



FISH PASSAGE CENTER

847 NE 19th Avenue, #250, Portland, OR 97232

Phone: (503) 833-3900 Fax: (503) 232-1259

www.fpc.org/

e-mail us at fpcstaff@fpc.org

MEMORANDUM

TO: FPAC

FROM: Michele DeHart

DATE: February 16, 2016

SUBJECT: Request to Collect Weight Data on SMP fish at Bonneville Dam and development of a Condition Factor

We have received your request to collect weight data on fish examined for condition at Bonneville Dam. The request was discussed at the January 19, 2016, FPAC meeting. The request was sent to the Fish Passage Center by Paul Wagner, on behalf of FPAC, on January 28, 2016. In your request you also asked that we combine the weight data with the length data to calculate and report a "condition factor" for the Bonneville Dam fish.

At the FPAC meeting a need for this information was described citing the development of a condition index baseline for juveniles at Bonneville Dam. One application for the information, suggested at the meeting, was to compare the condition factor between McNary and Bonneville dams as a way to evaluate the availability of Siberian prawns as a food source in the system. If, Siberian prawns continue to increase in abundance, and are eaten proportionately, juvenile migrants should see an increase in the condition index concurrent with the increase in the prawn population.

At present, the collection of weight information is limited to the transportation collector sites. The weight data at those sites is used to determine loading densities in raceways, trucks, and barges.

"Species composition and weight samples will be taken to determine loading densities for raceways, barges, and trucks." Each transport vehicle has a designated capacity in terms of pounds of fish on board (2015 Fish Passage Plan, see Appendix B *Transportation Plan* and Table B-1).

The collection of weight data requires additional sampling time at a project. The request memo suggests that this sampling might require just several additional seconds to the sampling protocol for each fish. However, it must be recognized that any additional sampling and handling has potential consequences in affecting fish survival. The overall time required to process fish can be substantially longer than indicated by the wording “only several seconds per fish.” This time added to sampling results from the number of fish sampled for weight, the required increase in anesthesia time, and the need to process smaller batches of fish.

We collect weight at the transport sites, but we do not calculate a condition factor at any of our projects. Condition factor is calculated as $\text{length} \div \text{weight}$ and represents a measure of “plumpness” of fish. Condition factors are often applied when checking growth rate or determining the amount of food to be fed at fish hatcheries. We have used a “condition factor” in analyses where we believe it is appropriate. For example, in 2008 we looked at the differences between the subyearling fall Chinook surrogates and wild/natural fall Chinook to determine if the surrogate fish could be used to make inferences about wild/natural fall Chinook (<http://www.fpc.org/documents/memos/03-08.pdf>). In this instance we found that the surrogates were not representative of the wild/natural fish. We compared length and weight data between surrogates and wild/natural fish that were marked or released at similar times. To ascertain the degree to which surrogates were leaner than wild/natural fish an analysis was performed to compare weights of surrogates and wild/natural fish where lengths overlapped. The results showed that the surrogates were significantly “leaner” than wild/natural fish tagged the same month (or when comparing with wild/natural fish of any month).

In order to compare the condition of McNary versus Bonneville Dam fish, a comparable population of fish would have to be sampled. With the input of the Bonneville Pool local hatchery fish just above the dam, particularly for yearling Chinook, coho, and subyearling Chinook, a comparable population of fish would not be obtained. Given this, any measures of condition factor would likely be more representative of the rearing practices at the close-by hatcheries than of fish that have migrated through the FCRPS. In order to compare populations among projects, the sampling specific of PIT-tagged groups of fish would be needed, and that is beyond the scope of the SMP.

We suggest that FPAC reconsider their request to add weights to the Bonneville Dam sampling protocol given the lack of ability to collect meaningful data for management application and the potential increased mortality associated with this type of sampling.