



*Independent Scientific Advisory Board  
for the Northwest Power & Conservation Council,  
Columbia River Basin Indian Tribes,  
and NOAA Fisheries Service  
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# Independent Scientific Advisory Board Fiscal Year 2019 Statement of Work

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\*These members' terms will end in 2018, and new members will be appointed in 2019.

*(October 2, 2018 Version – subject to revision as assignments are added and approved throughout the year)*

# Independent Scientific Advisory Board

## Fiscal Year 2019 Statement of Work

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# Independent Scientific Advisory Board

## Fiscal Year 2019 Statement of Work

### Partnership

In 1996, the Northwest Power and Conservation Council and NOAA Fisheries established the Independent Scientific Advisory Board (ISAB). The ISAB was formed to provide independent scientific advice and recommendations regarding scientific issues posed by the respective agencies on matters that relate to their fish and wildlife programs. In 2002, the Columbia River Basin Indian Tribes were added as equal partners in the administrative oversight of the ISAB.

### Purpose

The ISAB fosters a scientific approach to fish and wildlife recovery and the use of sound scientific methods in research related to the programs of NOAA Fisheries, the Council, and the Tribes. It is understood that the interests of NOAA Fisheries relate particularly to anadromous fish conservation and management, while those of the Council and the Tribes include all fish and wildlife populations affected by operation and development of the Columbia River Basin hydroelectric system. NOAA Fisheries is responsible for federal stewardship of the Nation's marine and anadromous fish, and marine mammals. The Council is charged to "protect, mitigate, and enhance" fish (anadromous and resident) and wildlife as affected by operation and development of the hydroelectric system. The Tribes manage fish and wildlife resources on their respective reservations, are co-managers on ceded lands, and are responsible to ensure treaty provisions governing natural resources are secured to future generations.

The ISAB is a standing body with general tasks, specified in a [Terms of Reference](#), that guide its work plan. Specific ISAB assignments are commonly generated within the fiscal year, often span fiscal years, and are sometimes unanticipated. The ISAB's general tasks are described below, followed by proposed and potential assignments for Fiscal Year (FY) 2019. The ISAB's total FY 2019 budget to complete these and other potential reviews approved by the ISAB Administrative Oversight Panel is \$547,000.

This draft Statement of Work has not yet been approved by the ISAB Administrative Oversight Panel, consisting of Jim Yost, Council Chair; Kevin Werner, Science and Research Director, NOAA's Northwest Fisheries Science Center; and Jaime Pinkham, Executive Director, Columbia Inter-Tribal Fish Commission (CRITFC). This Statement of Work will be submitted for ISAB Executive Committee input and Oversight Panel approval with the understanding that it is a working document and potential assignments may be added by the Oversight Panel based on discussions with the entities they represent. The potential assignments described in this document and any new assignment proposed during the year are subject to Oversight Panel revision and approval.

## General ISAB Responsibilities

The ISAB addresses scientific and technical issues relating to the Council's Fish and Wildlife Program, tribal fish and wildlife programs, and the NOAA Fisheries Recovery Program for Columbia River Basin salmonids. As described in the Terms of Reference, principal activities include, but are not limited to, the following:

- Evaluate the Council's Fish and Wildlife Program on its scientific merits in time to inform amendments to the Fish and Wildlife Program and before the Council requests recommendations from the region.
- Provide scientific review of NOAA Fisheries recovery planning, recovery implementation, and other ESA-related activities for Columbia River Basin stocks when requested.
- Review the scientific and technical issues associated with efforts to improve anadromous fish survival through all life stages, based on adaptive management approaches.
- Review and provide advice on priorities for conservation and recovery efforts, including research, monitoring, evaluation, and data management.
- Provide scientific reviews of topics identified as critical to fish recovery and conservation in the Columbia River Basin.
- Provide scientific review of, and suggestions to strengthen, tribal efforts to restore fish and wildlife resources when requested.
- Compare the various plans, strategies, analytical tools, and methods employed by the Council, NOAA Fisheries, the Columbia River Basin Indian Tribes, and others related to the management of Columbia River Basin fish and wildlife to identify areas of consensus, disagreement, uncertainty, and opportunity.

To the extent allowed by time and resources, the ISAB provides specific scientific advice on topics and questions requested from the region or the ISAB itself and approved by the Oversight Panel by majority vote. Fish and wildlife agencies and others may submit questions to the ISAB. The ISAB may also identify questions and propose reviews. The Oversight Panel, in consultation with the ISAB, reviews these questions in a timely manner and decides which are amenable to scientific analysis; are relevant to the Tribes', Council's, and NOAA Fisheries' programs; and fit within the ISAB's work plan. As stated in the ISAB's Terms of Reference, many questions pertaining to the recovery of the Columbia River ecosystem contain both scientific and policy aspects. The ISAB addresses the scientific and technical aspects of issues.

In addition, the Council's 2014 Fish and Wildlife Program directs the Council to work with the ISAB to organize Columbia River science/policy conferences to discuss and explore scientific and technical developments in key policy areas. For example, the ISAB assisted CRITFC and the Council

in developing the agendas for CRITFC's 2016 Future of Our Salmon workshop and conference on floodplain restoration.

## Specific Assignments for Fiscal Year 2019

For FY 2019, the ISAB anticipates working on a mix of long, medium, and short-term assignments that allow for an efficient use of the ISAB's expertise and resources. Ongoing and potential topics for assignments are described below. In addition, the ISAB is on-call for assignments from the Council, Tribes, and NOAA Fisheries. These on-call assignments pertain to scientific issues raised in the Council's Program, Tribal programs, and NOAA analyses that inform Columbia River fish management, including mainstem passage analyses and experiments.

### 1. Research, Monitoring, and Evaluation (RM&E) Reviews

In FY 2019, the ISAB will continue its shared role with the ISRP in reviewing regional plans aimed at monitoring and evaluating the status of fish and wildlife populations in the Basin and the effectiveness of projects at benefiting those populations. The ISRP and ISAB<sup>1</sup> closely coordinate reviews of RM&E plans and products, such as the Council's Research Plan, draft Council documents related to Program RM&E activities and guidance, Pacific Northwest Aquatic Monitoring Partnership (PNAMP) products, Action Agency RM&E plans, and RM&E proposals. The Council, BPA, and NOAA staff are currently developing an integrated Research, Monitoring and Evaluation strategy that will meet multiple basin needs and include a [tributary habitat monitoring strategy](#). They hope to complete a draft of the habitat restoration RM&E strategy as early as August 2018 with further iterations of integrated RM&E strategy throughout 2019. Consequently, in FY 2019, the ISAB and/or ISRP may be requested to assist with reviews of draft habitat restoration monitoring and other integrated RM&E implementation strategies.

### 2. Fish and Wildlife Program Development: Objectives

A central task described in the ISAB's Terms of Reference is for the ISAB to "evaluate the Council's Fish and Wildlife Program on its scientific merits in time to inform amendments to the Fish and Wildlife Program and before the Council requests recommendations from the region." The ISAB completed a review of the 2014 Fish and Wildlife Program in March 2018 ([ISAB 2018-3](#)). Among other topics, the ISAB highlighted the need for clear qualitative goals and quantitative, time-bound objectives to guide actions and track Program progress. The Council's 2014 Fish and Wildlife Program specifies that "the Council, working with others in the region, including the state and federal fish and wildlife agencies and tribes, other federal agencies and the independent science panels, will oversee a regional process to survey, collect, identify, and refine a realistic set of quantitative objectives for Program focal species and their habitat ..." The ISAB's role is to "review objectives for scientific quality and usefulness in tracking progress and adaptively managing

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<sup>1</sup> Joint ISRP/ISAB members will bill their services related to these reviews to their ISAB contracts.

Program efforts.” In the spring of 2015, the Council initiated a process to refine Program goals and quantitative objectives focusing on natural-origin adult salmon and steelhead. This process resulted in the creation of an [objectives mapping tool](#), which is informing the NOAA-led [Columbia Basin Partnership Task Force](#), a special task force organized under NOAA Fisheries' Marine Fisheries Advisory Committee. The Task Force intends to recommend “a shared vision for Columbia Basin salmon and quantitative goals to meet conservation needs and provide harvest opportunities.” Any potential ISAB assignment in FY 2019 will need to be closely coordinated with and complementary to the Council’s and Task Force’s efforts. Given the Council’s Program amendment schedule and process, it is unclear if an ISAB review will be feasible in FY 2019.

### 3. Mainstem Passage Reviews and Regular Review of Fish Passage Center Products

Since its formation, the ISAB has been continuously engaged in reviews of projects, programs, study designs, and analyses related to fish passage at the mainstem Columbia and Snake river dams. The ISAB will continue to be on-call to address mainstem issues including reviews identified in the Council’s Fish and Wildlife Program and in NOAA’s Biological Opinion (BiOp). For example, the [2014 Federal Columbia River Power System BiOp’s](#) section 3.3.3.5 on Reasonable and Prudent Alternative implementation regarding System Survival, page 382, specifies that regional consideration of a spill test include “independent review of (a) data to address potential spurious correlations and (b) alternative experimental design proposals (by the ISAB or other qualified entities).” In 2014, the ISAB completed a review of the spill experiment submitted by the State of Oregon, the Nez Perce Tribe, and others for inclusion in the Council’s Fish and Wildlife Program ([ISAB 2014-2](#)). In 2018, the ISAB completed the report, *Review of NOAA Fisheries Document: A Power Analysis of Two Alternative Experimental Designs to Evaluate a Test of Increased Spill at Snake and Columbia River Dams, Using Smolt-to-Adult Returns of Anadromous Salmonids* ([ISAB 2018-2](#)). As described in the 2014 Fish and Wildlife Program (pages 65-66), if other regional spill proposals are developed in FY 2019 and if requested by the Administrative Oversight Panel, the ISAB is prepared to review them.

In addition, the May 2016, US District Court ruling by Judge Simon called for the federal action agencies to revise the BiOp and meet National Environmental Protection Act requirements by developing appropriate EIS documents, including consideration of alternatives. These alternatives may include analyses of a variety of changes to hydrosystem operations and configuration that could benefit from ISAB input. Other issues raised in the Court’s decision such as the state of the science on climate change impacts and the benefits of habitat restoration may benefit from ISAB input.

In response to language in the Council’s 2009 Program, the Fish Passage Center (FPC), its Oversight Board, and the ISAB organized a system of independent and timely reviews of FPC analytical products. The Council’s 2014 Program maintains this ISAB review function. FPC products take several forms, and the review guidelines are tailored to reflect the scientific content of these various products. Scientific review by the ISAB is recommended for selected FPC products including the Comparative Survival Study (CSS) annual report as well as analytical products that are identified for review based on the following criteria: (1) new or novel analyses are introduced; (2) new conditions or data bring old analyses into question; and/or (3) consensus cannot be reached in the

region on the science involved in the product. As appropriate, these reviews are not limited to only the FPC's analysis but, as identified, can also include reviews of similar analyses by others. In FY 2019, the ISAB will complete a review of the CSS's draft 2018 annual report. The review period will begin in early September and end in mid-October 2018.

#### 4. Review of NOAA Fisheries Recovery Planning and Life-Cycle Modeling Products

One of the ISAB's primary roles is to review draft NOAA Fisheries' analytical projects that address Columbia River salmon ESA listings and thus affect recovery planning and Council Fish and Wildlife Program planning. For example, the 2010 Supplemental Biological Opinion called for development of a life-cycle model and a subsequent scientific review. In September 2017, the ISAB completed a *Review of NOAA Fisheries' Interior Columbia Basin Life-Cycle Modeling Draft Report* ([ISAB 2017-1](#); also see [ISAB 2013-5](#)). The ISAB found that progress was evident on model development. However, not all model components were complete, and the model was evolving. Consequently, in FY 2019 the ISAB may be asked to review updated drafts of specific model components.

In August 2014, the ISAB completed a review of NOAA Fisheries' draft Viable Salmonid (VSP) Modeling of Willamette River Spring Chinook Populations ([ISAB 2014-4](#)). The ISAB may review future iterations of that modeling effort as more data become available and as the model is further refined to account for stochastic variability and to reflect results of sensitivity analyses.

#### 5. Comparative Examination of Fish and Wildlife Recovery and Mitigation Planning Documents

The ISAB Administrative Oversight Panel have discussed collectively shaping a request to the ISAB to assist in a review pertaining to the [Fish and Wildlife Program](#), [Wy-Kan-Ush-Mi Wa-Kish-Wit](#) tribal salmon restoration plan, and possibly NOAA's [Columbia Basin Long-term Recovery Situation Assessment](#) and other [recovery planning documents](#). Such a review would be collaboratively developed by the Council, CRITFC in consultation with the upriver tribes, and NOAA's Northwest Fisheries Science Center and Regional Office. The review would be complementary to any related or planned efforts of NOAA, the Tribes, or the Council. The review might be patterned after the ISAB's 1999 report "[Work-In-Progress Report: Looking for Common Ground: Comparison of Recent Reports Pertaining to Salmon Recovery in the Columbia River Basin](#)." The ISAB would look at areas of scientific consensus and disagreement, shared uncertainties and strategies, and recovery goals and visions. This potential assignment will be further discussed in the fourth quarter FY 2018 and in FY 2019. This comparative examination of recovery plans might best be enveloped within a potential ISAB review of the Columbia Basin Partnership Task Force recommendations with special regard to quantitative goals; see item 2 above.

## 6. State of Science and Other Potential Reviews

The ISAB partners through the Administrative Oversight Panel and the ISAB regularly identify issues that might benefit from ISAB evaluation. The ISAB's Ex Officio members<sup>2</sup> – Zach Penny for CRITFC and the Columbia Basin Tribes, Mike Ford for NOAA Fisheries, and Nancy Leonard for the Council – are considering three assignments for potential feedback from the ISAB and consideration by the Oversight Panel:

- Predation management effectiveness:** The 2014 Fish and Wildlife Program includes recommendations for 1) development of a common predation metric and 2) evaluation of predator management effectiveness by a federal, state, tribal technical work group. The ISAB's Predation Metrics Report ([ISAB 2016-1](#)) addressed the first item, but the second item has not been addressed; a technical work group has not been formed. It remains unclear the extent to which the Basin's pinniped, avian, northern pikeminnow, lake trout, and northern pike suppression efforts are improving or protecting survival, diversity, and abundance of salmon, steelhead, and sturgeon at the population level or are meeting mitigation goals such as increased harvest. The ISRP's recent review of the Lake Roosevelt northern pike suppression multi-year proposal ([ISRP 2018-3](#)) highlighted the need for a predation management effectiveness review. Do we want to embark on a long-term northern pike suppression effort without fully learning from our past predator control efforts? Also, what are the impacts of other major predators or competitors that are not the focus of Fish and Wildlife Program projects, e.g., American shad, walleye, and smallmouth bass? Council staff is exploring a potential economic analysis of northern pike impacts and control or possibly predation control basinwide that would be added to the scientific review. This might be done through bolstering the ISAB with ad hoc members with economic and fisheries expertise, the Council hiring an economic consultant to work independently but coordinate with the ISAB, or the Council enlisting the Independent Economic Analysis Board to work with the ISAB on a joint biological and economic analysis.
- Orcas and the connection with Columbia Basin salmon and salmon management:** The recent ISAB reports covering predation have highlighted increases in salmon predation by marine mammals. But to what extent do killer whales (orcas), namely the ESA-listed Southern Resident Pods, rely on Columbia River Basin stocks versus other stocks and food sources? And thus, what contributions or level of production is needed from the Columbia to provide salmon for killer whales and other marine mammals, especially the southern resident killer whales? The southern resident killer whales' abundance and breeding success has been decreasing, and there are worries that the population is heading toward an extinction threshold. No southern resident calves have survived since 2015. The population has decreased from ~100 whales in the 1990s to 75 now. The southern residents rely on Columbia River Chinook for part of their seasonal diet, and lack of prey has been identified as a limiting factor. Pollutants, inbreeding, and vessel traffic and noise have also been identified as limiting factors. The Orca BiOp's RPAs point to salmon recovery and restoration as a strategy to increase prey abundance to help aid in orca recovery. In March 2018,

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<sup>2</sup> Ex officio members are liaisons between their agencies and the ISAB, assist in the ISAB's operation and administration, help develop and support assignments, and provide scientific and policy context for reviews.



Washington Governor Inslee signed an [executive order](#) to protect the southern resident orcas. The order called for the establishment of a task force. ISAB Ex Officio member Mike Ford and Council member Guy Norman serve on the Prey Availability Working Group. The working group meets monthly and has a product due in November 2018.

Scoping a potential killer whale review assignment for the ISAB is challenging. Any ISAB assignment would need to 1) be designed to focus on the Columbia River Basin and the hydrosystem's connection to killer whales, 2) be complementary to other ongoing efforts such as the Prey Availability Working Group and the Columbia Basin Partnership Task Force, and 3) account for the ISAB's expertise to conduct the review (ad hoc members with marine mammal expertise may be needed). Some questions that could connect the review to the Columbia Basin include:

- What are the priority stocks for the orca diet? Are Columbia Basin wild and hatchery stocks included? The Working Group is looking at this question. The ISAB could review the Working Group's methodology for prioritizing stocks. This would be a narrowly focused review.
- Is increased production and diversity from improved salmon habitat in the Columbia Basin on a time-scale that could be reasonably expected to aid the recovery of southern residents?
- What is the scientific rationale and evidence that increasing Columbia Basin hatchery production would improve the southern residents' chance for recovery? Much of hatchery discussion focuses on risk and benefits to other salmon populations and human harvest, and this question could expand our perspective. Some sub-questions include:
  - What is the ecological contribution of hatchery fish in the current marine ecosystem? That is, can changes in fish production from the freshwater impact the broader food web?
  - Do releases of hatchery fish in other areas cause density-dependent impacts for Columbia River basin salmon; e.g., Ruggerone articles on pink salmon interactions with other salmon species, density dependence in the Northeastern Pacific?
  - To what extent could changes in hatchery practices and production have a role in increasing life history and stock diversity? Under what circumstances would this be useful?

This last set of hatchery-related questions might be of interest more broadly, rather than focusing only on killer whales. Basically, most hatchery reviews have focused on risks and benefits to salmon, and the benefits to human fisheries. A broad review question might be: Are hatchery salmon providing essential ecosystem benefits that would be lost if they were removed and wild salmon did not increase concurrently?

- **Habitat Action Effectiveness RM&E:** A key role of the ISAB is to review alternative and complementary approaches for addressing uncertainty. This review would be forward looking, focused on complementing ongoing regional efforts, including the

Bonneville-Council-NOAA habitat RME Steering committee work. The review would provide an independent assessment of 1) how to leverage existing data, 2) best parameters to guide selection and implementation of habitat actions, 3) strengths and weaknesses of approaches to address habitat uncertainties and decisions at different scales, such as at the reach, watershed, or population scale. This review would provide a basis for reference as the Council begins the Category Review of projects and for when the ISAB and/or ISRP is requested to review the Bonneville-Council-NOAA habitat RME draft strategy in FY 2019.

- Measuring, Monitoring, and Managing Life History Diversity for Sustainable Restoration of Anadromous and Resident Fish Species:** The ISAB's FY 2014 Statement of Work described more than twenty topics that might benefit from scientific review. In 2014, the ISAB selected and developed three topics from this larger set for consideration by the ISAB's Administrative Oversight Panel: density dependence, novel ecosystems, and life history diversity. The ISAB Administrative Oversight Panel considered these three topics and approved the density dependence review (ISAB 2015-1). The assignment included questions on novel ecosystems and life history diversity as relevant to density dependence with the intent that the ISAB could further scope and refine potential review proposals for those topics. An update of the summary request for life history diversity as proposed in 2014 could be refined and developed into a revised proposal for FY 2019.

Life history diversity buffers fish production and the fisheries they sustain from variable environmental conditions, for example, swings in climate such as wet and dry years, which are becoming more severe. This ISAB review would provide specific information on what is known and needs to be known about basin-scale trends in loss of life history diversity of key anadromous and resident fish species in the Basin. It would also provide recommendations for specific quantitative measures and methods to identify, monitor, and manage life history diversity. This review could examine how life history diversity information could best be incorporated into mitigation, conservation, restoration, hydrosystem operations, and reintroduction efforts. One question might be whether recent genomic research probing the genetic basis of life history variation changes how we need to think about diversity in a recovery context. Another question might be how to manage for life history diversity in a novel/modified ecosystem, including anticipated modifications due to climate change.

The Administrative Oversight Panel approves, modifies, or disapproves assignments requested by the region or generated by the ISAB and thus would consider these or other topics for approval if so requested.