# Spatial Stock Assessment Methods: International Approaches and Advancements

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## METADATA FOR SIMULATED DATASETS

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## 1. Overview

The SPM operating model applies catches, growth and movement within and across each grid cell (~5x5° bin) and time period (pseudo-years=quarters). For each fully spatial SPM simulation (1-100), we have provided the simulated:

- **Catches by fishery (not flag specific),**
- **CPUE (from a pelagic longline fishery),**
- **Length frequencies (from the purse seine fishery),**
- **Tag releases and recaptures (reported from the purse seine fishery only).**

These spatially explicit data output from SPM, were then **aggregated by regional scale (4 area or 1 area)** by summing catch, length frequencies, and tag release/recaptures by region. CPUE was standardized by cell and year with regional scaling applied (abundance-based weightings) following Hoyle & Langley (2020).

Fisheries/fleets include: Purse seine (ps), baitboat (bb), longline (ll), troll (trol), gillnet (gi), handline (hand), other (other) Please refer to YFT OM description for more OM specific information.

## 2. Datasets provided to analysts

We provide 100 iterations of the spatially aggregated data (1 area), and 100 iterations of the spatially stratified data (4 areas) on the GitHub repository (as well as the fully spatially disaggregated by grid cell datasets).

| Dataset name | Description | Github location |
|---|---|---|
| YFT_1area_observations_1-100.RData | Single area (panmictic population) YFT data | here |
| YFT_4area_observations_1-100.RData | Four area (four area aggregation) YFT data | here |
| YFT_221cell_observations_1-100.RData | Fully spatial (5x5 binned) YFT data | here |

## 3. Data structure

### Dataset: **YFT_221cell_observations_1-100.Rdata**

Sim_X (X: sim # 1-100)
    Length frequencies
    CPUE
    Tag release data
    Tag recapture data
    Layers
        Base
        Cell
        Latitude
        Longitude
        Regions
        Catch (spatial catch by fishery)

### Dataset: **YFT_4area_observations_1-100.Rdata**

**dat_4A_X** (X: sim # 1-100)
   *For all platforms:*
    **lencomp:** (list) 4 area dataframe of aggregated length frequencies by age bin (purse seine only):
    **catch:** (list) 4 area dataframe of catch by fishery, including pseudo-year, and season (=1).
    **CPUE/cpu:** (list) 4 area cpue (longline only)
    **tag_releases:** 4 area tag release data
    **tag_recaps:** 4 area tag recapture data
    **Biol_dat:** Biological data from Fu et al. (2018)

**M:** Age varying natural mortality
**Linf:** Length infinity (cm)
**Lmin:** Length minimum (cm)
**Maturity:** maturity ogive (pseudo-years)
**K:** age varying growth coefficients
**a:** scaling coefficient
**b:** shape parameter
**age:** first age to last age (pseudo-years)
**L:** Length (cms)
**W:** Weight (kgs)

*Stock Synthesis:* (Arguments to create 4 area Stock Synthesis data file (in SS3.24Z) (sourcefile, type, SSversion, styr,endyr, nseas, months_per_seas, spawn_seas, Nfleet, Nsurveys, N_areas, fleetnames, surveytiming, areas, fleetinfo1, units_of_catch, se_log_catch, fleetinfo2, Ngenders, Nsexes, Nages, init_equil, N_catch, catch, N_cpue, CPUEinfo, CPUE, N_discard_fleets, N_discard, N_meanbodywt, DF_for_meanbodywt,lbin_method, binwidth, minimum_size, maximum_size, N_lbinspop, lbin_vector_pop, comp_tail_compression, add_to_comp, max_combined_lbin, N_lbins, lbin_vector, N_lencomp, lencomp, N_agebins, N_ageerror_definitions, N_agecomp, Lbin_method, max_combined_age, N_MeanSize_at_Age_obs, N_environ_variables, N_environ_obs, envdat, N_sizefreq_methods, do_tags, N_tag_groups, N_recap_events, mixing_latency_period, max_periods, tag_releases, tag_recaps, morphcomp_data, fleetinfo, NCPUEObs)


## Dataset: **YFT_1area_observations_1-100.Rdata**

**dat_1A_X** (X: sim # 1-100)
*For all platforms:*
**lencomp:** (list) 1 area dataframe of aggregated length frequencies by age bin (purse seine only):
**catch:** (list) 1 area dataframe of catch by fishery, including pseudo-year, and season (=1).
**CPUE/cpu:** (list) 1 area cpue (longline only)
**tag_releases:** 1 area tag release data
**tag_recaps:** 1 area tag recapture data
**Biol_dat:** Biological data from Fu et al. (2018)
**M:** Age varying natural mortality
**Linf:** Length infinity (cm)
**Lmin:** Length minimum (cm)
**Maturity:** maturity ogive (pseudo-years)
**K:** age varying growth coefficients
**a:** scaling coefficient
**b:** shape parameter
**age:** first age to last age (pseudo-years)

**L:** Length (cms)

**W:** Weight (kgs)

***Stock Synthesis:*** (Arguments to create 1 area Stock Synthesis data file (in SS3.24Z) (sourcefile, type, SSversion, styr,endyr, nseas, months_per_seas, spawn_seas, Nfleet, Nsurveys, N_areas, fleetnames, surveytiming, areas, fleetinfo1, units_of_catch, se_log_catch, fleetinfo2, Ngenders, Nsexes, Nages, init_equil, N_catch, catch, N_cpue, CPUEinfo, CPUE, N_discard_fleets, N_discard, N_meanbodywt, DF_for_meanbodywt,lbin_method, binwidth, minimum_size, maximum_size, N_lbinspop, lbin_vector_pop, comp_tail_compression, add_to_comp, max_combined_lbin, N_lbins, lbin_vector, N_lencomp, lencomp, N_agebins, N_ageerror_definitions, N_agecomp, Lbin_method, max_combined_age, N_MeanSize_at_Age_obs, N_environ_variables, N_environ_obs, envdat, N_sizefreq_methods, do_tags, N_tag_groups, N_recap_events, mixing_latency_period, max_periods, tag_releases, tag_recaps, morphcomp_data, fleetinfo, NCPUEObs)