

## **Port Moller Test Fishery Catch versus Index, prepared June 13, 2020**

We present both the raw catches by station and by mesh size, and we present an index for each station. The index is a common source of confusion with the PMTF results. Catches are numbers of fish and the index is the rate of fish caught, expressed in fish per hour.

### Catch

The station catch is the number of sockeye caught in each set. This tells us how many fish we have to use to estimate age composition, and much more importantly, how many we have to use for running genetic analysis, which we use for estimating the stock composition, or the fraction of the total run going to the different fishing districts. However, the raw catches do not necessarily reflect the rate of fish passage, which is a big goal of the program.

### Index

The **index is the computed hourly catch rate** from a net set at a station.

The index is different from the catch because the net is not set for one hour. Sets most often range from 20 to 30 minutes but are sometimes longer, if we either have a large catch which takes more time to pick, or it takes longer because the crew must deal with weather, net or mechanical issues, and other things, like lots of jelly fish, the odd salmon shark, etc.

Put another way, a given raw catch among different sets, say 20 fish, does not always equate to the same index value; it depends on the number of minutes the net was in the water, and these set durations vary by small and sometimes large amounts.

### Why the Index?

We must convert the catch to a catch rate to make any comparisons of the relative abundance across stations, days, and years.

We convert the raw catch to a catch rate so that we can compare one station's result to other stations that day and to result from other days (and years). One goal of the test fishery is to gauge the rate of fish passage, i.e., how many fish to expect inshore. Bigger catches represent more fish in the area. However, most can appreciate intuitively that a catch of 50 fish in, say, in a 45-minute set, does not represent a similar number of fish passing the station as a catch of 50 fish in 20 minutes.

### A simple example from something more familiar, **we all index all the time**

Three different companies offer you a job, say 8 hours a day and 40 hours a week, all positions equally satisfactory.

One says it will pay you \$22 for every 20 minutes you work. Another offers to pay you \$25 for every 30 minutes of work, and a third offers to pay you \$30 for every 40 minutes of work.

If you did not convert each offer to an hourly rate and you wanted to maximize your pay, you might think the highest pay was offer #3, \$30. At first glance it sounds much better than \$25 and \$22.

Hopefully, you all go wait, the raw numbers are not enough to go on, and you ask which will give me the most pay at the end of the day. You want to standardize the pay across offers to compare apples to apples.

Most would compare the offers by using an hourly rate (index) so that you can make comparisons of apples to apples. The first outfit is offering you \$66 per hour, the second \$50/hour and the third is \$45/hour. The hourly rate (index) is much more informative than the raw dollar values (catch). In this example, you reach an opposite ranking as to value to the nominal pay (raw catches) and take-home pay among job offers by indexing the pay. The pay rate (index) will always be more informative than the raw pay number (catch).

We do the same when buying food, gas, etc. You ask what the price per pound is, not the price for a given steak or salmon fillet. We all index, all the time.

#### **Port Moller Examples of Catch versus Index**

- A catch of 20 fish in 20 minutes of fishing is an index of 60 fish per hour.
- Catch of 20 fish in 30-minute set is an index of 40 fish per hour.
- Catch of 20 in a 40-minute set is an index of just 30 fish per hour.
- Catch of 20 fish in a 60-minute set would give an index of just 20 fish per hour

In summary, the index is not mysterious. It is simply the computed number of fish per hour from a given set. It is the only way to compare apples to apples; i.e., what results from one set represent in terms of fish passage relative to than another.

#### **A recent example; two different catches but give the *same* index**

On June 12, 2020 we had a catch of 25 fish from a 25-minute set at Station 10. To compute the fish per hour (index):

- Index = 60 minutes/25 minutes and multiply by the catch (25 fish) = **60 fish per hour**

We only caught 25 fish but it gives an index of 60

On June 13, we had a catch of 22 fish at Station 10, but the set was only 22 minutes long. When we convert this catch to fish per hour (index), we get:

- Index = 60/22 minutes multiplied by 22 fish = (coincidentally) **60 fish per hour**

In this case, we had two different catches but ended up with the same fish per hour (same index).

I hope this helps.

Michael