



North Pacific Fisheries Commission

## Five-Year Research Plan and Work Plan of the Scientific Committee

### North Pacific Fisheries Commission Scientific Committee 2021-2025 Research Plan

#### 1.0 BACKGROUND

Article 10, Section 4(a) of the *Convention on the Conservation and Management of High Seas Fisheries Resources in the North Pacific Ocean* states that the Scientific Committee (SC) will “recommend to the Commission a research plan including specific issues and items to be addressed by the scientific experts or by other organizations or individuals, as appropriate, and identify data needs and coordinate activities that meet those needs.”

An initial draft of this research and accompanying work plan was presented for review during the 4<sup>th</sup> Preparatory Conference and a subsequent discussion was held by a small working group to establish science priorities for the NPFC. This plan draws on those discussions and was updated by the SC Chair based on the progress made by NPFC since that Conference.

The development of multi-year science research or work plans is common across regional fisheries management organizations as well as domestic fisheries science agencies. This draft plan draws on such examples, and has been developed for consideration by the SC before it may be adopted by the Commission.

#### 2.0 OBJECTIVES

The research plan is intended to guide the work of the Scientific Committee by identifying key research priorities and associated areas of work to be undertaken or maintained. The plan should also serve to: ensure efficient utilization of scarce resources within the Commission; inform Parties’ domestic research planning as a means to complementing the Commission’s science activities; and, help the Commission identify potential sources of external funding.

It is not intended as an exhaustive plan describing all research activities that may be carried out by Parties, nor is it intended to preclude work already taking place. The plan should support the Commission’s primary objective (*Article 2* in the Convention), which is to “ensure the long-term conservation and sustainable use of the fisheries resources in the Convention Area while protecting

the marine ecosystems of the North Pacific Ocean in which these resources occur”. The plan should also help the Scientific Committee fulfill its functions as specified in the Convention.

### **3.0 PRIORITY RESEARCH AREAS**

In addition to discussions held during the Preparatory Conference (referenced above) followed by the Commission and Scientific Committee after their establishment, the identification of priority research areas draws largely from the Commission’s Convention, which outlines specific functions for the Scientific Committee in *Article 10, Section 4*. These priority research areas are subject to the approval of the Commission, and may be revisited and/or revised as deemed appropriate by the Commission. Proposed rolling five-year work plans for each priority area are available in the attached Annex I.

The proposed priority research areas are:

1. Stock assessments for target fisheries and bycatch species
2. Ecosystem approach to fisheries management
3. Data collection, management and security

#### **3.1 Stock Assessments**

##### Rationale

Accurate stock assessments are critical in helping to ensure the long-term conservation and sustainable use of fisheries resources in the Convention Area. One of the primary functions of the Commission is setting total allowable catch or total allowable level of fishing effort, and as per *Article 7-1(b)*, this is to be in “accordance with the advice and recommendations of the Scientific Committee”.

Consistent with this, *Article 10-4(b)* states that one of the functions of the Scientific Committee is to “regularly plan, conduct and review the scientific assessments of the status of fisheries resources in the Convention Area, identify actions required for their conservation and management, and provide advice and recommendations to the Commission”.

Finally, *Article 10-4(i)* states that the Scientific Committee shall also “develop rules and standards, for adoption by the Commission, for the collection, verification, reporting, and the security of, exchange of, access to and dissemination of data on fisheries resources, species belonging to the same ecosystem, or dependent upon or associated with the target stocks and fishing activities in the

Convention Area”.

The Scientific Committee should endeavor to understand the current status and trends in production of populations of priority species as agreed by the 2<sup>nd</sup> Commission meeting in 2016, as well as factors that may affect future trends.

#### Areas of work

- Development of baseline assessment of the status of priority stocks
- Review of existing data standards in relation to stock assessments (e.g. Annual Report template, future vessel monitoring system)
- Stock delineation of important commercial species for the purpose of providing advice for the determination of management units
- For each commercial species, determination of data requirement, including data availability and data gaps; identification, where possible, of strategies to fill the data gaps, including for bycatch
- Development of a standardized method to provide advice to the Commission
- Development of assessment models by species and research as required to determine various assessment parameters

#### 3.1.1. Pelagic fish stock assessment

##### Rationale

Pelagic fish and squids are primary fisheries resources for NPFC Members. They comprised more than 99% of total catch of species covered by the Convention. Many of them are migratory species with wide geographical distributions which include both EEZs of the North Pacific Rim countries and High Seas. Management of such stocks requires close cooperation among Members concerned to ensure sustainable use and conservation of fisheries resources.

Four fish species and two squid species were recognized by the Scientific Committee as priority species: Pacific saury *Cololabis saira*, Chub mackerel *Scomber japonicus*, Spotted mackerel *Scomber australasicus*, Japanese sardine *Sardinops melanostictus*, Neon flying squid *Ommastrephes bartramii*, Japanese flying squid *Todarodes pacificus*.

##### Areas of work

- Completion of stock assessment for Pacific saury and development of the framework and timeline

for its regular improvement and update

- Conducting stock assessment for Chub mackerel and other priority species considering their top-down prioritization (Spotted mackerel - Japanese sardine - Neon flying squid – Japanese flying squid) and available funds and capacity
- Identification of data gaps, determination of activities to address those gaps and development of standards and mechanisms for data collection and verification
- Develop management strategy evaluations (MSEs) for Chub Mackerel and Pacific Saury in collaboration with NPFC’s Technical and Compliance Committee (TCC), fishery managers, fishers, and stakeholders.

### 3.1.2. Bottom fish stock assessment

#### Rationale

Data used for traditional stock assessment are sparse for bottom fish, and it is unlikely that traditional methods will be applicable for most deepwater species in the Convention Area. In addition, some bottom species have unique life cycles, sporadic recruitment patterns and irregular spawning-recruitment relationships that also makes difficult accurate stock assessment. All these require specific approaches for management and sustainable use of bottom fisheries resources. More than ten bottom species have been exploited by fisheries in the Convention Area last two decades. Two fish are recognized as priority species: North Pacific armorhead (NPA) *Pentaceros wheeleri*, Splendid alfonsino *Beryx splendens*.

#### Areas of work

- Review of approaches applicable for stock assessment of target bottom species and investigate various management strategies
- Further development of the Adaptive Management approach for NPA and mechanism for its implementation
- Identification of data needs and establishment of activities to fill data gaps

## 3.2 Ecosystem Approach to Fisheries Management

#### Rationale

*Article 3 (c)* in the Convention states that: “In giving effect to the objective of this Convention, the following actions shall be taken individually or collectively as appropriate: (c) adopting and

implementing measures in accordance with the precautionary approach and an ecosystem approach to fisheries, and in accordance with the relevant rules of international law, in particular as reflected in the 1982 Convention, the 1995 Agreement and other relevant international instruments”.

*Article 7-1 (c,d)* in the Convention states that the Commission shall: “adopt, where necessary, conservation and management measures for species belonging to the same ecosystem or dependent upon or associated with the target stocks”; and, “adopt, where necessary, management strategies for any fisheries resources and for species belonging to the same ecosystem or dependent upon or associated with the target stocks, as may be necessary to achieve the objective of this Convention.”

*Article 10-4 (d)* states that the Scientific Committee shall “assess the impacts of fishing activities on fisheries resources and species belonging to the same ecosystem or dependent upon or associated with the target stocks.”

#### Areas of work

- Formulation of a work plan on how to implement the ecosystem approach to fisheries management in the Convention Area
- Vulnerable Marine Ecosystems
- Understand ecological interactions among species
- Ecosystem modelling
- Evaluate impacts of fishing on fisheries resources and their ecosystem components, including bycatch species
- Other issues related to marine ecosystems including marine debris and pollution

#### 3.2.1 Vulnerable Marine Ecosystems

##### Rationale

The identification of vulnerable marine ecosystems is a necessary precursor to implementing measures to protect these ecosystems, and such measures are explicitly called for in the Convention (e.g. *Article 7-1(e)*).

*Article 10-4 (e)* states that the Scientific Committee shall “develop a process to identify vulnerable marine ecosystems, including relevant criteria for doing so, and identify, based on the best scientific information available, areas or features where these ecosystems are known to occur, or are likely to occur, and the location of bottom fisheries in relation to these areas or features, taking due account

of the need to protect confidential information.”

*Article 7-1 (e)* states that the Commission shall “adopt conservation and management measures to prevent significant adverse impacts on vulnerable marine ecosystems in the Convention Area, including but not limited to: measures for conducting and reviewing impact assessments to determine if fishing activities would produce such impacts on such ecosystems in a given area; measures to address unexpected encounters with vulnerable marine ecosystems in the course of normal bottom fishing activities; and as appropriate, measures that specify locations in which fishing activities shall not occur.”

To date, Japan, Russia, Korea, the US and Canada have completed a report on identification of VMEs and an assessment of impacts caused by bottom fishing activities on VMEs and marine species. The Scientific Committee may build on these reports, which will be kept up to date by respective Parties.

#### Areas of work

- Review existing NPFC standards on VME data collection, including guidelines set forth in the CMMs for bottom fisheries and protection of vulnerable marine ecosystems in the northwestern and northeastern Pacific Ocean (CMM 2019-05 and CMM 2019-06), and determine if any modifications to these standards are needed in the short-term and/or longer term
- Review of Encounter Protocol for bottom fisheries on Vulnerable Marine Ecosystems
- Determination of data requirements and identification of what data may be collected through commercial fishing operations
- Develop consensus on criteria used to identify VMEs and how this might be applied in the NPFC (note that guidelines from the FAO are already referenced in Annex 2 of the CMM 2019-05 and CMM 2019-06)
- Analysis of known or suspected VMEs in the Convention Area
- Visual surveys of VMEs for data collection
- Development of a framework to conduct assessments of Impacts of Bottom Fishing Activities on Vulnerable Marine Ecosystems

#### *3.2.1.1 Review of Encounter Protocol for bottom fisheries on Vulnerable Marine Ecosystems*

#### Rationale

The purposes of VME encounter protocols in NPFC Convention Area include:

- Ensuring early detection and protection of potential VMEs within an existing fishing area;
- Ensuring early detection and protection of potential VME within an unfished area;
- Documenting information on known occurrences of VME indicators within the Convention Area.

Development of the Encounter Protocol progressed through the Science Working Group and Scientific Committee meetings as well as intersessional activities. VME encounter protocols are incorporated in the CMMs for bottom fisheries and protection of vulnerable marine ecosystems in the northwestern and northeastern Pacific Ocean, specifically in Para 4(g) and 3(j), respectively.

#### Areas of Work

Consideration of the following subjects of research and analyses are recommended to further refine encounter protocols in the Convention Area (as notified in Appendix C, NPFC01-2016-SSCVME01- Final Report):

- Other taxa, topographical, geographical and geological features that may indicate the presence of VMEs;
- Taxon-specific encounter thresholds and reporting;
- Framework for evaluating the effectiveness of encounter protocols;
- Tiered approach with different encounter protocols associated with different thresholds;
- Gear-specific thresholds to reflect differences in catchability;
- Gear-specific move-on distances to reflect type of gear;
- Different reporting requirements for different catches;
- Tiered approach to reporting bycatch of VME indicator taxa;
- Different encounter protocols for existing and new fishing areas

### **3.3 Data collection, management and security**

#### Rationale

*Article 10, paragraph 4 (i)* in the Convention states that the functions of the Scientific Committee shall be to: “develop rules and standards, for adoption by the Commission, for the collection, verification, reporting, and the security of, exchange of, access to and dissemination of data on fisheries resources, species belonging to the same ecosystem, or dependent upon or associated with the target stocks and fishing activities in the Convention Area”.

## Areas of work

- Review of data standards related to stock assessments and other relevant data, including VME data collection and vessel monitoring systems
- Identify data sources to meet data needs for priority areas of work above and develop programs for data collection
- Develop data security policy including data handling and sharing protocol, information confidentiality classification and access control security guideline

### **4.0 IMPLEMENTATION AND REVIEW**

The SC will review the Research Plan and update it as necessary on an annual basis. The Research Plan will form the foundation of SC's rolling five-year Work Plan. Monitoring the implementation of this Research Plan will be the responsibility of the Chair of the Scientific Committee in collaboration with the Chairs of the Scientific Committees' subsidiary groups and the Executive Secretary. Members of the Commission and the Secretariat will share responsibility for implementation of the Research Plan.

Full implementation of the Research Plan will likely be beyond the means of the Commission's core budget. Extra-budgetary funds from voluntary contributions of Members and other sources will be required and actively sought by the Commission. Nevertheless, adoption of the Plan by the Scientific Committee and subsequent strong support from the Commission is a prerequisite to securing the necessary extra-budgetary funds.

An independent external review of the Plan may periodically be requested by the SC. The Scientific Committee will be responsible for preparing the terms of reference for the review. The Scientific Committee will present the report of the review to the next regular session of the Commission.

### **5.0 SCIENTIFIC COLLABORATION WITH OTHER ORGANIZATIONS**

While not included as a priority, *Article 21* of the Convention addresses cooperation with other organizations or arrangements. It calls on the Commission to cooperate, as appropriate, on matters of mutual interest with Food and Agriculture Organization (FAO), other specialized agencies of the FAO and relevant Regional Fisheries Management Organizations (RFMOs). Further, the Commission is called on to develop cooperative working relationships, including potential agreements, with intergovernmental organizations that can contribute to its work.

*Article 10* also speaks to this issue in clauses five and six, stating that the Scientific Committee may



exchange information on matters of mutual interest with other relevant scientific organizations or arrangements, and that the Committee shall not duplicate the activities of other scientific organizations and arrangements that cover the Convention Area.

The impetus to collaborate is made stronger by the prospect of limited research funding in the Commission, at least in the short-term, but it is also in the best interests of the Commission to seek synergies with other organizations with mutual interests and similar membership (e.g. North Pacific Marine Science Organization (PICES) and North Pacific Anadromous Fish Commission (NPAFC)).

Activities could include:

- Evaluate reports of International Organizations that may be relevant to the functioning of the Scientific Committee
- Identify other organizations with relevant mandates and activities
- Formalize relationships with these organizations (e.g. MOUs, standing invitations to meetings)
- Identify potential funding opportunities

**FIVE-YEAR WORK PLAN****Small Scientific Committee on Pacific Saury (SSC PS)**

## Priority list:

1. Conduct a stock assessment update based on BSSPM analyses
2. Further investigate improvements to the BSSPM
3. Develop an age/size-structured model
4. Develop a list of plausible ranges for biological parameters
5. Develop databases to support age/size-structured models
6. Continue joint CPUE work to incorporate broader spatial and temporal coverage
7. Update the biomass estimate using the existing method (swept area method)
8. Develop spatio-temporal model for the biomass estimate
9. Further refine the catchability coefficient of the Japanese survey and characterize its variance
10. Develop a longer-term roadmap for work related to Pacific saury stock assessment
11. Set biological reference points
12. Develop a timeframe for MSE process

[H] and [M] indicate high and medium priorities. Cells with “TBD” depend on the progress of data preparation and analytical works.

ITEM	SSC-PS05 (2019 Fall)	SSC-PS virtual (2020 June)	Intersessional	SSC-PS06 (2020 Fall)	2021	2022	2023	2024
<b>Regular update of inputs</b>								
Update & improvement of biomass survey index	<ul style="list-style-type: none"> <li>Review 2019 survey outcomes</li> <li>Investigate/refine q_biomass</li> <li>Review spatio-temporal modelling</li> <li>Review simulation results</li> </ul> [H]	Review 2020 survey plan [H]	Review 2020 survey outcomes and finalize for use in BSSPM	Continue review of 2020 survey and analytical works, and then finalize for use in BSSPM [H]	Continue regular review [H] of 1) survey plan 2) analytical work 3) any related issues	Continue regular review [H] of 1) survey plan 2) analytical work 3) any related issues	Continue regular review [H] of 1) survey plan 2) analytical work 3) any related issues	Continue regular review [H] of 1) survey plan 2) analytical work 3) any related issues
Update & improvement of CPUE indices	Review CPUEs up to 2018 fisheries [H]		Review CPUEs up to 2019 fisheries and finalize for use in BSSPM	Continue review of CPUEs up to 2019 fisheries and finalize for use in BSSPM [H]	Continue review of outcomes of regular update and analytical works [H]	Continue review of outcomes of regular update and analytical works [H]	Continue review of outcomes of regular update and analytical works [H]	Continue review of outcomes of regular update and analytical works [H]
Development of joint CPUE index	Review results and choose some initial sets of series for trial use in BSSPM [M]	Review further results [M]	Review CPUEs up to 2019 fisheries and finalize for use in sensitivity test of BSSPM	Review CPUEs up to 2019 fisheries and finalize for use in sensitivity test of BSSPM [H]	Continue review of outcomes of regular update and analytical works [H]	Continue review of outcomes of regular update and analytical works [H]	Continue review of outcomes of regular update and analytical works [H]	Continue review of outcomes of regular update and analytical works [H]
<b>Regular update of the existing SA</b>								
Routine update BSSPM as a benchmark	Set up data and modify specification (if	Update with base case 2	Conduct BSSPM	Update with base and sensitivity cases	Continue review of outcomes of	Continue review of outcomes of	TBD	TBD

ITEM	SSC-PS05 (2019 Fall)	SSC-PS virtual (2020 June)	Intersessional	SSC-PS06 (2020 Fall)	2021	2022	2023	2024
	necessary) [H]		analyses using updated data	and draft BSSPM stock assessment report for review by SC and Commission [H]	regular BSSPM update [M]	regular BSSPM update [M]		
Improvement and further investigation of BSSPM	Review any outcomes of improvements (see Para 29 in TWG04 report) [L]	Continue [L]		Continue [L]	Review any outcomes of improvements (see Para 29 in TWG PSSA04 report) [M]	Review any outcomes of improvements (see Para 29 in TWG PSSA04 report) [M]	TBD	TBD
<b>Toward age/size- structured models (ASSMs)</b>								
Data inventory (CPUE and size/age in space and time)	<ul style="list-style-type: none"> <li>Review data availability for each member</li> <li>Discuss data sharing process</li> </ul> [H]	Review an initial data set for initial trials of conditioning (intersessionally)		Finalize an initial data set for initial trials of estimation [M]	Finalize data for 2021 stock assessment with ASSMs [H]	Continue update of data for stock assessment with ASSMs [H]	TBD	TBD
Summarizing available information on PS biology	Review comprehensive reports [H]			Finalize an initial list of assumptions for initial trials of estimation [M]	Finalize assumption for 2021 stock assessment with ASSMs [H]	Continue update of data for stock assessment with ASSMs [H]	TBD	TBD
Development of models	Review proposal and discuss evaluation methods (including simulation) [H]			After PS06 meeting [M]: <ul style="list-style-type: none"> <li>Start conditioning</li> <li>Compare with BSSPM</li> </ul>	Review results of analyses by an agreed initial set of ASSMs [H]	Finalize models and results of analyses by ASSMs [H]	TBD	TBD

ITEM	SSC-PS05 (2019 Fall)	SSC-PS virtual (2020 June)	Intersessional	SSC-PS06 (2020 Fall)	2021	2022	2023	2024
				results				
Uncertainty in models (possible link with OM grid under MSE)	Grid of uncertainty and information gaps [L]	Continue [L]			Start investigation [M]	Finalize the procedure of assessing model uncertainty [H]	TBD	TBD
Examination of estimation performance and finalization of models	Develop simulation specification [M]			Plan conducting simulation [M]	Review initial simulation works [H]	Finalize simulation works [H]	TBD	TBD
<b>Toward development of reference points</b>								
Set biological reference points (limit and target)	Review intensively RPs report Start investigating reasonable options [H]			Identify candidate RPs [M]	Continue discussion and adoption [H]	Continue discussion and amend if necessary [M]	TBD	TBD
<b>Toward development of MSE (work formally starts in 2021)</b>								
Development of management objectives	Review intensively RPs report [L]							
Definition of performance measures	Review intensively RPs report [L]							
Construction of OMs	See items in age-structured models [L]							
Development								

<b>ITEM</b>	<b>SSC-PS05 (2019 Fall)</b>	<b>SSC-PS virtual (2020 June)</b>	<b>Intersessional</b>	<b>SSC-PS06 (2020 Fall)</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>
of candidate MPs								
Simulation performance tests								
Comparison of MPs and finalize advice								

**Technical Working Group on Chub Mackerel Stock Assessment (TWG CMSA)**

Priority list:

1. Data preparation and review of biological information
2. Develop an operating model
3. Test stock assessment models (VPA, ASAP, KAFKA, SAM, state-space production model)
4. Conduct stock assessment of chub mackerel
5. Set biological reference points
6. Provide scientific advice on the management of chub mackerel stock to the Commission
7. Regularly update and refine inputs
8. Conduct MSE for chub mackerel

ITEM	2020 (TWG CMSA03)	2021 spring	2021-2022 winter	2022	2023	2024	2025
<b>Regular update of inputs</b>							
Research survey indices	Review survey indices to be used for stock assessment	<ul style="list-style-type: none"> <li>• Standardize survey data (intersessional)</li> <li>• Review the data used for the stock assessment</li> <li>• Finalize the data used for the stock assessment</li> </ul>	Update survey indices, if possible	Update	Update	Update	Update
CPUE indices	Review CPUE indices to be used for stock assessment	<ul style="list-style-type: none"> <li>• Standardize CPUE (intersessional)</li> <li>• Review the data used for the stock</li> </ul>	Update CPUE indices, if possible	Update	Update	Update	Update

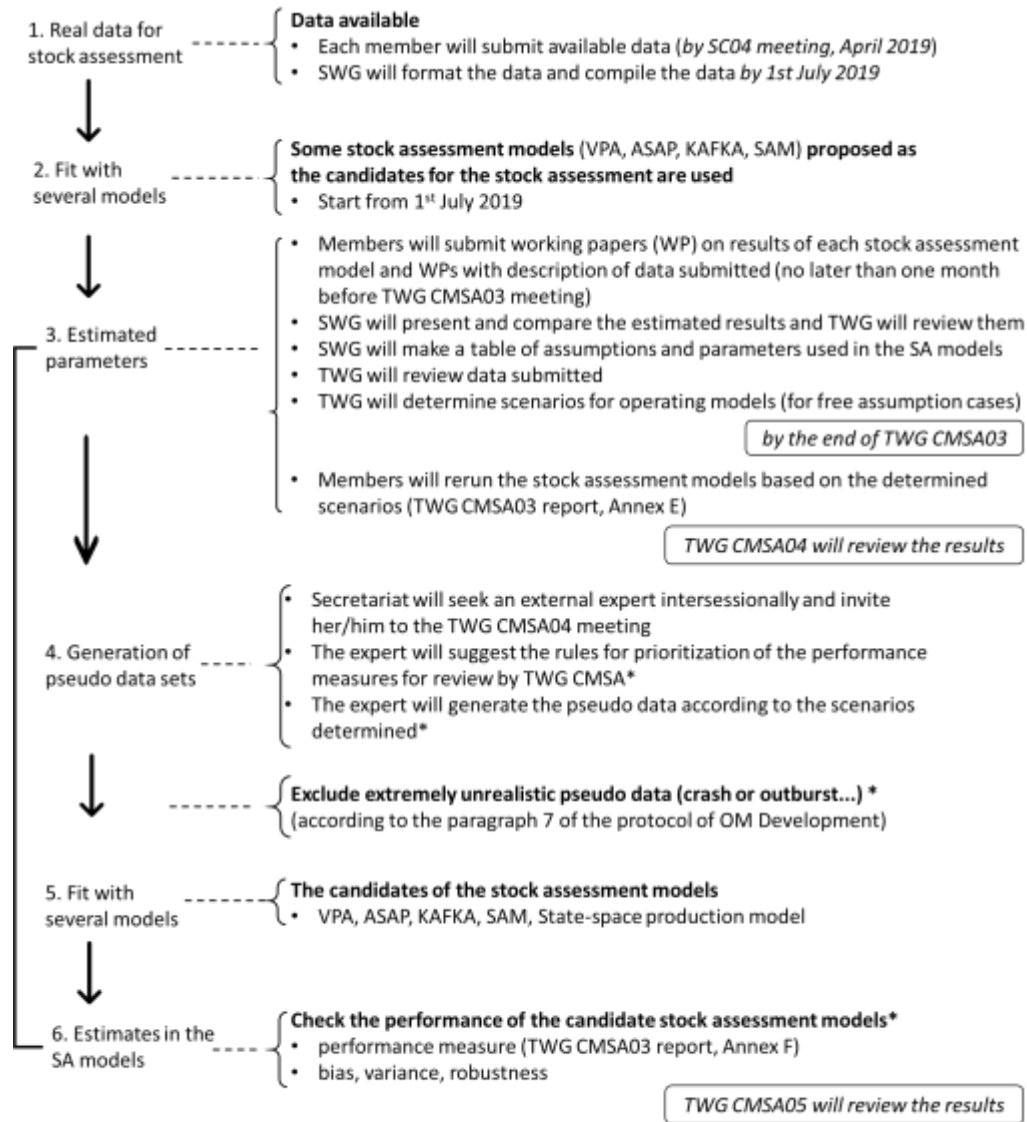
ITEM	2020 (TWG CMSA03)	2021 spring	2021-2022 winter	2022	2023	2024	2025
		assessment <ul style="list-style-type: none"> <li>Finalize the data used for the stock assessment</li> </ul>					
Catch data/catch composition	Compile and review data	<ul style="list-style-type: none"> <li>Review the data used for the stock assessment</li> <li>Finalize the data used for the stock assessment</li> </ul>	Update catch composition data, if possible	Update and revise, if needed	Update	Update	Update
Biological parameters (maturity, M, weight)	Review the three reference cases for natural mortality	<ul style="list-style-type: none"> <li>Review biological parameters</li> <li>Finalize assumptions for the stock assessment</li> </ul>	Review biological parameters	Review biological parameters	Review biological parameters	Review biological parameters	Review biological parameters
<b>Operating model (OM)*</b>							
Development of operating model	Describe and review all data for OM/ Set OM scenarios		Generate pseudo data to be fitted to the stock assessment models (intersessional)				
Testing stock assessment models	Condition the OM	Condition the OM	<ul style="list-style-type: none"> <li>Compare stock assessment model candidates</li> <li>Choose the best SA model(s)</li> </ul>				
<b>Stock assessment</b>							
Benchmark stock assessment			Conduct preliminary stock assessment	Complete stock assessment with the selected SA model(s) and	Update benchmark stock assessment	Update benchmark stock assessment	Update benchmark stock assessment



ITEM	2020 (TWG CMSA03)	2021 spring	2021-2022 winter	2022	2023	2024	2025
				provide recommendations to SC			
Improvement and further investigation of the selected model					Review and improve, if needed, the SA model	Review and improve, if needed, the SA model	Review and improve, if needed, the SA model
<b>Toward development of reference points</b>							
Set biological reference points (limit and target)		<ul style="list-style-type: none"> <li>• Review RPs report</li> <li>• List candidate reference points</li> </ul>	<ul style="list-style-type: none"> <li>• Compare robustness of reference points</li> <li>• Choose reference points</li> </ul>				
<b>Toward development of MSE</b>							
Development of management objectives			Liaise with the Commission and TCC to set management objectives	Finalize management objectives			
Definition of performance measures				List performance measures			
Construction of OMs	Discuss MSE approaches for chub mackerel	Continue	Discuss MSE approaches and frameworks for chub mackerel	Discuss ranges of uncertainties			
Development of candidate							

<b>ITEM</b>	<b>2020 (TWG CMSA03)</b>	<b>2021 spring</b>	<b>2021-2022 winter</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>
MPs							
Simulation performance tests							
Comparison of MPs and finalize advice							

## Flowchart for the development of operating models and testing stock assessment models



\* By an external expert

**Small Scientific Committee on Bottom Fish and Marine Ecosystems (SSC BF-ME)**

Priority list:

1. NPA and SA: Develop catch and CPUE time series for commercial fisheries
2. NPA: Review survey
3. SA: Conduct comprehensive stock assessment and provide management advice
4. NPA, SA and Sablefish: Develop and Implement harvest control rule
5. Sablefish: Evaluate historical harvest relative to trip limits and update trip limits if necessary
6. Sablefish and VME: Conduct trade-off analysis between commercial fishing and VME protection
7. VME: Collect and share fishing footprint data
8. VME: Develop a process for establishing quantitative definitions of VMEs
9. VME: Develop standardized approach to SAI determination

ITEM	SSC BFME01 (2020)	SSC BFME02 (2021)	SSC BFME03 (2022)	SSC BFME04 (2023)	SSC BFME05 (2024)
North Pacific Armorhead					
Assess and monitor status of stock	Update catch data for NPA	Update catch data and CPUE index for NPA	Update catch data and CPUE index for NPA	Update catch data and CPUE index for NPA	Update catch data and CPUE index for NPA
	Develop CPUE index for NPA				
	Review results of NPA monitoring surveys	Review results of NPA monitoring surveys	Review results of NPA monitoring surveys	Review results of NPA monitoring surveys	Review results of NPA monitoring surveys

ITEM	SSC BFME01 (2020)	SSC BFME02 (2021)	SSC BFME03 (2022)	SSC BFME04 (2023)	SSC BFME05 (2024)
	Complete review of data requirements to assess and monitor status of NPA and identify gaps	Integrate CPUE index and NPA surveys (acoustic and pre-fishery) into preliminary stock assessment or simulation approach using DLM tools	Update status of stock	Update status of stock	Update status of stock
	Conduct acoustic survey and research	Review acoustic survey and research			
		Conduct analysis of historical patterns in NPA recruitment and oceanography; Identify and conduct additional research on NPA	Identify and conduct additional research on NPA	Identify and conduct additional research on NPA	Identify and conduct additional research on NPA
	Review fisheries observer program data collection for adequacy to produce data streams to support management advice	Review fisheries observer program data collection for adequacy to produce data streams to support management advice	Review fisheries observer program data collection for adequacy to produce data streams to support management advice	Review fisheries observer program data collection for adequacy to produce data streams to support management advice	Review fisheries observer program data collection for adequacy to produce data streams to support management advice
Conserve stock		Develop conservation objective(s)			

ITEM	SSC BFME01 (2020)	SSC BFME02 (2021)	SSC BFME03 (2022)	SSC BFME04 (2023)	SSC BFME05 (2024)
	Develop work plan and TORs to implement adaptive management	Implement adaptive management			
		Refine harvest control rule if needed	Assess HCR against stock assessment	Refine HCR and implement	Update data and implement HCR
Splendid alfonsino					
Assess and monitor status of stock	Update catch data for SA	Update catch data and CPUE index for SA	Update catch data and CPUE index for SA	Update catch data and CPUE index for SA	Update catch data and CPUE index for SA
	Develop CPUE index for SA				
	Review data requirements to assess and monitor status of SA and identify gaps	Develop monitoring plan for SA	Implement monitoring plan for SA	Conduct monitoring plan for SA	Conduct monitoring plan for SA
		Conduct comprehensive stock assessment or data limited approach	Update comprehensive stock assessment or data limited approach, and provide management advice	Update comprehensive stock assessment or data limited approach, and provide management advice	Update comprehensive stock assessment or data limited approach, and provide management advice
	Report on efforts by other RFMO's to assess SA stock				

ITEM	SSC BFME01 (2020)	SSC BFME02 (2021)	SSC BFME03 (2022)	SSC BFME04 (2023)	SSC BFME05 (2024)
	Review fisheries observer program data collection for adequacy to produce data streams to support management advice	Review fisheries observer program data collection for adequacy to produce data streams to support management advice	Review fisheries observer program data collection for adequacy to produce data streams to support management advice	Review fisheries observer program data collection for adequacy to produce data streams to support management advice	Review fisheries observer program data collection for adequacy to produce data streams to support management advice
Conserve stock		Develop conservation objective(s); Define and implement harvest control rule	Update data and implement HCR	Update data and implement HCR	Update data and implement HCR
Sablefish					
Assess and monitor status of stock	Update catch data and CPUE index	Update catch data and CPUE index	Update catch data and CPUE index	Update catch data and CPUE index	Update catch data and CPUE index
	Provide an update on USA-Canada stock assessment models for Sablefish and joint research on Sablefish	Provide an update on USA-Canada stock assessment models for Sablefish and joint research on Sablefish	Provide an update on USA-Canada stock assessment models for Sablefish and joint research on Sablefish	Provide an update on USA-Canada stock assessment models for Sablefish and joint research on Sablefish	Provide an update on USA-Canada stock assessment models for Sablefish and joint research on Sablefish
	Review fisheries observer program data collection for adequacy to produce data streams	Review fisheries observer program data collection for adequacy to produce data streams	Review fisheries observer program data collection for adequacy to produce data streams	Review fisheries observer program data collection for adequacy to produce data streams	Review fisheries observer program data collection for adequacy to produce data streams

ITEM	SSC BFME01 (2020)	SSC BFME02 (2021)	SSC BFME03 (2022)	SSC BFME04 (2023)	SSC BFME05 (2024)
	to support management advice	to support management advice	to support management advice	to support management advice	to support management advice
Conserve stock	Evaluate harvest relative to trip limits and historical catches	Evaluate catch limits relative to stock status	Evaluate catch limits relative to stock status	Evaluate catch limits relative to stock status	Evaluate catch limits relative to stock status
		Summarize harvest control rules and stock status			
Other research	Update analysis of tagging data - coastwide	Conduct analysis of sablefish associations with VME (intersessional)			
		Conduct trade-off analysis for Sablefish fishing and VME protection (intersessional)			
Vulnerable marine ecosystems					
Defining and Identifying VMEs	Approval of VME Indicator ID guide for observers				



ITEM	SSC BFME01 (2020)	SSC BFME02 (2021)	SSC BFME03 (2022)	SSC BFME04 (2023)	SSC BFME05 (2024)
		Map the distribution of VME indicator taxa (model, kernel density estimates, observation data); Determine a quantitative definition of VMEs	Review and apply quantitative definition of VMEs		
Identifying and defining SAI's		Determine data requirements and resolution for SAI assessment;			
	Continue development of standardized approach and encounter rules for SAI assessments	Apply the standardized approach for SAI assessments and conduct integrated SAI assessment	Conduct integrated SAI assessment	Conduct integrated SAI assessment	Conduct integrated SAI assessment
Quantifying interactions between fisheries and VMEs	Map and share the data to define footprint of fisheries and effort within these footprints	Update spatially explicit fishing effort data	Update spatially explicit fishing effort data	Update spatially explicit fishing effort data	Update spatially explicit fishing effort data

ITEM	SSC BFME01 (2020)	SSC BFME02 (2021)	SSC BFME03 (2022)	SSC BFME04 (2023)	SSC BFME05 (2024)
	Develop timely reporting and action protocol when VME sites or recovering sites are identified	Implement timely reporting and action protocol when VME sites or recovering sites are identified			
	Review fisheries observer program data collection for adequacy to produce data streams to support management advice	Review fisheries observer program data collection for adequacy to produce data streams to support management advice	Review fisheries observer program data collection for adequacy to produce data streams to support management advice	Review fisheries observer program data collection for adequacy to produce data streams to support management advice	Review fisheries observer program data collection for adequacy to produce data streams to support management advice
Conserving VMEs		Develop management objectives for recovering VME sites	Periodic review of VME management	Periodic review of VME management	Periodic review of VME management
		Refine the exploratory fishing protocol and consider banning exploratory fishing in VME closed areas			
	Review and refine the encounter protocol if necessary	Review and refine the encounter protocol if necessary			
Other ecosystem components					

ITEM	SSC BFME01 (2020)	SSC BFME02 (2021)	SSC BFME03 (2022)	SSC BFME04 (2023)	SSC BFME05 (2024)
	Develop combined bycatch taxa list for observers in NW Pacific Ocean	Approval of fish ID guide for scientific observers in the NW Pacific Ocean			
	Task development of fish ID guide for scientific observers in the NW Pacific Ocean				

## Scientific Committee (SC)

### Priority list

As stipulated in the Convention, Article 10, the Scientific Committee shall provide scientific advice and recommendations to the Commission which is considered the highest priority task of the SC. The following priority areas have been identified for SC:

1. Priority species summaries and stock assessments for management advice
2. Management Strategy Evaluation (MSE) for priority species
3. Ecosystem approach to fisheries management: understand ecological interactions among species and impacts of fishing on fisheries resources and their ecosystem components
4. Collaboration with other organizations
5. Regular review of the research plan and work plan
6. Data collection, management, and security

ITEM	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
<b>Priority Species</b>					
Summaries of priority species	Develop summary template	Draft summary sheet	Update summary sheets as needed	Update summary sheets as needed	Update summary sheets as needed
Assessment of Spotted Mackerel and associated bycatch	Identify lead  Identify data sources, data gaps and strategies to fill gaps	Collate data  Develop data collection templates and share data  Determine spatial structure of stocks	Undertake baseline stock assessment and provide management advice including harvest control rules	Update baseline stock assessment as needed and provide management advice including harvest control rules	Update baseline stock assessment as needed and provide management advice including harvest control rules

ITEM	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
				Collate data on associated bycatch species	Develop baseline stock assessment of associated bycatch species
Assessment of Japanese Sardine and associated bycatch	Identify lead  Identify data sources, data gaps and strategies to fill gaps	Collate data  Develop data collection templates and share data  Determine spatial structure of stocks	Undertake baseline stock assessment and provide management advice including harvest control rules	Update baseline stock assessment as needed and provide management advice including harvest control rules  Collate data on associated bycatch species	Update baseline stock assessment as needed and provide management advice including harvest control rules  Develop baseline stock assessment of associated bycatch species
Assessment of Neon Flying Squid and associated bycatch	Identify lead  Identify data sources, data gaps and strategies to fill gaps	Collate data  Develop data collection templates  Determine spatial structure of stocks	Undertake baseline stock assessment and provide management advice including harvest control rules	Update baseline stock assessment as needed and provide management advice including harvest control rules  Collate data on associated bycatch species	Update baseline stock assessment as needed and provide management advice including harvest control rules  Develop baseline stock assessment of associated bycatch species
Assessment of Japanese Flying Squid and associated bycatch	Identify lead  Identify data sources,	Collate data	Undertake baseline stock assessment and provide management advice	Update baseline stock assessment as needed and provide management	Update baseline stock assessment as needed and provide management

ITEM	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
	data gaps and strategies to fill gaps	Develop data collection templates  Determine spatial structure of stocks	including harvest control rules	advice including harvest control rules  Collate data on associated bycatch species	advice including harvest control rules  Develop baseline stock assessment of associated bycatch species
<b>Management Strategy Evaluation (MSE)</b>					
Chub Mackerel	Describe MSE from a scientific perspective  Establish a joint MSE Committee that includes members from SC, TCC, fishery managers, and stakeholders	Develop preliminary MSE tools for Chub Mackerel in consultation with TCC, fishery managers, and stakeholders	Update MSE tools for Chub Mackerel with input from TCC, fishery managers, and stakeholders	Update MSE tools for Chub Mackerel with input from TCC, fishery managers, and stakeholders	Update MSE tools for Chub Mackerel with input from TCC, fishery managers, and stakeholders
Pacific Saury				Develop preliminary MSE tools for Pacific Saury in consultation with TCC, fishery managers, and stakeholders	Update MSE tools for Pacific Saury with input from TCC, fishery managers, and stakeholders
<b>Ecosystem approach to</b>					

ITEM	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
<b>fisheries management</b>					
Ecological Interactions	Understand ecological interactions among species in the North Pacific Ocean	Understand ecological interactions among species in the North Pacific Ocean	Understand ecological interactions among species in the North Pacific Ocean	Understand ecological interactions among species in the North Pacific Ocean	Understand ecological interactions among species in the North Pacific Ocean
Impacts of fishing on ecosystem component	Evaluate impacts of fishing on fisheries resources and their ecosystem components, including bycatch species and discards	Evaluate impacts of fishing on fisheries resources and their ecosystem components, including bycatch species and discards	Evaluate impacts of fishing on fisheries resources and their ecosystem components, including bycatch species and discards	Evaluate impacts of fishing on fisheries resources and their ecosystem components, including bycatch species and discards	Evaluate impacts of fishing on fisheries resources and their ecosystem components, including bycatch species and discards
<b>Collaboration with other Organizations</b>					
PICES	Review implementation of NPFC-PICES Framework for Collaboration  Discuss SC representation at PICES Annual Meetings  Review ICES-PICES WGSPF activities	Review implementation of NPFC-PICES Framework for Collaboration  Review ICES-PICES WGSPF activities  Review NPFC-PICES workshop on VME indicator identification	Review implementation of NPFC-PICES Framework for Collaboration  Review ICES-PICES WGSPF activities  Review NPFC-PICES workshop on VME indicator identification	Review implementation of NPFC-PICES Framework for Collaboration  Identify other opportunities for collaboration with PICES	Review implementation of NPFC-PICES Framework for Collaboration  Identify other opportunities for collaboration with PICES

ITEM	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
FAO	Review partnership with FIRMS	Review NPFC's involvement in the 2nd Phase of the GEF-FAO Common Oceans Programme			
NPAFC	Review work plan to implement NPFC/NPAFC Memorandum of Cooperation  Review NPAFC- NPFC multinational survey program	Review work plan to implement NPFC/NPAFC Memorandum of Cooperation  Review NPAFC- NPFC multinational survey program			
Other organizations	Review collaborations with other organizations	Review collaborations with other organizations	Review collaborations with other organizations	Review collaborations with other organizations	Review collaborations with other organizations
<b>Research and Work Plans</b>					
Terms of Reference	Review SC's Terms of Reference	Review SC's Terms of Reference, as needed	Review SC's Terms of Reference, as needed	Review SC's Terms of Reference, as needed	Review SC's Terms of Reference, as needed



ITEM	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
Research Plan	Update SC's rolling 5-year research plan	Update SC's rolling 5-year research plan	Update SC's rolling 5-year research plan	Update SC's rolling 5-year research plan	Update SC's rolling 5-year research plan
Work Plan	Update SC's rolling 5-year work plan	Update SC's rolling 5-year work plan	Update SC's rolling 5-year work plan	Update SC's rolling 5-year work plan	Update SC's rolling 5-year work plan
Projects	Review completed and ongoing projects  Identify and prioritize new projects and recommend sources of funding	Review completed and ongoing projects  Identify and prioritize new projects and recommend sources of funding	Review completed and ongoing projects  Identify and prioritize new projects and recommend sources of funding	Review completed and ongoing projects  Identify and prioritize new projects and recommend sources of funding	Review completed and ongoing projects  Identify and prioritize new projects and recommend sources of funding
<b>Data Management</b>					
	Review SC's Interim Regulations for Management of Scientific Data and Information  Review and Endorse overarching policy for data management and security for TCC and SC  Discuss need of VMS	Review data standards in relation to stock assessment of priority species	Review data standards in relation to stock assessment of priority species  Discuss need for additional sources of data for scientific analyses and associated data management policy	Review data standards in relation to stock assessment of priority species  Discuss need for additional sources of data for scientific analyses and associated data management policy	Review data standards in relation to stock assessment of priority species  Discuss need for additional sources of data for scientific analyses and associated data management policy

ITEM	2020-2021	2021-2022	2022-2023	2023-2024	2024-2025
	data for scientific analyses  Review data management system (DMS) and Electronic Annual Report				
<b>Recommendations</b>					
Advice	Develop recommendations for the Commission, TCC, and FAC	Develop recommendations for the Commission, TCC, and FAC	Develop recommendations for the Commission, TCC, and FAC	Develop recommendations for the Commission, TCC, and FAC	Develop recommendations for the Commission, TCC, and FAC
<b>Media Communication</b>					
Press Release	Prepare and publish a press release about SC activities during its meeting	Prepare and publish a press release about SC activities during its meeting	Prepare and publish a press release about SC activities during its meeting	Prepare and publish a press release about SC activities during its meeting	Prepare and publish a press release about SC activities during its meeting