

Sent: Friday, September 22, 2006 3:42 PM
To: O'Toole, Patty
Subject: RE: Draft FY 2007-2009 Council recommendations

Thanks Patty for the information.

We have been trying to find additional funds for the insuline-like growth factor, though it will take some time to know if we are successful or not. The metabolic rate study is a different story. It is generally difficult to obtain funding for performing such needed basic experiments to parameterize models that have broad applications. Most funding agencies (like NSF for instance) do not consider this type of work original because it does not provide new ideas, but those parameters are needed to model how the ocean affects the growth performance, and hence, the marine survival of salmon. This type of work should have broad applications within the Columbia River System, such as studying the effects of changing river flows or temperature (i.e. warming) on the energetic costs of swimming of juvenile salmon and their growth, a key factor that may affect their marine survival. We are also looking for other sources of funding for complementary components that were not in this proposal, though that would still provide valuable information for this project.

DFO has provided all the ship time cost for FY03-FY06 (note that BPA funded about 28 days of ship time in FY00-FY02), and is expected to continue to fund at least 2 of the 3 surveys that we carry each year (note that the samples used for this project come from all the surveys we conduct). Thus, DFO will continue to contribute about \$500K per year in ship time in FY07-FY09. The issue is that the request for DFO ship time is highly competitive for June-July when Columbia River salmon dominate the stock composition in the areas that we survey (see Figure 1 of the attached document). This year will be particularly difficult due to a 2-month hydroacoustic survey that will be jointly carried by Canada and USA from San Diego to southeast Alaska in July-August under some treaty that requires this survey to be done every 2-3 years. As a results, the surveys that are normally conducted during that time may be moved earlier or later during the year. Thus we don't know yet if we will have any ship time during this critical period for Columbia River salmon. The only way to guaranty ship time for these months (either with the only DFO vessel that is available for this work or an acceptable charter vessel) is to get external funds to cover for this ship time, as was recommended by ISRP.

The calculations of the Council to determine the level of funding are strongly influenced by the \$0 that were provided by BPA in FY04 (as in FY03, but BPA provided about \$420-430K per year in FY00-FY02 for this project). Thus, even though the total amount recommended by the Council is higher than the FY04-FY06 average, it is lower than the amount we received during the years when BPA provided funding for this project. As an alternative, perhaps the Council could consider only the last two years that were funded by BPA (FY05-FY06: or \$250K per year) and provide the same level for each year for FY07-FY09 plus 15%(or about \$287.5 per year for a total of \$862.5K over three years). This would make this project far more viable than the current recommendation of \$191.7K per year. Although we can prioritize the elements of this project (as requested by ISRP), there isn't much left with this level of funding for collecting data comparable to the Survival of salmonids study (Project ID: 199901400) conducted by NOAA Fisheries off Oregon and Washington. Note that both projects are intimately interrelated and coordinated by DFO and NOAA Fisheries. At best, at this level of funding, we

can collect the samples (though we may miss the June-July period this year and in other years), make a few of the analyses we proposed for this project (for one species and in one of the region surveyed), and archive the samples for future analyses when additional funds are available.

It is important to note that we study more than just Columbia River salmon migration. But this is certainly an important aspect of this work. If different stocks migrate to different areas of the ocean (or at different time), they may not be exposed to the same ocean conditions, and may not vary in synchrony. This is important to know when studies are designed in the freshwater environment to evaluate the effects of different management actions such as habitat restoration on the return of adult Columbia River salmon (the ultimate objective is to have more fish) or to evaluate the potential effects of the hydropower system on these fish. For instance, Schaller et al. (1999) compared the survival of Lower Columbia River spring Chinook salmon (which go through few dams) with Upper Columbia and Snake River spring Chinook salmon (which go through more dams) and concluded that the lower survival of the Upper stocks (including Snake River stocks) were due to the number of dams that they had to go through. The main assumption of this analysis was that the ocean environment was the same for all these stocks, and therefore that they were affected the same way by ocean conditions. In contrast, our work has showed that the migration behavior of Lower Columbia River spring Chinook salmon was quite distinct than the migration behavior of Upper stocks (they entered the ocean much earlier, migrated faster to the west coast of British Columbia, and a larger proportion of these fish migrated south of the Columbia River). We also showed that the ocean conditions were not uniformly suitable for their growth and survival throughout their range. Thus, the differential survival of Upper and Lower stocks may be attributed to the different conditions they encounter in the ocean, rather than the number of dams that they have to go through. By combining the results of this study and with the NOAA Fisheries study, we hope to explain why the survival of Upper and Lower stocks differed.

In addition to salmon migration, we also assess how the ocean conditions affect their survival. In the long run, we hope to use these data to build a time series that is sufficiently long to forecast the return of adult salmon to the Columbia River a few years in advance. This could provide valuable information for setting defensible harvest strategies for these fish. For instance, we showed that the marine survival of Snake River spring Chinook salmon were correlated to the growth conditions off the west coast of Vancouver Island (see Figure 2 in the attached document). We recognize that this relationship is based on only 5 points (it take several years to obtain a single estimate of smolt-to-adult ratio because of the duration of their marine life), but it illustrates that we may be able forecast the return of adults 2-3 years in advance with growth rates measure during the smolt year (growth data are currently available from 1998 to 2005).

Understanding what happens in the ocean environment may have also a direct impact on hatchery operations in the Columbia River. Some of the questions that we may be able to address include: How many fish should be released given the current state of the ocean to reduce competitive interactions with wild smolts? When should these fish be released to maximize the return of adults? Therefore, overall, this research has the potential to help resolving the 4H's in the Columbia River Basin: harvest, hydropower, hatcheries, and habitat.

Hoping that the Council will readjust upward the level of funding that is required for this project.

Sincerely,
Marc Trudel