# Study of MSF methods

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## Overview

This document produces an overview of a set of candidate methods to account for mark-selective fisheries (MSF) in the calculations of calendar year exploitation rates (CYER) for the Chinook Technical Committee (CTC) indicator stocks.

The methods are divided into two major categories: single index tag (SIT) and double index tag (DIT) methods.

The list of methods studied in this documet are shown below: - SIT 1: $\lambda_a$ is estimating at spawning by age - SIT 2: $\lambda_a$ is estimating at spawning by age updated after successive fisheries - SIT 3: $\lambda$ is estimated at release - SIT 4: $\lambda$ is estimated at release and updated after successive fisheries - SIT 5: $\lambda$ estimated from total exploitation rate and escapement and updated after successive fisheries

## Global inputs

The global inputa for the simulatios shown in this study is based on a sigle year of data and daat is simulated without any observation or process error. The Simulated data produces based on the `create_example_input()` and the `simpop()` mimics the data produced on the 'MSF Methods Beta' excel spreadsheet.

## SIT 1

The first single index tagging method assumes that the ratio between unmarked and marked recoveries can only be updated at the escapement level.

- Assume discard mortality scalar is known
- Assume catch is known without error
- Assume Mark-Selective Fishery Release Mortality Rate is known

## SIT 2

The second single index tagging method assumes that the ratio between unmarked and marked recoveries can only be updated at the escapement level and after each terminal fisheries.

- Assume discard mortality scalar is known
- Assume catch is known without error
- Assume Mark-Selective Fishery Release Mortality Rate is known

### SIT 3

### SIT 4

### SIT 5