Hatchery Scientific Review Group
Pacific Salmon Hatchery Reform
www.hatcheryreform.us

January 21, 2016

Ms. Patty Dornbusch
National Marine Fisheries Service
1201 NE Lloyd Boulevard, Suite 1100
Portland, Oregon 97232

Dear Ms. Dornbusch,

Re: Hatchery Scientific Review Group, Comments on the Proposed ESA Recovery Plan for Snake River Fall Chinook Salmon

The Hatchery Scientific Review Group (HSRG) has reviewed the Proposed ESA Recovery Plan for Snake River Fall Chinook Salmon (Plan) and offers comments and recommendations to assist the National Marine Fisheries Service and its federal, state and tribal fishery co-managers in recovery of the species. The HSRG is an independent scientific review panel established and funded by Congress to promote use of the best available scientific information in management of anadromous fish hatcheries in the Pacific Northwest.

GENERAL COMMENTS:

Since its listing under the Endangered Species Act in 1992, the Pacific Northwest Region has made substantial strides towards recovery of Snake River fall Chinook salmon. Efforts to first preserve then re-colonize the species in its critical habitat have proven highly successful. The species has now achieved a status where management and recovery actions need to promote local adaptation of the population such that it can become more productive and self-sustaining in the wild. It is in this phase of recovery that management needs to meet and exceed minimum viable abundance of natural-origin spawners, and increase population fitness, reproductive success, and life history diversity. This must be accomplished, in part, by reducing hatchery influences on the wild population. The HSRG generally recommends managing for local adaptation by ensuring that the Proportionate Natural Influence (PNI) exceeds 0.67 (HSRG 2009, 2014, 2015). For species recovery relying on a single population, a PNI of 0.67 should be considered an absolute minimum.

As the Plan states, “The Snake River fall Chinook salmon population currently has a PNI of approximately 0.06, which is considerably below this level” [0.67]. And, “In recent years, however, the proportion of natural-origin fish in the broodstock has been under 10 percent,

and the proportion of hatchery-origin fish on the spawning grounds has been over 70 percent." Based on the best available scientific information reviewed and considered by the HSRG, we strongly urge NOAA to include more specific and priority actions in its Plan to immediately address this (order of magnitude) disparity in PNI value.

The need for immediate action to improve the population's PNI metric is particularly important given the uncertainty surrounding estimates of the population's true productivity. Recovery depends on the population being self-sustaining in the wild without dependence on artificial propagation. With the population's annual escapement consisting primarily of hatchery-origin Chinook, much of the natural-origin Chinook escapement is likely a result of spawning hatchery-origin fish. This may provide an increasing trend in the abundance of natural-origin fish, but the actual productivity of the natural-origin fish in the wild is masked.

The HSRG encourages NOAA to include in its final Plan the HSRG's 4-phase management framework for conservation of Primary populations of salmon: Preservation Phase, Re-Colonization Phase, Local Adaptation Phase, Full Restoration Phase (HSRG 2014, 2015). With appropriate biological triggers to guide management through these phases, fishery agencies and tribes can better understand how their actions are contributing towards recovery or, alternatively, deferring local adaptation for other management purposes, such as harvest. We believe application of this structure and management for PNI will help ensure that the features characteristic of Viable Salmonid Populations (VSP) are re-established as they are the management actions that are needed to both accomplish measureable and timely progress towards recovery and provide for sustainable fisheries. Managing for PNI should guide Plan actions to address ecological threats which are critical given that Snake River fall Chinook ESU recovery is reliant on a single population.

Salmon management during the Local Adaptation Phase often requires balancing local adaptation for recovery purposes with accommodating harvest needs. Local adaptation is delayed and recovery placed at risk when pHOS is allowed to remain high (PNI low) in order to accommodate harvest. Excessive delay in achieving VSP parameters and local adaptation is of particular concern when accounting for expected effects of climate change. Salmon populations need to be well-adapted to their current habitats to be successful in further adapting as environmental variables change with climate. Current gene flow theory suggests that the level of success the program is currently experiencing may not be sustainable under the current implementation plan. The current hatchery programs appear to be very successful in re-colonizing current habitats. This success should, however, not be confused with re-establishing a locally-adapted, productive and self-sustaining population. Monitoring and evaluation should emphasize determining the productivity and sustainability of natural-origin Chinook over time, in the wild. At current ESU abundances, management of the Snake River fall Chinook hatchery programs is likely threatening the ESU's long term viability and capacity to recover.

Actions which can increase PNI as a management measure of local adaptation include:

1. Increasing the proportion of natural-origin spawners in hatchery broodstocks,
2. Increasing selective harvest or removal of hatchery-origin fish prior to spawning,
3. Reprogramming hatchery releases away from critical spawning habitats, and/or
4. Reducing hatchery production.

Increasing the proportion of natural-origin spawners in hatchery broodstocks:

Hatcheries producing the listed species are not applying best management practices as integrated propagation programs. A higher proportion of natural-origin Chinook (pNOB) is required in broodstocks. Conversely, one or more hatcheries could be operated as segregated programs without integration of natural-origin broodstock, but strays to natural spawning habitats would need to be significantly constrained (i.e. < 5%). Segregated programs are, however, very difficult to properly implement in large rivers.

The Plan would be improved if actions are specified and prioritized to improve pNOB. The Plan could include actions to develop and apply means to collect more natural-origin fish for broodstock. This collection could be population wide or more localized to the area of corresponding juvenile fish acclimation sites, if management for subpopulation structure is desired. Managers should consider and evaluate collection techniques, including broodstock removal from fishways (at least initially), use of fishing seines, deployment of traps, and hook & line techniques. Broodstock collection could be combined with additional terminal, selective fishing to reduce the proportion of hatchery-origin spawners (pHOS) in the wild. Means similar to those being implemented by the Colville Tribes on Upper Columbia Summer/Fall Chinook salmon should be considered.

Managers may want to consider a stepping stone hatchery program (HSRG 2014, 2015) to operate in conjunction with integrated programs and reprogramming of juvenile release sites. Stepping stone programs in the Snake Basin might better accomplish conservation and harvest purposes. Should reintroduction of Snake River fall Chinook above Hells Canyon Complex be pursued, the stepping stone concept might best provide a supply of fish for upriver passage with the least impacts on ongoing recovery of the existing population. A stepping stone hatchery program should also be considered as an interim, initial step in implementing a potential Placeholder Scenario. NOAA should examine the stepping stone concept implemented at the Colville Tribes' Chief Joseph Hatchery as an example.

Increasing selective harvest or removal of hatchery-origin fish prior to spawning:

In addition to increasing pNOB, PNI can be improved by adding selective fishing capacity, particularly in the terminal fishing area. The Plan indicates the option of allowing additional selective, recreational fishing capacity above Lower Granite Dam. Given the extremely low PNI value and size of hatchery programs, the Plan should consider more intensive selective fishing for hatchery-origin Chinook. Perhaps a new tribal fishery applying passive collection techniques for anadromous fish in traps could collectively increase harvest, reduce pHOS, supply natural-origin broodstock, and increase PNI. If recreational and tribal selective, terminal harvest is insufficient to achieve biological objectives, NOAA and co-managers should consider a fishery manager's operation to remove excess hatchery-origin fish in the terminal area (perhaps in combination with collection of natural-origin Chinook for broodstock). Such a management based removal operation is likely necessary to reduce the pHOS from 70% to less than 30%.

In the short-term, managers should consider removal (harvest) of hatchery-origin Chinook from fishways at Snake River dams to begin to raise PNI and promote local adaptation.

Reprogramming hatchery releases away from critical spawning habitats:

pHOS could be reduced by acclimating and releasing juvenile fish away from critical spawning habitats thereby reducing straying, or releasing more fish directly from hatchery sites from which returning adults can be collected (i.e. as being considered in the Placeholder Scenario). Some combination of such reprogramming should be evaluated as a priority recovery action to effectively promote both local adaptation and sustainable fisheries. Reprogramming of hatchery fish releases could be an important action within each of the three potential Viability Scenarios.

Reducing hatchery production:

The numbers of juveniles released from hatcheries could be reduced or modulated with escapement performance to increase PNI and local adaptation. With performance objectives established for pNOB in hatchery programs and the ESU's PNI, managers are encouraged to establish a propagation framework that adjusts hatchery production numbers to ensure achieving performance objectives necessary for wild escapement abundance and local adaptation. As with the Colville Tribe's Chief Joseph Hatchery, production numbers can be varied based on performance triggers that address escapement of natural-origin Chinook, pNOB and population PNI.

The HSRG has found that when seeking solutions that improve local adaptation, hatchery actions and harvest actions are often inseparable and may best be integrated to achieve performance targets for quantity and quality of wild escapement and broodstock collection.

SPECIFIC COMMENTS:

Page 188, par 2: The harvest rate schedule for Snake River fall Chinook under the 2008-2017 *U.S. v Oregon* Management Agreement should be reviewed to determine if it is really adequate to protect natural-origin Chinook and allow for species recovery. The abundance-based harvest schedule purports to limit harvest rates based on the numbers of natural-origin Chinook. But many of these first generation natural-origin fish are progeny of the more numerous hatchery-origin parents (70% pHOS). The abundance of natural-origin fish is therefore propped up by ongoing hatchery operations and excessive escapement of hatchery-origin Chinook, an outcome that is not consistent with self-sustainability of the species in the wild; a requirement for recovery. The existing harvest rate schedule could be appropriate once pHOS is reduced below 30% and PNI exceeds 0.67, at which time the true measure of productivity of the natural-origin population can be assessed and properly harvested.

Page 199, par. 1: For successful recovery of the single population of Snake River fall Chinook, external marking of the hatchery-origin fish is essential for: proper hatchery broodstock collection (to improve pNOB), management and measurement of pHOS, necessary selective fisheries to both reduce pHOS and increase escapement of natural-origin Chinook, and to allow

for measurement of population productivity. With a 75% mark rate and 70% pHOS, about 18% of the spawning Chinook are not discernible as hatchery- or natural-origin. This situation will frustrate the above management needs. The HSRG therefore urges NOAA to include 100% marking of hatchery-origin Chinook in the Plan. With 100% external marking, the money spent on a parental-based tagging protocol might better be spent on other recovery actions.

Should you have any questions concerning these comments, please do not hesitate to contact us.

Sincerely,

Andy Appleby, Co-Chair
Hatchery Scientific Review Group

Peter Paquet, Co-Chair
Hatchery Scientific Review Group

cc: William W. Stelle, Jr., Regional Administrator, NMFS West Coast Region

References

HSRG. 2009. Columbia River hatchery reform system-wide report. Peter Paquet (chair), Andrew Appleby, John Barr, Lee Blankenship, Don Campton, Mike Delarm, Trevor Evelyn, David Fast, Tom Flagg, Jeffrey Gislason, Paul Kline, Des Maynard (alternate), George Nandor, Paul Seidel, Stephen Smith. www.hatcheryreform.us

HSRG. 2014. On the Science of Hatcheries: An updated perspective on the role of hatcheries in salmon and steelhead management in the Pacific Northwest. A. Appleby, H.L. Blankenship, D. Campton, K. Currens, T. Evelyn, D. Fast, T. Flagg, J. Gislason, P. Kline, C. Mahnken, B. Missildine, L. Mobrand, G. Nandor, P. Paquet, S. Patterson, L. Seeb, S. Smith, and K. Warheit. www.hatcheryreform.us

HSRG. 2015. Annual Report to Congress on the Science of Hatcheries, 2015. A. Appleby, H.L. Blankenship, D. Campton, K. Currens, T. Evelyn, D. Fast, T. Flagg, P. Kline, C. Mahnken, B. Missildine, L. Mobrand, G. Nandor, P. Paquet, S. Patterson, L. Seeb, S. Smith, and K. Warheit. www.hatcheryreform.us