



FISH PASSAGE CENTER

1827 NE 44th Ave., Suite 240, Portland, OR 97213

Phone: (503) 230-4099 Fax: (503) 230-7559

<http://www.fpc.org/>

e-mail us at fpcestaff@fpc.org

MEMORANDUM

TO: Mr. Raymond C. Bark, USBR

FROM:  Jerry McCann, SMP Manager

DATE: June 7, 2007

RE: Absolute abundance in relation to Passage Index at Rock Island Dam

This memo is in response to your query regarding the utility of using Passage Index data from Rock Island Dam to estimate absolute abundance of various juvenile salmonids. The passage index is a relative number and not an absolute number of fish, estimated to be passing the dam. The index uses the number of collected fish, expanded at Rock Island by the proportion of total discharge through the dam that was “unsampled”. Essentially, spillway and powerhouse 1 are not sampled, so that the number of fish arriving in the trap are expanded by the proportion of non-powerhouse 2 flows as shown in the following equation.

$$\text{PassageIndex} = \text{collection} * ((\text{powerhouse1flow} + \text{powerhouse2flow} + \text{totalspill}) / \text{powerhouse2flow})$$

The assumption of the index is that fish pass in equal proportions (i.e. 1:1 fish to flow) via each route at the dam. This assumption simplifies calculation of the index and makes it relatively simple to understand, but is likely not necessarily. Nor does collection in powerhouse2 represent the total number of fish passing via that route, since an unknown, but likely small percentage of fish entering the powerhouse are captured in the trap. So it follows that the index expansion does not represent a population estimate. We generally assume that the smolt trap collects less than 5% of passing fish.

The strength of the index is that it provides an indication of passage timing. In other words, while magnitude is not reliable when comparing one year to another, relative magnitude within a single season is more likely reliable, so that day to day changes in numbers can be used to characterize timing.