**DRAFT Programmatic Topic of Interest:**

**Incorporating Relevant ISAB Food-Web Report Components into Council Recommendations for RME Categorical Review Projects**

**Issue:**

The ISAB have completed their report on *Columbia River Food Webs: Developing a Broader Scientific Foundation for Fish and Wildlife Restoration*. As stated by the ISAB, achieving the Council’s vision of restoring and maintaining ecosystems sustaining an abundant, productive and diverse community of fish and wildlife through the Fish and Wildlife Program (NPCC 2009-09) can be assisted through a food web perspective. A food web perspective also complements other approaches, such as the Program’s focus on habitat restoration, and thereby enhances our collective ability to meet the Council’s vision.

This issue paper was prepared as requested by the Fish and Wildlife Committee and Full Council for staff to synthesize the ISAB food-web report and suggest options for addressing the report’s suggestions during the categorical review of RME+ projects.

**Background and Staff Comments:**

**Restoration Assumptions and Food Webs**

The ISAB summarizes that, in general, restoration activities have traditionally focused on physical habitat, an approach that assumes local habitat structure and quality dictate fish production. River habitats traditionally have been thought to constrain fish production. More importantly, traditional freshwater food-web illustrations assume most fish food is produced locally. In reality, much of the food comes from external or very distant sources – including marine nutrients brought by adult returns of anadromous fish, from fishless headwater tributaries that transport prey downstream, and from adjacent streamside and estuarine vegetation and associated riparian and terrestrial habitats. Key food sources vary over time and space throughout watersheds. When restoration activities are not successful, it is often because they do not take a sufficiently broad view of the watershed, including food webs and the processes that influence food availability. Many fish use a variety of habitats to complete their life cycles, and use many different important prey resources. Effective restoration requires an understanding of the entire fish life cycle and what food, from where, is important at each part of the life cycle.

**Council’s Fish and Wildlife Program and Food Webs**

The habitat-based ecosystem foundation of the Program can accommodate additional emphasis on a food-web perspective, including the fact that food source inputs may come from outside the local watershed. The Program currently considers and funds work related to many topics identified in the ISAB’s food web report, for example:

* The Program contains language related to the need to consider non-native species, predator control, and toxic contaminants.
* The Program funds projects focused on basic food web research, predator management, species interactions research, climate change, and nutrient supplementation.

**Staff Comments**

There are several ways that the Council may find it appropriate to address the spectrum of ISAB suggestions from:

* Making modifications to the Program language during the next amendment process,
* Incorporating recommendations during subbasin plan updates,
* Enhancing regional understanding by holding science-policy workshops,
* Making programmatic or project level recommendations to Bonneville.

When determining how best to address these suggestions, it is important to consider work being done by agencies that already contribute to meeting the ISAB’s suggestions and that can complement the Council’s work, such as work done by:

* U.S. Geological Survey
* U.S. Environmental Protection Agency
* U.S. Army Corps of Engineers
* NOAA Northwest Fisheries Science Center

Equally important, is to take into consideration projects in upcoming resident fish and geographic reviews that may benefit from Council guidance to enhance incorporation of food-web concepts.

**ISAB Food-Web Report Comments Pertinent to the RME Categorical Review:**

Below is a summary of a subset of ISAB Food-Web comments that may begin to be more fully addressed through programmatic and project level recommendations for the RME+ Categorical Review.

**Carrying Capacity of the Columbia River**

* Determine the ability of the system, both currently and after habitat-restoration, to produce foods to support proposed or anticipated numbers of both wild and hatchery reared fishes at a level promoting adequate growth and/or successful migration.
* Determine where and when wild and hatchery fish growth is density dependent.

**Alignment of Hatchery Releases with Food Availability, Reduced Predation, and Favorable Environmental Conditions**

* Quantify critical connections and model how to get the fish where they need to be, when they need to be there, with the right blend of available food resources, water temperatures and interactions with predators and competitors.

**Nutrient Organic Matter (Energy), Water, and Thermal Sources and Flows**

* Assess extent to which marine-derived nutrients are helpful.
* Identify nutrients that enhance the productivity of food webs, and determine whether existing concentrations are limiting productivity.
* Model scenarios of different policy options about nutrient concentration manipulation to assess its effectiveness (carcass etc).

**Impacts of toxic contaminants on fish and their food-webs**

* Evaluate and model impacts of the increasing chemical load on organisms and on aquatic food webs.

**Effects of climate change, river conditions, and ocean conditions on salmonids and food-webs**

* Assess relationship between SAR and ocean productivity and river conditions.
* Establish planning goals for the biota and food webs for the foreseeable future, while taking into account anticipated climatic and anthropogenic changes that may impact the basin.

**ISRP Programmatic Comments Related to ISAB’s Food-Web Report:**

Several of the ISAB’s suggestion may be addressed as the Council determines how best to respond to the ISRP’s programmatic concerns as these topics overlap. The same header used for grouping the ISAB food-web report comments are used to group the relevant ISRP specific Programmatic comment.

**Carrying Capacity of the Columbia River and Alignment of Hatchery Releases with Food Availability, Reduced Predation, and Favorable Environmental Conditions**

* Develop/implement an ecosystem program centered on the reservoirs and estuary that examines the inter-relationships between all major species (salmonids, sturgeon, lamprey, pike minnows, shad, cyprinids, and others) that informs managers on critical management topics related to recovery of listed species, invasive species (especially shad), food and space limitation/competition, predation in the context of depensatory mortality, and avian predation.
* Evaluate factors limiting white sturgeon populations below and above Bonneville Dam (carrying capacity, food-web).
* Assess hatchery effectiveness impacts and reform needs at the basinwide scale, including assessing carrying capacity, competition with wild, improving hatchery release timing to align with food availability, etc.
* Evaluate impacts of predation, such as impacts on SARs, and of invasive species.

**Nutrient Organic Matter (Energy), Water, and Thermal Sources and Flows*.***

* Evaluate effects of nutrient supplementation projects on the ecosystem and fish, including what are the cumulative effects over space and time.

**Impacts of toxic contaminants on fish and their food-webs**

* Evaluate the impacts of contaminants on salmonids and on their food-webs.

**Effects of climate change, river conditions, and ocean conditions on salmonids and food-webs**

* Evaluate the effects of climate and ocean conditions on salmonids.

**Possible Options to Address ISAB’s Food-Web Report Comments:**

Based on the overlapping themes found in the ISAB food-web report and ISRP programmatic concerns, below we identify programmatic and project level recommendations that the Council could consider making duringr the RME+ categorical review. The same headings used to group the ISAB food-web comments are used to group these potential recommendations.

**Programmatic Level**

***Carrying Capacity of the Columbia River*.**

* Consider requesting that Bonneville explore whether current data collected through Program funded projects, e.g., ISEMP, CHaMP, coordinated VSP data from individual projects, or other, could be synthesized to assess carrying capacity. This may result in a RFP for an entity or individual to synthesize the information, or require an adjustment to existing projects.

***Nutrient Organic Matter (Energy), Water, and Thermal Sources and Flows.***

* Consider the ISRP’s recommendation for Council/BPA to request a 2011 science-policy exchange or workshop on nutrient addition projects (carcass and other types of additions) to inform ISRP and ISAB food-web related questions. The exchange or workshop would include at a minimum the Program nutrient projects (Upper Columbia Nutrient Supple (2008-471-00), Salmon River Basin Nutrient Enhancement (2008-904-00), Mitigation of Marine-Derived Nutrient Loss in Central Idaho (2007-332-00). Based on the outcome of the science-policy exchange or workshop, Council can assess if it is worth investing in continuing this type of work under the Program.

**Project Level**

***Carrying Capacity of the Columbia River and Alignment of Hatchery Releases with Food Availability, Reduced Predation, and Favorable Environmental Conditions***

* **CHaMP (2011-006-00), ISEMP (2003-01-700) and CHREET (2010-085-00) -**Council should consider recommending that the umbrella projects ISEMP, CHaMP, and CRHEET be modified as feasible, to provide the data needed to improve knowledge about carrying capacity and impacts of hatchery fish on the system.
* **CHaMP (2011-006-00) and ISEMP (2003-01-700) -**Consider recommending that the umbrella projects ISEMP and CHaMP be modified, as needed, to provide the status and trend information on the basin’s nutrient, water flow, and water temperature.
* **CHREET (2010-085-00) *-*** Consider recommending that the CRHEET project be modified to provide the information needed to guide optimal hatchery fish stocking practices and to provide the data needed to address the hatchery related gaps identified by ISAB’s food-web report and ISRP.
* **Impact of American Shad in the Columbia River (2007-275-00) *-*** Council may want to consider recommending that the unfunded food web component of this project be funded as the ISRP suggests it would provide valuable information regarding the impacts of shad on juvenile salmonids and this interaction is linked to the food-web report.

***Nutrient Organic Matter (Energy), Water, and Thermal Sources and Flows.***

* Consider the ISRP’s recommendation for Council/BPA to request a regional synthesis of results of nutrient addition projects (carcass and other types of additions) to inform ISRP and ISAB food-web related questions. This synthesis would include the Program’s nutrient projects: Upper Columbia Nutrient Supple (2008-471-00), Salmon River Basin Nutrient Enhancement (2008-904-00), Mitigation of Marine-Derived Nutrient Loss in Central Idaho (2007-332-00).
* Consider recommending that BPA assess the potential to expand implementation of this type of project, Multiscale Hyporheic Exchange (2007-252-00), and expanding hyporheic work into the Mainstem, to meet the ISAB food-web recommendation.

***Effects of climate change, river conditions, and ocean conditions on salmonids and food-webs***

* Council should consider recommending that projects assessing SAR, including Comparative Survival Study (1996-020-00) and Survival Estimate for Passage through Snake and Columbia River Dams and Reservoirs (1993-029-00), be modified to consider ocean and river conditions, including food availability, in their analysis.

Given the limited RME Program budget at this time, Council may want to focus their recommendations on recommendations that would not require increasing project budgets, such as:

1) Suggesting that the ‘in-development’ CHaMP and CRHEET projects to be adjusted as feasible within currently planned budget to address the ISRP and ISAB’s food-web concerns related to carrying capacity, hatchery impacts, and timing of hatchery releases.

2) Recommending that the Comparative Survival Study (1996-020-00) and Survival Estimate for Passage through Snake and Columbia River Dams and Reservoirs (1993-029-00**)** take into consideration impacts of climate change, river conditions and ocean conditions within their analysis, as feasible, within current budget.

3) Requesting that nutrient supplementation projects produce a combined synthesis of results to-date using currently budgeted funds for review by ISRP and ISAB. Council may consider making funding of nutrient supplementation projects past 2013 to be contingent on producing this synthesis and obtaining a favorable review by ISAB and ISRP to continue this work under the Program.

4) Inviting entities (i.e., EPA, USGS) that work on food-web related topics to present to the Fish and Wildlife Committee agenda or Full Council to increase the Council’s knowledge of progress being made in the region on these various topics.

5) Addressing other food-web related concerns through the Program amendment process by emphasizing these topics in the next Program, and by providing relevant guidance to projects that are scheduled to be reviewed through the upcoming categories and geographic review as appropriate.

**Projects Included in the Categorical RME Review with a Specific or General Link to Food-Web Topics:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Project #** | **Project Title** | **Sponsors** | **Accord** | **BiOp**  **(need to verify)** | **Funding Req. Annual**  **FY 2012-2015??** |
| Based on a rough analysis of WEs related to food-web topics, there appears to be at least 40 RME+ categorical review projects that are collecting information that could inform food-web topics.  Several non-RME+ categorical review projects also appear to have components relevant to the ISAB’s food-web topics.  The food-web related information collected by these projects does not appear to be synthesized in a manner that would inform the food-web’s questions/concerns and it is likely that not all the needed information for a synthesis would be available without additional funding and/or changes to projects.  If the FW Committee is interested, staff can work on refining the list of projects and provide the information for this table. | | | | | |
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**Following are the Corps funded food-web related projects under AFEP for FY 2011:**

The Corps is funding RME projects assessing avian predation in the inland of the Columbia River basin above Bonneville Dam (below Bonneville dam avian predation is funded through the Fish and Wildlife Program). The Corps also funds pinniped predation monitoring immediately below Bonneville Dam. These predation projects may collect information that could inform components suggested by the ISAB Food-Web report.

**Preliminary Recommendations:**

**Potential Schedule/Next Steps:**