# Stepwise Changes in the 2020 Assessment Model Development

## 09\_IdxNoeff … 10\_SelUngroup

### Flags

87 flags were changed, related to selectivity grouping, selectivity shape, length sample size, and catchability deviations.

| **Model setting** | **Applies to** | **Before** | **After** | **Flag** |
| --- | --- | --- | --- | --- |
| Selectivity grouping | Fisheries 4, 9, 11, 12, 29 | Grouped | Split into four groups | Fish flag 24 |
| ” | Fisheries 13, 15, 24, 25, 30 | Grouped | Split into four groups | Fish flag 24 |
| ” | Fisheries 17, 23, 32 | Grouped | Split into three groups | Fish flag 24 |
| ” | Fisheries 10, 27 | Ungrouped | Grouped | Fish flag 24 |
| Selectivity shape | Fishery 7 | Non-decreasing with age | Can decrease with age | Fish flag 16 |
| ” | Fishery 28 | Zero for all ages over 24 quarters | Not constrained to be zero | Fish flag 16 |
| Length sample size | Fisheries 7, 8, 29 | Divisor = 20 | Divisor = 40 | Fish flag 49 |
| Catchability deviations | Fisheries 1-41 | Constant for 24 months after each change | Can vary between quarters | Fish flag 23 |

### Data

(No changes to data.)

## 10\_SelUngroup … 11\_JPTP

### Flags

606 flags were changed, related to selectivity shape and adding tag groups.

| **Model setting** | **Applies to** | **Before** | **After** | **Flag** |
| --- | --- | --- | --- | --- |
| Selectivity shape | Fisheries 1, 5, 6, 9, 10, 12, 27 | Can decrease with age | Non-decreasing with age | Fish flag 16 |
| ” | Fisheries 17, 20, 21, 22, 23, 24, 28, 32 | Not constrained to be zero | Zero for all ages over 25 quarters | Fish flag 16 |
| ” | Fisheries 2, 4, 5, 6, 7, 9, 11, 12, 29 | Not constrained to be zero | Zero for ages 1-2 quarters | Fish flag 75 |

### Tag file

* Define mixing period of the tag recaptures to be 182 days for each tag release.
* Tag release groups are increased from 87 to 145 because JPTP program tags were added.
* There are more recaptures for RTTP and PTTP programs. This is a change in the 2020 assessment, including tags without recapture locations in the purse seine fisheries, as well as tags added after revising the tagger effect analysis.
* Number of effective releases are higher for some length bins in all programs. This may be a change to usability correction for having additional recaptures.

### Ini file

* With more release groups, the ini file has more lines to assign reporting rates, priors, and penalties for those additional release groups.

### Frq file

* Number of release groups was updated.

## 11\_JPTP … 12\_Age10LW

### Flags

41 flags were changed, related to selectivity shape.

| **Model setting** | **Applies to** | **Before** | **After** | **Flag** |
| --- | --- | --- | --- | --- |
| Selectivity shape | Fisheries 1-41 | Constant for all ages over 25 quarters | Constant for all ages over 37 quarters | Fish flag 3 |

### Ini file

* Number of age classes increased from 28 to 40 quarters.
* Maturity-at-age updated for all age classes and extended for the increased number of age classes.
* Natural mortality is slightly decreased from 0.25 to 0.23.
* Age parameters updated for all age classes and extended for the increased number of age classes.
* Length-weight parameters updated.

## 12\_Age10LW … 13\_CondAge

### Flags

196 flags were changed, related to growth curve estimation, initial population, fishing mortality, catch likelihood, and selectivity shape.

| **Model setting** | **Applies to** | **Before** | **After** | **Flag** |
| --- | --- | --- | --- | --- |
| Growth curve estimation | Parameters | Not estimated, apart from variance | Not estimated | Parest flag 32 |
| ” | Early ages | First 8 quarters are independent parameters | All ages follow growth curve | Parest flag 173 |
| ” | Penalty | No penalty wt for length estimation | Penalty wt of 1 for length estimation | Parest flag 182 |
| ” | Age-length data | Model fit to observed data not activated | Model fit to observed data activated | Parest flag 240 |
| Initial population | Scaling pop | Estimated | Disabled | Age flag 113 |
| Fishing mortality | Max F | 0.7 | 5.0 | Age flag 116 |
| Catch likelihood | Common wt | 100,000 | 10,000 | Age flag 144 |
| ” | Specific wt | 0 | 100,000 | Fish flag 45 |
| Selectivity shape | Fisheries 17, 23-24, 28, 32 | Constant for all ages over 37 quarters | Constant for all ages over 12 quarters | Fish flag 3 |
| ” | Fisheries 20-22 | Constant for all ages over 37 quarters | Constant for all ages over 24 quarters | Fish flag 3 |
| ” | Fishery 6 | Logistic shape | Cubic spline, or length-specific selectivity | Fish flag 57 |
| ” | Fishery 28 | 4 spline nodes | 5 spline nodes | Fish flag 61 |

### Age-length file

* Addition of otolith data through conditional age-at-length.

### Ini file

* Updated maturity-at-age.
* Natural mortality updated.
* Age parameters updated.
* Length-weight parameters updated.

## 13\_CondAge … 14\_MatLength

### Flags

1 flag was changed, related to maturity.

| **Model setting** | **Applies to** | **Before** | **After** | **Flag** |
| --- | --- | --- | --- | --- |
| Maturity | Convert mat @ length to age | Not converted | Converted using weighted spline | Age flag 188 |

### Data

(No changes to data.)

## 14\_MatLength … 15\_NoSpnFrac

### Flags

(No flags were changed in this step.)

### Ini file

* Updated maturity at length.

## 15\_NoSpnFrac … 16\_Size60

### Flags

83 flags were changed, related to length sample size and weight sample size.

| **Model setting** | **Applies to** | **Before** | **After** | **Flag** |
| --- | --- | --- | --- | --- |
| Length sample size | Fisheries 1-2, 4, 7-9, 11-12, 29, 33-41 | Divisor = 40 | Divisor = 120 | Fish flag 49 |
| Weight sample size | Fisheries 1-2, 4, 7-9, 11-12, 29, 33-41 | Divisor = 40 | Divisor = 120 | Fish flag 50 |
| Length sample size | Fisheries 3, 5-6, 10, 13-28, 30-32 | Divisor = 20 | Divisor = 60 | Fish flag 49 |
| Weight sample size | Fisheries 3, 5-6, 10, 13-28, 30-32 | Divisor = 20 | Divisor = 60 | Fish flag 50 |

### Ini file

* Updated tag reporting group flags.
* Updated maturity at age and maturity and length.
* Updated von Bertalanffy parameters.

## 16\_Size60 … 17\_Diag20

### Flags

12 flags were changed, related to selectivity shape.

| **Model setting** | **Applies to** | **Before** | **After** | **Flag** |
| --- | --- | --- | --- | --- |
| Selectivity shape | Fisheries 13-16, 19-22, 25-26, 30-31 | Not constrained to be zero | Zero for age 1 quarter | Fish flag 75 |

### Data

(No changes to data.)