

LRC WORKGROUP – PROGRESS REPORT

This is a progress report on results of the May 15, 2014 work session of the *Ad Hoc* Lower Columbia River Natural Coho (LRC) Work Group. This group was established to explore existing and alternative harvest policies for Columbia River coho. The May work session focused on a review of the available information and development of an approach for identifying and evaluating alternative harvest control rules. Specifically, the Group reviewed the status of Lower Columbia Natural coho populations, the current harvest control rule matrix, and the risk analysis of LCN harvest policy completed in 2013. Based on this review, the Work Group identified the following approach for their effort.

1. Explore the potential for streamlining the harvest control-rule matrix structure.

The current harvest control rule is based on a matrix approach that determines allowable fishery impacts based on parental spawner escapement and marine survival. This matrix is complex, including specific harvest rates for 20 combinations of five escapement and four survival index categories. This complexity makes it difficult for managers and fishers to understand and evaluate the implications of different alternatives. The Work Group examined the technical basis of the general matrix strategy and the specific definition of categories. Based on this examination, it was concluded that the current matrix complexity may not be necessary or entirely effective.

Harvest rates are the same for many matrix cells and several categories and cells seldom or never occur. For data-rich populations, natural coho abundance and recruits per spawner was strongly correlated with a marine survival index based on hatchery jacks/smolt, so there is a justifiable rationale for a related abundance-based harvest strategy. However, abundance was weakly related to parental escapement which calls into question the definition of five parental escapement categories, particularly since natural coho escapement is also measured with substantial error in most populations.

The workgroup identified a number of alternative matrix structures for consideration including 1x3, 1x5, 2x3, and 3x3 frameworks. Risk/benefit assessments of potential alternative structures will be conducted prior to the July Work Group meeting in order to develop specific recommendations.

2. The work group will assess conservation risks of the fishery strategy based on effects on primary populations, representative of all three spatial strata of the Evolutionary Significant Unit (ESU).

An essential objective of the fishing strategy for LCN coho is to avoid jeopardizing long term viability or precluding recovery of LCN coho, including primary populations of all three spatial strata (Coast, Cascade, and Gorge). Salmon recovery plans adopted by Washington, Oregon, and NMFS, identify recovery objectives for LCN coho that designate a subset of all populations as primary targets for restoration to high levels of viability based on abundance, productivity spatial structure and diversity. A total of 16 of the 24 lower Columbia populations were identified in recovery plans as primary populations. The remainder were identified as contributing populations where recovery measures are expected to result in some improvement, or as stabilizing populations where measures are expected to prevent further declines. Of the primary populations, at least three were identified in each of the three spatial strata within the ESU. Primary populations of coho will require some of the most significant improvements in status, hence, will be most constraining to a viable recovery fishing strategy.

Previous application of the coho harvest matrix was based on Sandy and Clackamas coho which are two of the stronger populations in the ESU and the only two for which long-term stock assessment data were

available. Over the last five to ten years, data has been collected on the status of additional natural populations.

Risk assessments will incorporate recent data which now provides an empirical basis for assessment of representative populations in addition to the Sandy and Clackamas. Any parental criteria included in future matrices will likely be based on average values of representative populations where significant data is available.

3. Status of Willamette coho might inform our understanding of population dynamics and response to recent fishing patterns but does not change the need to develop effective fishing alternatives for management of coho populations that are in the current ESU.

The Work Group reviewed current information on Willamette coho prepared by ODFW and NMFS. Willamette River tributaries upstream from Willamette Falls currently support naturally-produced coho that have often been the largest return of natural coho in the lower Columbia in recent years. Willamette coho were not included in the listed ESU, primarily because access was historically blocked by Willamette Falls. However, a naturally-producing population has become established following decades of hatchery releases, which were discontinued after 1996. Ladder counts at Willamette Falls provide some of the most accurate information on status of a naturally-producing coho population in the region.

The appropriate status of Willamette coho relative to the listed ESU and coho recovery goals has been debated by some. On the one hand, this population is not part of the ESU because it has colonized streams where it is not native. On the other hand, it appears to be a viable naturally-producing population which is the goal for the ESU.

NMFS's West Coast Region and Northwest and Southwest Fisheries Science Centers are still assessing the scope of the status review and are considering taking up boundary questions related to Columbia River coho as part of the next formal 5-year status review scheduled for 2016. **NMFS advises that their ESA analysis will be on the current ESU. Willamette coho is not part of the ESU. Therefore, NMFS will not use Willamette information in writing the Biological Opinion.**

The Work Group will proceed with the understanding that any fishery strategy must effectively protect listed coho populations throughout the designated ESU. The risk assessment will include Willamette coho to inform expectations for the response of a relatively strong coho population under various fishing scenarios. The degree to which the Willamette population might be considered representative of other coho populations in the ESU is unknown.

4. Evaluate effects of fishing strategies on coho conservation risk utilizing the assessment and model adapted by ODFW and WDFW in 2013.

A harvest strategy risk assessment was prepared by ODFW and WDFW for LCN coho using an adaptation of the Lower Columbia River tule fall Chinook risk model. This model analyzes effects of fishing on natural population status using a stochastic stock-recruitment model in a Population Viability Analysis framework like that employed in salmon ESA status assessments and recovery plans. The 2013 LCN assessment was vetted in a 2013 salmon methodology review (November 2013 Briefing Book, Agenda Item C.2.s, Attachment 2, available on the Council web site). At the November 2013 Council session, the Scientific and Statistical Committee suggested improvements and found the risk analysis to be "sound" and "suitable for ranking the relative risk of various harvest scenarios."

The Work Group will incorporate results of the 2013 risk assessment into their effort and also complete additional analyses with the same modeling approach. Model sensitivity analysis will be used to evaluate the effects of alternative matrix structures and different combinations of fishing rates.

5. Analyses of alternative fishing strategies will consider both conservation risks and fishery effects.

Previous quantitative risk assessments for coho and Chinook have demonstrated that many different combinations can produce equivalent conservation risks. For instance, the current coho matrix produces population risk levels equivalent to a fixed 15-16% harvest rate. However, abundance-based management defined by a matrix approach can provide significant fishery benefits by allowing increased opportunity during large return years when risks of low escapement are negligible. The 2013 coho harvest strategy risk assessment primarily focused on conservation risks and did not attempt to estimate fishery benefits. The Work Group will include assessments of fishery effects in the current analysis in order to provide a basis for weighing tradeoffs between conservation risks and harvest benefits.

Fishery effects of alternative fishing strategies will be evaluated based on the implications of different fishing rates to fishery configurations and the likely frequency of occurrence of each. For instance, fishing rates can be identified in the ocean or Columbia River fisheries corresponding to no coho target fisheries, full coho retention fisheries, and maximum potential rates given other constraints.

6. The work group will examine the technical feasibility of evaluating risk tradeoffs between fishing effects on spawning escapements and the incidence of hatchery-origin strays in natural production areas.

Hatchery-origin coho dominate the Columbia River return and these fish are primarily produced for fishery mitigation purposes. Consequently, it is difficult to separate fishery and hatchery effects in considerations of natural coho population status. As a result, recovery plans adopted by Washington, Oregon and NMFS include a series of closely-related and complementary fishery and hatchery measures.

Conservation risks of fishery alternatives are being evaluated based on the frequency of critical low natural spawning escapements which potentially reduce long-term population viability. Higher fishing rates can increase risk by increasing the likelihood of small escapements. Higher fishing rates might also reduce risk by removing larger numbers of hatchery fish which impact natural population productivity. Higher productivity will increase long-term viability as populations are less likely to fall to critical low levels and more likely to rebound quickly. The 2013 coho risk assessment discussed this relationship but did not incorporate changes to productivity that might accrue from reduced hatchery spawning.

The impact of hatchery-origin spawners on wild productivity is uncertain and subject to considerable debate. However, the *Hatchery Scientific Review Group* (HSRG) has developed tools for evaluating hatchery spawner impacts on natural population productivity based on a number of assumptions. These relationships were used in a comprehensive hatchery review for the Columbia Basin by the HSRG, and were included as a component of the Washington recovery plan. These efforts led to the implementation of a series of hatchery reforms, which, for coho, included elimination of some programs, program changes, establishment of wild fish refuges, and increased stock assessment.

The Work Group will explore the feasibility of including fishery-hatchery interaction effects in assessing conservation risks based on tools developed by the HSRG. Percentages of hatchery-origin natural spawners will also be documented by population where available. Results will be evaluated to determine if appropriate for consideration quantitatively or qualitatively in the risk analysis.

7. An appropriate risk standard for evaluating alternative fishing strategies remains to be determined.

As noted by the SSC, the assessment methodology provides a robust means of identifying relative risks of fishery alternatives to natural coho populations but absolute risk levels calculated by this method are much more subjective. Risk levels associated with current fisheries might be regarded as a benchmark against which other alternatives can be measured. However, current fishing levels were themselves based on subjective considerations.

Current fishing levels were effectively established in 2006 and 2007 when NMFS implemented further reductions under federal rules relative to those in place since 2001 under state rules. Rates were previously indexed to Sandy and Clackamas coho seeding levels in part because data on other coho populations was quite limited. However, Sandy and Clackamas may not be representative of many of the weaker populations in the ESU. Therefore, reduced fishing rates were implemented as a precautionary measure for protecting significant coho populations throughout the ESU.

Since the federal listing of coho in 2005, substantial new information on the status of natural coho populations has been collected by ODFW and WDFW. This data now provides a means of conducting a formal risk assessment to demonstrate the likely effects of proposed harvest strategies as identified by NMFS in a 2011 guidance letter.

Results of the 2013 risk assessment conducted by ODFW and WDFW suggest that it will be difficult to significantly reduce already-low fishery-related risk levels and that further risk reductions would have drastic fishery repercussions. Unlike tule Fall Chinook, current low fishing levels for LCN coho may not provide room for a “win-win” strategy where both reduced risk and increased flexibility can be achieved. The win-win solution was possible for Fall Chinook where fishing rates because substantially greater and within an effective range.

The Work Group anticipates that a number of alternative fishery strategies might increase fishery opportunities with no or little effective increase in wild population risk. A key consideration will be whether marginal increases in model-derived risks relative to the current level are significant in the broader context of current coho information and status.

8. Future Workload and Meeting Schedule.

The Workgroup’s next formal meeting will be July 16th at the Council offices in Portland and will focus on reviewing Council guidance from the June Council meeting, discussion of preliminary model results, and developing a range of alternative harvest matrices for further analysis. The Workgroup then plans to develop a report for the September Council meeting via email and phone until they meet again on August 14th to finalize a range of analyzed alternatives and a set of recommendations for Council review.

The Council is tentatively scheduled to receive an update at the June Council meeting, adopt alternatives for public review at the September Council meeting, and adopt a preferred alternative at the November Council meeting.

The Workgroup stressed the importance of keeping the Salmon Advisory Subpanel (SAS) informed of progress and developments. SAS members are encouraged to attend Workgroup meetings. The Workgroup strongly recommended a joint session of the Workgroup and the SAS at or just before the September Council meeting in Spokane, Washington. A meeting in Portland in advance of the June Council meeting may be more convenient and cost effective than meeting in Spokane.