. Kill them all! There is no shortage. By not seriously addressing the massive number of salmon that sea lions eat it is as if you are choosing which animals or sea life, in this example, you want to survive.

Response: Comment noted. The topic of eradication of sea lions is outside the scope of this rulemaking.

(Everett) The City notes that Ecology should be more productively working to develop new marine dissolved oxygen criteria that meet the requirements of 40 CFR 131.11.

Response: Comment noted. In a letter sent by Director Maia Bellon on 3/2/18 to James Miller, City of Everett Public Works, we considered Everett's petition request to adopt new marine water quality criteria for dissolved oxygen. This letter provides details on why the petition was denied. Further, we developed a paper, "Washington State's Marine Dissolved Oxygen Criteria: Application to Nutrients", that provides the regulatory framework, history and rationale for the marine dissolved oxygen numeric criteria. Please see the paper at: https://www.ezview.wa.gov/Portals/_1962/Documents/PSNSRP/Marine%20DO%20Paper%20Guidance%20Updated%20July%202018.pdf.

(Good Stefani) It's very odd to come to a public hearing and to turn your back on the staff. I would just ask staff next time when you facilitate the meeting to consider that. I want to be respectful of all of the people who have traveled here today to be here in person. I think it takes a significant amount of time. It's an hour and 20 minute drive for me each direction to get here. And I'm sure others -- I know others have traveled from Seattle and further. So just a courtesy next time. I have no desire to talk to you all with my back to you.

Response: Comment noted. It is important to note that during a formal public hearing, the Hearings Officer represents the Department of Ecology for purposes of gathering the testimony. It is agency policy, when the Hearings Officer is accepting oral testimony, to have the person testify directly into the microphone facing the Hearings Officer, rather than face the audience. This practice ensures that the Hearings Office, as official representative of the agency, acknowledges the testimony being given and gets a clear record of the testimony without distractions that could potential occur from the audience. We will take your comment into consideration for future hearings and include additional instructions to the persons testifying so that they are aware of why Ecology conducts testimony at formal public hearings in this manner.

Appendix A: Citation List

Chapter 173 – 201A WAC
Water Quality Standards for Surface Waters of the State of Washington

AO # 19 – 02

This citation list contains references for data, factual information, studies, or reports on which the agency relied in the adoption for this rule making (RCW 34.05.370(f)).

At the end of each citation is a number in brackets identifying which of the citation categories below the sources of information belongs. (RCW 34.05.272).

Citation Categories	
1	Peer review is overseen by an independent third party.
2	Review is by staff internal to Department of Ecology.
3	Review is by persons that are external to and selected by the Department of Ecology.
4	Documented open public review process that is not limited to invited organizations or individuals.
5	Federal and state statutes.
6	Court and hearings board decisions.
7	Federal and state administrative rules and regulations.
8	Policy and regulatory documents adopted by local governments.
9	Data from primary research, monitoring activities, or other sources, but that has not been incorporated as part of documents reviewed under other processes.
10	Records of best professional judgment of Department of Ecology employees or other individuals.
11	Sources of information that do not fit into one of the other categories listed.

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