House Energy & Commerce January 30, 2024 Hearing
Questions for the Record

The Honorable Cathy McMorris Rodgers

Question 1: NOAA reached a no jeopardy biological opinion in 2020 under the Endangered Species Act for the operation of the Federal Columbia Hydropower System. Yes, or no, does NOAA stand by its 2020 Biological Opinion including its finding of no jeopardy?
NOAA Response:
The 2020 biological opinion on the operation and maintenance of the Columbia River System (2020 Biological Opinion) remains valid. Additionally, the *Rebuilding Interior Columbia Basin Salmon and Steelhead* report (2022 Rebuilding Report) does not supersede the 2020 Biological Opinion.

While NOAA may have been able to conclude that the continued operations of the Columbia River System dams are likely to avoid jeopardizing the species under the Endangered Species Act when paired with non-operational conservation measures like habitat restoration and predator control over the next fifteen years, listed salmon and steelhead generally remain at a high risk of extinction.

The biological opinion and the Rebuilding Report were evaluating two different questions. In the 2022 Rebuilding Report, we evaluated what actions would provide the highest likelihood of achieving the mid-range goals established by the Columbia Basin Partnership. The Partnership's goals were intended to move toward rebuilding healthy and harvestable runs of salmon and steelhead that would contribute more fully to the culture, environment, and economy of the region. The work presented in the Rebuilding Report is drawn from existing science and from NOAA Fisheries' expertise, and was developed pursuant to authorities granted under the Magnuson Stevens Fishery Conservation and Management Act (MSA), among others, through which NOAA Fisheries furthers conservation and enhancement of essential fish habitat in support of realizing the full potential of the Nation's fishery resources.

Question 2a: How does the MOU provide certainty about river operations and fish programs given that parties or new plaintiffs can still raise separate complaints given the MOU is beyond the scope of the initial lawsuit?
NOAA Response:
The MOU and the associated USG Commitments resulted in a five-year stay of litigation granted by the U.S. District Court for the District of Oregon in *NWF et al. v. NMFS*, No. 3:01-

cv-640-SI (D. Or). At the conclusion of that five-year stay, there is an opportunity to seek an additional five years. The Parties that sought the stay of litigation have agreed not to litigate over the USG Operations for a period of 10 years so long as the MOU remains in effect. The stay does not affect the ability of other parties to participate in future administrative processes or pursue other administrative or judicial remedies. NOAA remains committed to collaboration with the states, tribes, and stakeholders of the region, including addressing questions or concerns over the MOU, the USG Commitments, and USG Operations.

Question 2b: The MOU commits the Bonneville Power Administration to $200 million in hatchery upgrades and $100 million over 10 years for additional projects identified by the Six Sovereigns. Are these funding commitments being addressed through the Northwest Power and Conservation Council? And if so, how does the Council address the fact that the federal government has only resolved issues with Washington and Oregon?

NOAA Response:

NOAA defers to the Bonneville Power Administration and the Northwest Power and Conservation Council on this question.

Question 3: Published scientific analysis titled, "Climate change threatens Chinook salmon throughout their life cycle" by Lisa G. Crozier (NOAA Fisheries), Brian J. Burke (NOAA Fisheries), Brandon E. Chasco (NOAA Fisheries), Daniel L. Widener (Ocean Associates -under contract to NOAA Fisheries) & Richard W. Zabel (NOAA Fisheries); February 18, 2021; states: "Previous population models that have used global climate model (GCM) projections have focused on drivers in freshwater life stages only (e.g., stream temperature, winter flooding, and drought). While these are useful for evaluating restoration actions within those contexts, they completely ignore the large impacts of climate change on the marine stage." Does the Biden Administration agree with this analysis? Please explain.

NOAA Response:

Traditionally, salmon science has focused much more detailed research and modeling on the freshwater life stages than the marine life stages of salmon because of the relative logistical difficulties of working at sea, rather than in streams and rivers. As a result, there are multiple analyses of salmon needs in freshwater and what biotic and abiotic factors affect their condition and survival. Quite a few of these studies have included formal projections of climate change from earth systems models (for a review of this literature, see Crozier and Seigel 2023, https://www.mdpi.com/2410-3888/8/6/319). However, most of these population-specific models conducting climate change assessments have used very coarse model projections for marine stages. This is largely because the most frequently cited climate indices of marine conditions, such as the Pacific Decadal Oscillation (PDO) or the North Pacific Gyre Oscillation (NPGO) cannot be reliably projected into future climate scenarios by earth systems models. However, these PDO and NPGO are strongly correlated with sea surface temperature (SST), which can be robustly predicted. Therefore, SST is a potentially valuable indicator of future ocean conditions

for salmon population productivity. The analysis presented in Crozier et al., 2021, is a novel, critically necessary, initial attempt to incorporate detailed projections of future ocean conditions and their potential correlation with future salmon population health.

Question 4: Published scientific analysis titled, "Climate change threatens Chinook salmon throughout their life cycle" by Lisa G. Crozier (NOAA Fisheries), Brian J. Burke (NOAA Fisheries), Brandon E. Chasco (NOAA Fisheries), Daniel L. Widener (Ocean Associates -under contract to NOAA Fisheries) & Richard W. Zabel (NOAA Fisheries); February 18, 2021; states: "Nonetheless, negative effects from SST [see surface temperature] still drove most populations extinct within the century." Does the Biden Administration agree with this analysis? Please explain.

NOAA Response:

To capture the complexity of salmon ocean ecology, researchers use 15 ocean indicators - grouped into the three categories (Climate and Atmospheric Indicators, Local Physical Indicators, and Local Biological Indicators). NOAA's Northwest Fisheries Science Center (NWFSC) tracks these indicators to characterize ocean conditions experienced by juvenile salmon entering the northern California Current. Salmon ocean ecologists rate each of the 15 indicators in terms of whether the relative impact on the marine survival of juvenile salmon is "good," "poor," or "fair" and assess how this state may translate into future adult returns. Thus, SST and change in SST is not the only driver of salmon and steelhead marine life stages. SST is a powerful indicator of ocean condition change because it is directly predicted from earth system models; using a richer suite of indicators allows researchers to understand the complexity of salmon ocean ecology and to develop management strategies to adapt to and mitigate climate change. For example, projected shifts in salmon prey availability or alternative prey for salmon predators can be leveraged to increase salmon ocean survival by linking hatchery release and harvest rates to indicators of ocean ecosystem structure and seasonality. Actions such as these are consistent with the basic tenets of ecosystem-based fisheries management. Individual fish condition, such as size and ocean entry timing, strongly impact marine survival of salmon and steelhead. Changes in freshwater and estuarine ecosystem function will impact salmon and steelhead marine survival by influencing these two factors. Restoration actions that address ecosystem function and result in more robust juveniles rather than just "more" juveniles leaving freshwater will improve the marine survival of salmon and steelhead, even when conditions in the ocean are poor.

Question 5: Published scientific analysis titled, "Climate change threatens Chinook salmon throughout their life cycle" by Lisa G. Crozier (NOAA Fisheries), Brian J. Burke (NOAA Fisheries), Brandon E. Chasco (NOAA Fisheries), Daniel L. Widener (Ocean Associates - under contract to NOAA Fisheries) & Richard W. Zabel (NOAA Fisheries); February 18, 2021; states: "Climate impacts were most dramatic in the marine stage, where survival was reduced by 83-90%." Does the Biden Administration agree with this analysis? Please explain.

NOAA Response:
The preliminary data in this modeling effort was included in the 2020 Biological Opinion. The authors' goal was to model how wild populations of spring Chinook salmon might respond to climate change forcing mechanisms, not to provide specific predictions about the future of the modeled population. This modeling indicated that productivity was most impacted in the marine rearing life history stage. The authors also acknowledged that "Strong density dependence limited the number of salmon that survived early life stages, suggesting a potentially efficacious target for conservation effort." and concluded that "dramatic increases in smolt survival are needed to overcome the negative impacts of climate change for this threatened species."

Question 6: Published scientific analysis titled, "Climate change threatens Chinook salmon throughout their life cycle" by Lisa G. Crozier (NOAA Fisheries), Brian J. Burke (NOAA Fisheries), Brandon E. Chasco (NOAA Fisheries), Daniel L. Widener (Ocean Associates - under contract to NOAA Fisheries) & Richard W. Zabel (NOAA Fisheries); February 18, 2021; states: "Our analysis showed relative resilience in freshwater stages, with the dominant driver toward extinction being rising SST (sea surface temperature), which tracked a 90% decline in survival in the marine life stage." Does the Biden Administration agree with this analysis? Please explain.
NOAA Response:
People who build and use future projections from modeling exercises acknowledge that these projections, while very useful, are not perfect. Based on correlating past ocean conditions with marine survival rates for Chinook salmon, sea surface temperature (SST) was the most strongly correlated indicator such that salmon survival was lower in years with higher SST. This correlation was stronger than that with other marine condition indicators, such as Pacific Decadal Oscillation (PDO) or the North Pacific Gyre Oscillation (NPGO). Unfortunately, an ecological mechanism that connects SST with salmon survival is not known (and likely varies from year to year), while there are potential linkages between PDO and NPGO and the drivers of salmon productivity. Therefore, a correlative, not causative, relationship between SST and salmon survival has been established, and successfully leveraged to project the potential impact of climate change on marine life stages of pacific salmon and steelhead.

Modeling the effects of a changing climate on the lifecycle of pacific salmon and steelhead is a critically important task that NOAA Fisheries has undertaken in collaboration with our state and tribal co-managers. Predictive models based on the best available science allow the translation of our collective knowledge into management through decision support tools and scenario evaluations. Model output is understood to be an imperfect, but highly likely, descriptor of future conditions, if all the underlying relationships in the model still hold under future conditions. Climate change is continually proving to be a challenging, non-stationary situation to model in which future conditions and ecological and physical relationships are fundamentally different from the present. Stated in another way: the past cannot be used as an analogue for the future under climate change as we are moving out of the bounds of any data collected on natural

systems. This both makes predictive models incredibly valuable (the future will not look like the now), and challenging (models are just that, representations of what is known and has been observed).

Question 7: Published scientific analysis titled, "Climate change threatens Chinook salmon throughout their life cycle" by Lisa G. Crozier (NOAA Fisheries), Brian J. Burke (NOAA Fisheries), Brandon E. Chasco (NOAA Fisheries), Daniel L. Widener (Ocean Associates - under contract to NOAA Fisheries) & Richard W. Zabel (NOAA Fisheries); February 18, 2021; states: "Our results indicate that as one symptom of a changing ocean, rising SST (sea surface temperature) puts all of our study populations at high risk of extinction, despite actions within the hydrosystem to speed juvenile travel and increase in-river survival." Does the Biden Administration agree with this analysis? Please explain.

NOAA Response:

Sea surface temperature is the strongest predictor currently available for marine survival. Based on this relationship, further increases in temperature will most likely continue to lower marine survival. For example, during the recent marine heatwave in 2014-2016, there were very low returns of Chinook salmon and steelhead across many river systems along the West Coast. However, ocean ecosystems are complex, and temperature is not causing mortality on salmon directly. Rather, currents and marine communities change at the same time, and it is a combination of changes in prey and predator impacts that reduces salmon survival. This is why the salmon ocean ecology research community generally tracks a large number of indicators of the ocean ecosystem, and not just temperature. Each species will respond in a unique way to climate change, and some of those responses are likely to appear as “surprises”, in that it is unknown with any certainty that a particular species would change in that way. Therefore, although negative responses to warming are almost certain, there is room for a change in that relationship. If freshwater ecosystems produce more food in a warmer environment, predation does not increase, and density dependent limits in freshwater are reduced, salmon are likely to respond to changes in tributary temperatures by growing faster and migrating seaward earlier, which could improve their marine survival, even when conditions in the ocean are poor.

Question 8: Please describe what actions are being taken by the Federal Government and the State of Washington to address pollution and other threats to Puget Sound salmon.

NOAA Response:

NOAA’s actions to protect and restore salmon in Puget Sound are varied and extensive. NOAA has worked in the surrounding watersheds with tribes and watershed councils on habitat restoration and pursued fish passage at dams on the Skagit River as part of the relicensing of a hydroelectric project. Our NWFSC is pursuing research throughout the Sound, evaluating the most effective forms of habitat restoration to help us make the most of our habitat dollars. The NWFSC has pioneered ecotoxicology studies that have identified highway contaminants toxic to salmon when they pollute streams and marine waters. The Center has also identified natural,

low-cost means of removing these contaminants from runoff that are increasingly being adopted in highway construction. NMFS biologists in the Puget Sound region are ensuring that where stormwater runoff is created or discharged as an effect of an action (e.g. roads, parking areas, housing developments, outfall relocation or replacement) measures to increase treatment are incorporated as fully as possible. Further, working with the U.S. Army Corps of Engineers (USACE) and property owners, NOAA recently adopted an approach of "no net loss" of nearshore habitat that is vital to the survival of juvenile salmon. This has created a market for habitat credits that help offset the impacts of development by funding habitat restoration at a time when climate change puts more habitat at risk. Last year the Puget Sound Partnership sold more than $3 million worth of these credits, which in turn have funded important projects and offset losses. This has helped us reverse what had been the continuing loss of that habitat at a time when threatened Puget Sound Chinook salmon can least afford it.

NOAA Fisheries is working with the Federal Highway Administration on the development of a new programmatic ESA section 7 biological opinion which will change the approach used for analysis and treatment of stormwater impacts on aquatic ecosystems in Puget Sound. The result will be greater treatment of stormwater from impervious surfaces and reduced loading of contaminants into Puget Sound. Under the auspices of the Puget Sound Federal Leadership Task Force, multiple agencies, including NOAA Fisheries, the U.S. Geological Survey and the Environmental Protection Agency are collaborating on scientific research on stormwater management techniques to more effectively protect salmon and the habitat and food web upon which they depend.

Question 9: It appears that the Biden Administration and Governor Jay Inslee are distracted by misguided efforts to breach the Lower Snake River dams and failing to address pollution and runoff negatively impacting Puget Sound salmon. Please describe the status of Puget Sound salmon and explain whether you believe the level of attention they are receiving is adequate.
NOAA Response:
Puget Sound salmon and steelhead are listed as threatened, so are likely to become endangered throughout all or a significant portion of their range without maintaining the programs that helped to stabilize these populations. They deserve a substantial amount of attention and NOAA is pleased with the recent increased focus and momentum behind protecting and restoring salmon and their habitat in Puget Sound. As referenced earlier, the "no net loss" approach to essential nearshore habitat is now fostering more restoration work that helps keep development balanced with habitat improvements. At the same time, new funding from the Bipartisan Infrastructure Law and Inflation Reduction Act has made possible more extensive restoration projects than NOAA has been able to undertake previously. For example, the new funding resources allow NOAA to reach entire watersheds with a series of coordinated projects, often in partnership with tribes, the state, or local watershed groups.

The new funding will also support research at the NWFSC on a variety of salmon science topics, including efforts by the research group that has documented impacts of highway runoff on salmon and also identified low-cost, green solutions now being adopted in new highway construction.

However, NOAA remains unable to keep pace with the demand for development that requires consultation with other federal agencies, such as USACE. To make a real difference in the outlook for salmon, especially in light of climate change, the science indicates that we must continue this degree of effort, and then some, for many years to come. NOAA appreciates the increasing interest in, awareness of, and support for this work.

Question 10: Please describe the status of Snake River salmon in comparison to other salmon found in the Puget Sound and Columbia River Basin.

NOAA Response:

The 2020 Columbia Basin Partnership Task Force Report describes the status of salmon and steelhead in the basin. Of 27 extant stocks in the Columbia Basin, 17 are ESA- listed. Of the 16 stocks in the Interior Columbia River Basin, seven are listed as threatened; two are listed as endangered, including Snake River sockeye salmon; and four have been extirpated. NOAA Fisheries' most recent viability risk assessment conducted in 2022 (Ford, 2022) found that all of the Columbia Basin ESA-listed stocks remain at moderate to high risk of extinction. NOAA Fisheries' recent 5 Year Reviews for Snake River stocks noted extreme low abundance and high risk for Snake River sockeye; and sharp declines, high risk and increased level of concern for Snake River spring/summer Chinook salmon. While Snake River fall Chinook salmon have improved since the time of listing, they are still not meeting their recovery goals and remain listed as threatened.

Of the nine stocks of salmon and steelhead previously identified in Puget Sound and the Strait of Juan de Fuca, three (PS Chinook salmon, PS steelhead, and Hood Canal summer-run chum) are listed as threatened under the ESA. Pink and coho salmon, and additional stocks of steelhead and chum salmon, are currently not listed in Puget Sound and the Strait of Juan de Fuca.

NOAA Fisheries' 2022 viability risk assessment (Ford, 2022) found Puget Sound populations of Chinook salmon and steelhead have slightly increased in abundance over the last 5 years. Unfortunately, many of these populations are at very low abundances, numbering in the 10's to low 100's. Populations of steelhead and Chinook salmon have declined slightly over the last 15 years. Only a few of the extant 54 populations of both species have abundances greater than 20% of their recovery targets. Hood Canal summer chum salmon, in contrast, have meaningfully increased in abundance over the last 15 years.

The Washington State of Salmon Report contains ongoing assessments of the condition of different species in Washington and most recently identifies five species "in crisis," including: Snake River Spring/Summer Chinook, Puget Sound Chinook, Lake Ozette Sockeye, Upper Columbia River Spring Chinook, and Puget Sound steelhead. Five additional Columbia Basin species are "not keeping pace," while two lower Columbia species are "making progress" and two are "approaching recovery goals."

Question 11: Do you believe that removal of the Lower Snake River Dams is necessary for "healthy and abundant" salmon?

NOAA Response:

Based on existing science and our expertise in salmon conservation, NOAA Fisheries assessed that it will take a comprehensive suite of actions across the Columbia Basin, including Snake River restoration through dam breaching, to have the greatest likelihood of making significant progress towards healthy and harvestable abundances of salmon and steelhead.

The Honorable Frank Pallone, Jr,

Question 1: Throughout the hearing, there was discussion around different potential causes for the reason that several salmon runs in the Columbia River Basin are near-extinction. In your opinion, what is the importance of the dams in the Columbia River system relative to other potential reasons for why the basin's salmon are in such dire straits?

NOAA Response:

All factors identified as potential causes for decline at the time of ESA listing for salmon and steelhead in the Columbia River Basin (early to mid 1990s) are still active and current threats. The abundance and productivity of Columbia River Basin salmon and steelhead stocks have improved since ESA listing, indicating that the intensive management interventions designed and implemented across these threats have been successful. However, all ESA listed stocks are still listed and all MSA managed stocks are still dependent on industrial-scale artificial production operations in salmon hatcheries. Therefore, extinction may have been forestalled, but salmon and steelhead in the Columbia River Basin have not returned to healthy and abundant levels.

The 2020 Columbia Basin Partnership Task Force Report identified the relative effects of ecologically-limiting factors that the Partnership felt were in the control of resource managers. Across the board, freshwater/estuary habitat conditions and direct/indirect impacts from the hydrosystem were identified as the factors most limiting population productivity. Direct and indirect hydrosystem impacts were the greatest relative threat to all of the Snake River stocks. This assessment targeted factors that could be addressed by the co-manager community, considering ocean conditions and climate change as critically important to determining salmon and steelhead population health, but not in the direct control of fishery managers. In its 2022 Rebuilding Report, NOAA Fisheries affirmed the conclusions of the 2020 Columbia Basin Partnership Task Force Report, but also noted that there are critically important climate change adaptation and mitigation actions possible, and that ecosystem-based fisheries management gives us a suite of tools to apply in direct response to degrading ocean conditions for salmon and steelhead.

Question 2: Can you provide an update on which salmon species on the interior Columbia River are doing well, and which are endangered or at risk of extinction?

NOAA Response:

The 2020 Columbia Basin Partnership Task Force Report describes the status of salmon and steelhead in the basin. Of 27 extant stocks in the Columbia Basin, 17 are ESA- listed. Of the 16 stocks in the Interior Columbia River Basin, seven are listed as threatened; two are listed as endangered, including Snake River sockeye salmon; and four have been extirpated. Examples of unlisted stocks include Upper Columbia summer and fall Chinook and sockeye salmon.

NOAA Fisheries' most recent viability risk assessment conducted in 2022 (Ford, 2022) found that all of the Columbia Basin ESA-listed stocks remain at moderate to high risk of extinction. NOAA Fisheries' recent 5 Year Reviews for Snake River stocks noted extreme low abundance and high risk for Snake River sockeye; and sharp declines, high risk, and increased level of concern for Snake River spring/summer Chinook salmon. While Snake River fall Chinook salmon have improved since the time of listing, they are still not meeting all of their recovery goals and remain listed as threatened.

Question 3: Throughout the hearing, we heard discussions of retµrning Columbia River basin salmon and steelhead populations to a healthy and abundant level. Can you detail some of the benefits (economic, environmental, and others) of returning salmon and steelhead populations to that level?

NOAA Response:

As noted in the 2020 regional stakeholder report prepared by the Columbia Basin Partnership Task Force Report, healthy salmon and steelhead populations that are abundant, productive, widely distributed, diverse, and resilient to environmental perturbations including climate change, can sustain significant levels of harvest and support a full range of ecological benefits, including the needs of dependent species. Generally, healthy refers to a point substantially above ESA delisting on the spectrum from threatened/endangered to extremely low extinction risk. Harvestable species, stocks, or populations of salmon and steelhead are sufficiently viable, abundant, and productive to sustain significant levels of exploitation and harvest.

Salmon and steelhead form a foundation and centerpiece of the lives of many West Coast tribes, providing food that many tribes harvest and rely on year-round. Tribal cultures and calendars often hinge on the life-cycle of salmon, their annual travels and customs tied to the returns of fish and the economic and environmental benefits they provide. Many Northwest tribes were considered among the wealthiest cultures in the country because of the abundance of salmon they depended on. However, many have suffered as salmon and steelhead numbers have declined. While some tribes signed treaties with the government assuring them of the right to hunt and fish in ancestral areas, too few fish now return to many rivers to support those promises. Many tribes now rely on hatcheries to produce enough fish to sustain tribal fisheries.

Pacific salmon support some of the largest and most important fisheries along the Northeast Pacific. In U.S. waters, more than 5,000 boats participate annually in commercial salmon fisheries. Total salmon harvest along the U.S. West Coast has an ex-vessel value of between $400 and $800 million annually. As one example, commercial fisheries for one of the six focal salmon species (Chinook salmon) in California, Oregon, and Washington saw 1,885 unique vessels participating in ocean harvest between 2011 and 2020 producing a cumulative $188 million in ex-vessel revenue and supporting over $1.2 billion in overall economic activity in that span. This fishery catches Chinook salmon arising from at least

20 major stocks that spawn in rivers spanning California's Central Valley to Washington's Puget Sound and includes harvest on both healthy as well as endangered stocks. While still substantial, the overall number of vessels participating in commercial salmon fisheries in California, Oregon, and Washington has declined dramatically from over 10,000 vessels in 1980 to less than 2,000 in 2020.