



North Pacific Fisheries Commission

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

North Pacific Fisheries Commission

Scientific Committee

2024-2028 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 4th 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 the 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 of 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 the priority areas are available in the attached (Annex 1).

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

At its 7th meeting, the Commission adopted a resolution on climate change and tasked the SC to identify relevant data availability and needs and integrate analyses of climate change relevant to NPFC fisheries into its work plan. The resolution also requires SC to include climate change as a standing agenda item of its meetings.

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 2nd 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, NPFC’s 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*, Blue 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 a management strategy evaluation (MSE) for Pacific saury in collaboration with NPFC's Commission, Small Working Group on Management Strategy Evaluation for Pacific Saury (SWG MSE PS), Technical and Compliance Committee (TCC), fishery managers, fishers, stakeholders, and observers.

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 during the last two decades. Four fishes are recognized as priority species: North Pacific armorhead (NPA) *Pentaceros wheeleri*, splendid alfonsino (SA) *Beryx splendens*, sablefish *Anoplopoma fimbria*, and skilfish *Erilepsis zonifer*.

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 that 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 2024-05 and CMM 2024-06), 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 2024-05 and CMM 2024-06)
- 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 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 the 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 of the Scientific Committee and its subsidiary bodies

Small Scientific Committee on Pacific Saury

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. Continue exploring climate indices to explain impacts on Pacific saury stock productivity
10. Support any technical work on MSE under SWG MSE PS

ITEM	2024	2025	2026	2027	2028	Progress
Regular update of inputs						
Update & improvement of biomass survey index	Continue regular review of 1) survey plan 2) analytical work 3) any related issues including experiments to produce absolute biomass index and additional surveys by other Members to increase coverage	Same as on the left	Same as on the left	Same as on the left	Same as on the left	Completed annually
Update & improvement of CPUE indices	Continue review of outcomes of regular update and	Same as on the left	Same as on the left	Same as on the left	Same as on the left	Completed annually

ITEM	2024	2025	2026	2027	2028	Progress
	analytical works					
Development of joint CPUE index	Continue review of outcomes of regular update and analytical works	Same as on the left	Same as on the left	Same as on the left	Same as on the left	Completed annually
Regular update of the existing SA						
Routine update BSSPM as a benchmark	Continue review of outcomes of regular BSSPM update ¹⁾	Same as on the left	Same as on the left	Same as on the left	Same as on the left	Completed annually
Improvement and further investigation of BSSPM	Review any outcomes of improvements, inter alia in light of possible incorporation of environmental information and reduction of retrospective pattern	Same as on the left	Same as on the left	Same as on the left	Same as on the left	Completed annually
Toward age/size-structured models (ASSMs)						
Data preparation/update	Explore age-specific abundance indices and recruitment indices. Conditional age at length information. Spatio-temporal variation of size composition.	TBD ²⁾	TBD ²⁾	TBD ²⁾	TBD ²⁾	Completed annually
Summarizing available information on PS biology	Update regularly, specifically maturity ogive and growth function	Continue	Continue	Continue	Continue	Collaboration between modelers and biologists has been done well and it will continue for updates.
Development of models	Review preliminary models to be evaluated	Finalize development of a new stock assessment model	Test the age-structured model capabilities for Bayesian estimation,	External review		SS3 model was reviewed. WG NSAM will continue to work on the development of

ITEM	2024	2025	2026	2027	2028	Progress
			simulation testing and MSE work			the SS3 model.
Uncertainty in models (possible link with OM grid under MSE)	Refine the plausible range of values of key biological parameters. Refine assumptions about prior distributions and the ranges for model parameters.	Continue	Continue	Continue	Continue	On going with in the work on new stock assessment
Other key matters						
Spatio-temporal modelling	Explore better modelling approaches to understand distribution patterns and produce more reliable indices, possibly including several key environmental variables	Continue	Continue	Continue	Continue	Modelling with VAST and sdmTMB has been conducted and the work to be continued
Climate impact assessment	Explore models for assessing climate impacts on distribution and productivity	Continue	Continue	Continue	Continue	Modelling has been conducted and the work to be continued
HCR		Evaluate the performance of the interim HCR in the presence of retrospective pattern	Continue			Start in 2025

¹⁾ Until any new stock

assessment models other than the BSSPM are accomplished, the outcome will produce key inputs for the Harvest Control Rule (HCR).

Small Scientific Committee on Bottom Fish and Marine Ecosystems

Priority list:

1. NPA: Review monitoring survey
2. NPA: Conduct stock assessment and provide management advice
3. SA: Conduct 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: Assess the relative risk of SAI for VME as a step towards standardize approach to SAI

ITEM	SSC BFME05 (2024)	SSC BFME06 (2025)	SSC BFME07 (2026)	SSC BFME08 (2027)	SSC BFME09 (2028)	Progress
North Pacific Armorhead						
Assess and monitor status of stock	Update catch data for NPA	Update catch data for NPA	Update catch data for NPA	Update catch data for NPA	Update catch data for NPA	Completed annually
	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	Completed annually
	Implement alternative methods for stock status	Implement alternative methods for stock status	Implement alternative methods for stock status	Update status of stock	Update status of stock	Exploring alternative methods for stock status
	Evaluate trend in directed effort relative to NPA catch		Compare CPUE and acoustic estimates			Completed summary of trend in directed effort (to be presented at BFME05)

ITEM	SSC BFME05 (2024)	SSC BFME06 (2025)	SSC BFME07 (2026)	SSC BFME08 (2027)	SSC BFME09 (2028)	Progress
	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	Identify and conduct additional research on NPA	Completed annually
	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	Completed annually
Conserve stock	Develop conservation objective(s)		Develop conservation objective(s)			Not completed
	Implement adaptive management		Implement adaptive management			Not completed
	Develop HCR and implement	Update data and implement HCR	Develop HCR and implement	Update data and implement HCR	Update data and implement HCR	Not completed
Splendid alfonsino						
Assess and monitor status of stock	Update catch data for SA	Update catch data and CPUE standardization for SA	Update catch data and CPUE standardization for SA	Update catch data and CPUE standardization for SA	Update catch data and CPUE standardization for SA	Completed annually
	Implement life history based approach, and provide management advice	Update life history based approach and provide management advice if necessary	Update life history based approach and provide management advice if necessary	Update life history based approach and provide management advice if necessary	Update life history based approach and provide management advice if necessary	Completed life history based approach (to be presented at BFME05)

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ITEM	SSC BFME05 (2024)	SSC BFME06 (2025)	SSC BFME07 (2026)	SSC BFME08 (2027)	SSC BFME09 (2028)	Progress
	Sablefish and joint research on Sablefish	Sablefish and joint research on Sablefish	Sablefish and joint research on Sablefish	Sablefish and joint research on Sablefish	Sablefish and joint research on Sablefish	
	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	Completed annually
Conserve stock	Design HCR specific to NPFC Sablefish (joint intersessional work with Canada and USA assessment authors	[Design HCR specific to NPFC Sablefish (joint intersessional work with Canada and USA assessment authors]	Update data and implement HCR	Update data and implement HCR	Update data and implement HCR	Not completed
Other research	Update trade-off analysis for Sablefish fishing and VME protection (as new data is available)		Update trade-off analysis for Sablefish fishing and VME protection (as new data is available)			Not updated (no new data available)
Vulnerable marine ecosystems						
Defining and Identifying VMEs	Summarize VME indicator taxa observation data from		Consolidate other potential data sources and clarify gaps and			Completed mapping (SWG VME report)

ITEM	SSC BFME05 (2024)	SSC BFME06 (2025)	SSC BFME07 (2026)	SSC BFME08 (2027)	SSC BFME09 (2028)	Progress
	various sources and map for NPFC area		deficiencies in VME data			
	Review and update quantitative definition of VMEs as needed	Review and update quantitative definition of VMEs as needed	Review and update quantitative definition of VMEs as needed	Review and update quantitative definition of VMEs as needed	Review and update quantitative definition of VMEs as needed	Completed annually
		Update identification of new VME and areas likely to be VMEs as new data becomes available	Update identification of new VME and areas likely to be VMEs as new data becomes available	Update identification of new VME and areas likely to be VMEs as new data becomes available	Update identification of new VME and areas likely to be VMEs as new data becomes available	Completed annually
	Review updated taxonomy for corals and VME indicator taxa as needed (Hydrocorals)	Review updated taxonomy for corals and VME indicator taxa as needed	Review updated taxonomy for corals and VME indicator taxa as needed	Review updated taxonomy for corals and VME indicator taxa as needed	Review updated taxonomy for corals and VME indicator taxa as needed	Completed annually
Identifying and defining SAI's	Determine data requirements and spatial/temporal resolution for SAI assessment and continue developing risk assessment for SAI	Determine data requirements and spatial/temporal resolution for SAI assessment and continue developing risk assessment for SAI	Assess risk of SAI for bottom fisheries	Conduct integrated SAI assessment	Conduct integrated SAI assessment	Work in progress

ITEM	SSC BFME05 (2024)	SSC BFME06 (2025)	SSC BFME07 (2026)	SSC BFME08 (2027)	SSC BFME09 (2028)	Progress
Conserving VMEs	Refine framework for future monitoring of recovering VMEs	Refine framework for future monitoring of recovering VMEs	Periodic review of VME management	Periodic review of VME management	Periodic review of VME management	Not completed
Other ecosystem components						
Assess the impact of fisheries on other ecosystem components	Examine discards over time (species composition, weight of discards) for bottom fisheries in CA		Work towards assessment of fishing impacts on other (non-target) ecosystem components			Completed - To be presented at BFME05
Climate Change	SSC BFME05 (2024)	SSC BFME06 (2025)	SSC BFME07 (2026)	SSC BFME08 (2027)	SSC BFME09 (2028)	Progress
Preparing for climate change effect on bottom fish		Literature review for SA, NPA (SWG NPA&SA) Or Sablefish (Canada)				NA

Small Scientific Committee on Neon Flying Squid

Priority list:

11. Conduct research to appropriately separate two cohorts using spatial and age/size characteristics
12. Continue CPUE standardization work
13. Conduct research and literature reviews to better understand the biological characteristic (e.g., growth rate, natural mortality), life history (e.g., cohorts associated with spawning timing and location, feeding and spawning migration) of the species and population structure (e.g. genetic analysis)
14. Conduct a stock assessment based on surplus production model
15. Further investigate improvements to the surplus production model
16. Explore and develop alternative approaches, such as the management strategy evaluation framework and data-limited management procedures, to provide effective management advice
17. Conduct research and literature reviews to better understand the factors driving abundance fluctuations (including climate change) in this short-lived species
18. Review other successful (or unsuccessful) stock assessment and management practices for squid or other short-lived species globally to inform SSC NFS work
19. Develop other models e.g., age/size-structured model
20. Develop databases to support age/size-structured models

ITEM	2024	2025	2026	2027	2028	Progress
Regular update of inputs						
Update & improvement of CPUE indices	Continue review of outcomes of regular update and analytical works	Same as on the left	Same as on the left	Same as on the left	Same as on the left	
Joint CPUE standardization		Conduct joint CPUE standardization	TBD	TBD	TBD	
Regular update of the surplus production model						
Update and review of surplus production model and other stock assessment models	Continue review of outcomes of surplus production model	Conduct preliminary stock assessment	Finalize stock assessment	Same as on the left	Same as on the left	
Improvement and further investigation of surplus production model	Review any outcomes of improvements, inter alia in light of possible incorporation of environmental information	Same as on the left	Same as on the left	Same as on the left	Same as on the left	
Toward age/size-structured models						
Data inventory (CPUE and size/age in space and time)				Explore age-specific abundance indices or recruitment indices. Conditional age at length information. Spatio-temporal variation of size composition.	TBD	
Summarizing available information on neon				Update regularly, specifically maturity	Continue	

ITEM	2024	2025	2026	2027	2028	Progress
flying squid biology				ogive and growth function		
Development of models				Develop models to be evaluated	TBD	
Toward other approaches to provide management advises						
MSE or data-limited management procedures				Develop framework to provide management advices (MSE or data-limited management procedures)	TBD	
Review other successful (or unsuccessful) stock assessment and management practices for squid or other short-lived species globally to inform SSC NFS work	Review by the invited expert	TBD	TBD	TBD	TBD	

Technical Working Group on Chub Mackerel Stock Assessment

Priority list:

1. Data preparation and review of biological information
2. Conduct stock assessment of chub mackerel
3. Set biological reference points
4. Provide scientific advice on the management of chub mackerel stock to the Commission
5. Explore the influence of climate changes on chub mackerel stock
6. Regularly update and refine inputs

ITEM	2024 summer	2025 winter	2025 summer	2026	2027	2028	Progress
Regular update of inputs							
Research survey indices	Finalize data used for the stock assessment	Update		Update	Update	Update	Research survey indices have been finalized and used for stock assessment.
CPUE indices	Finalized CPUE standardization	Update		Update	Update	Update	CPUE standardization has been finalized and used for stock assessment.
Catch data/catch composition	Finalize data used for the stock assessment	Update CAA data		Update	Update	Update	Catch data and catch composition have been finalized and used for stock assessment.
Biological parameters (maturity, M, weight)	Finalize assumptions for the stock assessment	<ul style="list-style-type: none"> • Review biological parameters • Discuss setting of natural mortality at age for future 		Review biological parameters	Review biological parameters	Review biological parameters	Assumptions on biological parameters have been finalized and used for stock

ITEM	2024 summer	2025 winter	2025 summer	2026	2027	2028	Progress
		base cases • Explore mechanisms of temporal change of maturity at age and weight at age used for calculation of reference points and future projections • Bridge the gaps in maturity at age data among Members					assessment.
Quarterly fishery data (CAA, WAA, Maturity-at-age)	• Submit quarterly fishery data • Share and standardize age-counting rule	• Update quarterly fishery data • Share and standardize age-counting rule		Update	Update	Update	Quarterly fishery data has been submitted.
Stock assessment							
Benchmark stock assessment	Complete stock assessment with the selected SA model		Update SA	Update SA	Update SA	Update SA	Benchmark stock assessment has been conducted.
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	Review and improve, if needed, the SA model	Review and improve, if needed, the SA model	
New stock assessment models			Explore new stock assessment models, if available	Explore new stock assessment models, if available	Explore new stock assessment models, if available	Explore new stock assessment models, if available	
Reference points, HCR, future projections and MSE							

ITEM	2024 summer	2025 winter	2025 summer	2026	2027	2028	Progress
Set biological reference points (limit and target)	Review and calculate reference points	Discuss how to calculate biological reference points in consideration of nature of temporal changes in biological parameters	Review and calculate reference points	Review and calculate reference points	Review and calculate reference points	Review and calculate reference points	Commonly used reference points are reviewed, and calculation with the results of SA have been completed
Develop future projections	Provide preliminary results of future projection, if possible	<ul style="list-style-type: none"> • Initiate discussion of harvest control rule (HCR) to determined future catch, according to traits of CM biological parameters • Explore more sophisticated method for conducting future projections with more uncertainties 	Candidates of HCR are tested in future projections	Selection of HCR	Improvement	Improvement	Preliminary results of future projections have been provided.
Develop Management Strategy Evaluation (MSE)		Start discussion	Development	Trial to be used for selection of HCR	Improvement	Improvement	

Scientific Committee - other

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	2024	2025	2026	2027	2028	Progress
Priority Species						
Summaries of priority species	Update summary sheets as needed	Update summary sheets as needed	Update summary sheets as needed	Update summary sheets as needed	Update summary sheets as needed	Summary sheets are complete for 10 priority species
Assessment of Blue (Spotted) Mackerel and associated bycatch	Update data on Blue Mackerel and provide relevant data for stock assessment	Update data on Blue Mackerel and provide relevant data for stock assessment	Update data on Blue Mackerel and provide relevant data for stock assessment	Update data on Blue Mackerel and provide relevant data for stock assessment	Update data on Blue Mackerel and provide relevant data for stock assessment	Data on Blue Mackerel up to 2022 fishing year have been collated and provided for stock assessment

ITEM	2024	2025	2026	2027	2028	Progress
	Compile data on the catch composition of Chub Mackerel and Blue Mackerel and provide information to TWG CMSA and SWG BM	Compile data on the catch composition of Chub Mackerel and Blue Mackerel and provide information to TWG CMSA and SWG BM	Compile data on the catch composition of Chub Mackerel and Blue Mackerel and provide information to TWG CMSA and SWG BM	Compile data on the catch composition of Chub Mackerel and Blue Mackerel and provide information to TWG CMSA and SWG BM	Compile data on the catch composition of Chub Mackerel and Blue Mackerel and provide information to TWG CMSA and SWG BM	Data on catch composition are compiled up to 2022 fishing year and were provided to TWG CMSA and SWG BM
	Observe Japan's stock assessment of Blue Mackerel	Observe Japan's stock assessment of Blue Mackerel	Observe Japan's stock assessment of Blue Mackerel	Observe Japan's stock assessment of Blue Mackerel	Observe Japan's stock assessment of Blue Mackerel	The SC observed Japan's stock assessment of Blue Mackerel.
	Provide management advice to the Commission as needed.	Provide management advice to the Commission as needed.	Provide management advice to the Commission as needed.	Provide management advice to the Commission as needed.	Provide management advice to the Commission as needed.	Stock assessment results were communicated to the Commission
		Develop data collection templates		Collate data on associated bycatch species	Assess impacts of fishery on dependent or associated species	
Assessment of Japanese Sardine and associated bycatch	Update data on Japanese Sardine	Update data on Japanese Sardine	Update data on Japanese Sardine	Update data on Japanese Sardine	Update data on Japanese Sardine	Data on Japanese Sardine have been collated

ITEM	2024	2025	2026	2027	2028	Progress
	<p>Observe Japan's stock assessment of Japanese sardine</p> <p>Provide management advice to the Commission as needed.</p>	<p>Observe Japan's stock assessment of Japanese sardine</p> <p>Provide management advice to the Commission as needed.</p>	<p>Observe Japan's stock assessment of Japanese sardine.</p> <p>Provide management advice to the Commission as needed.</p>	<p>Observe Japan's stock assessment of Japanese sardine.</p> <p>Provide management advice to the Commission as needed.</p> <p>Collate data on associated bycatch species</p>	<p>Observe Japan's stock assessment of Japanese sardine.</p> <p>Provide management advice to the Commission as needed.</p> <p>Assess impacts of fishery on dependent or associated species</p>	<p>The SC observed Japan's stock assessment of Japanese Sardine</p> <p>Stock assessment results were communicated to the Commission</p>
Assessment of Japanese Flying Squid and associated bycatch	<p>Update data on Japanese Flying Squid</p> <p>Observe Japan's stock assessment of Japanese Flying Squid</p>	<p>Update data on Japanese Flying Squid</p> <p>Observe Japan's stock assessment of Japanese Flying Squid</p>	<p>Update data on Japanese Flying Squid</p> <p>Observe Japan's stock assessment of Japanese Flying Squid</p>	<p>Update data on Japanese Flying Squid</p> <p>Observe Japan's stock assessment of Japanese Flying Squid</p>	<p>Update data on Japanese Flying Squid</p> <p>Observe Japan's stock assessment of Japanese Flying Squid</p>	<p>Data on Japanese Flying Squid have been collated</p> <p>The SC observed Japan's domestic stock assessment</p>

ITEM	2024	2025	2026	2027	2028	Progress
	Provide management advice to the Commission as needed.	Provide management advice to the Commission as needed. Develop data collection templates	Provide management advice to the Commission as needed. Collate data on associated bycatch species	Provide management advice to the Commission as needed. Collate data on associated bycatch species	Provide management advice to the Commission as needed. Assess impacts of fishery on dependent or associated species	of Japanese Flying Squid Stock assessment results were communicated to the Commission
Management Strategy Evaluation (MSE)						
Pacific Saury	Support NPFC's SWG MSE PS in achieving its goals	Support NPFC's SWG MSE PS in achieving its goals	Support NPFC's SWG MSE PS in achieving its goals	Support NPFC's SWG MSE PS in achieving its goals	Support NPFC's SWG MSE PS in achieving its goals	The SC/SSC PS supported NPFC's SWG MSE PS
Ecosystem approach to fisheries management						
Ecological Interactions	Understand ecological interactions among species in the North	Understand ecological interactions among species in the North	Understand ecological interactions among species in the North	Understand ecological interactions among species in the North	Understand ecological interactions among species in the North	

ITEM	2024	2025	2026	2027	2028	Progress
	Pacific Ocean	Pacific Ocean	Pacific Ocean	Pacific Ocean	Pacific Ocean	
Impacts of fishing on ecosystem components	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	No assessment of the impacts of fishing on bycatch or discards were reported.
Climate change	Consider possible key vulnerabilities and management implications of changing oceanographic conditions resulting from climate change on NPFC fisheries resources and species belonging to the same ecosystem or dependent upon or associated with target stocks.	Consider possible key vulnerabilities and management implications of changing oceanographic conditions resulting from climate change on NPFC fisheries resources and species belonging to the same ecosystem or dependent upon or associated with target stocks.	Consider possible key vulnerabilities and management implications of changing oceanographic conditions resulting from climate change on NPFC fisheries resources and species belonging to the same ecosystem or dependent upon or associated with target stocks.	Consider possible key vulnerabilities and management implications of changing oceanographic conditions resulting from climate change on NPFC fisheries resources and species belonging to the same ecosystem or dependent upon or associated with target stocks.	Consider possible key vulnerabilities and management implications of changing oceanographic conditions resulting from climate change on NPFC fisheries resources and species belonging to the same ecosystem or dependent upon or associated with target stocks.	SC discussed implications of climate change and received three presentations including Tools for incorporating climate change considerations into scientific advice by Tom Carruthers, a FAO consultancy report on climate change in the

ITEM	2024	2025	2026	2027	2028	Progress
	Make recommendations to help adapt to climate change and promote resilience in NPFC fisheries	Make recommendations to help adapt to climate change and promote resilience in NPFC fisheries	Make recommendations to help adapt to climate change and promote resilience in NPFC fisheries	Make recommendations to help adapt to climate change and promote resilience in NPFC fisheries	Make recommendations to help adapt to climate change and promote resilience in NPFC fisheries	North Pacific and Ongoing research activities PICES' Basin-scale Events to Coastal Impacts (BECI) project
Collaboration with other Organizations						
PICES	Review implementation of NPFC-PICES Framework for Collaboration; Consider renewing this Framework for another 5 years Review ICES-PICES WGSPF activities (PICES WG43)	Review implementation of NPFC-PICES Framework for Collaboration	Review implementation of NPFC-PICES Framework for Collaboration	Review implementation of NPFC-PICES Framework for Collaboration	Review implementation of NPFC-PICES Framework for Collaboration	SC reviewed implementation of NPFC-PICES Framework for Collaboration and endorsed its renewal SSC BFME reviewed PICES WG43 activities

ITEM	2024	2025	2026	2027	2028	Progress
	<p>Review ICES-PICES WGSPF activities (PICES WG53)</p> <p>Identify other opportunities for collaboration with PICES.</p>	<p>Review ICES-PICES WGSPF activities (PICES WG53)</p> <p>Identify other opportunities for collaboration with PICES.</p>	<p>Review ICES-PICES WGSPF activities (PICES WG53)</p> <p>Identify other opportunities for collaboration with PICES</p>	<p>Review ICES-PICES WGSPF activities (PICES WG53)</p> <p>Identify other opportunities for collaboration with PICES</p>	<p>Identify other opportunities for collaboration with PICES</p>	<p>SC reviewed PICES WG53 activities</p>
FAO	<p>Review NPFC's involvement with the ABNJ Deep-sea fisheries project</p> <p>Review NPFC's partnership with the Fisheries and Resources Monitoring System of FAO (FIRMS)</p>	<p>Review NPFC's involvement with the ABNJ Deep-sea fisheries project</p> <p>Review NPFC's partnership with the Fisheries and Resources Monitoring System of FAO (FIRMS)</p>	<p>Review NPFC's involvement with the ABNJ Deep-sea fisheries project</p> <p>Review NPFC's partnership with the Fisheries and Resources Monitoring System of FAO (FIRMS)</p>	<p>Review NPFC's involvement with the ABNJ Deep-sea fisheries project</p> <p>Review NPFC's partnership with the Fisheries and Resources Monitoring System of FAO (FIRMS)</p>	<p>Review NPFC's involvement with the ABNJ Deep-sea fisheries project</p> <p>Review NPFC's partnership with the Fisheries and Resources Monitoring System of FAO (FIRMS)</p>	<p>SC reviewed its collaboration with the ABNJ Deep-sea fisheries project</p> <p>SC reviewed its partnership with the Fisheries and Resources Monitoring System of FAO (FIRMS)</p>

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ITEM	2024	2025	2026	2027	2028	Progress
	and ongoing projects Identify and prioritize new projects and recommend sources of funding	and ongoing projects Identify and prioritize new projects and recommend sources of funding	and ongoing projects Identify and prioritize new projects and recommend sources of funding	and ongoing projects Identify and prioritize new projects and recommend sources of funding	and ongoing projects Identify and prioritize new projects and recommend sources of funding	completed and ongoing projects, and recommended new projects and sources of funding
Data Management						
	Review data inventories and the status of data gaps Review data standards in relation to stock assessment of priority species Discuss need for additional sources of data for scientific analyses and associated data	Review data inventories and the status of data gaps Review data standards in relation to stock assessment of priority species Discuss need for additional sources of data for scientific analyses and associated data	Review data inventories and the status of data gaps Review data standards in relation to stock assessment of priority species Discuss need for additional sources of data for scientific analyses and associated data	Review data inventories and the status of data gaps Review data standards in relation to stock assessment of priority species Discuss need for additional sources of data for scientific analyses and associated data	Review data inventories and the status of data gaps Review data standards in relation to stock assessment of priority species Discuss need for additional sources of data for scientific analyses and associated data	SC discussed data standards in relation to stock assessment of priority species. SC discussed the need for additional sources of data for scientific analyses and associated data management policy

ITEM	2024	2025	2026	2027	2028	Progress
	management policy	management policy	management policy	management policy	management policy	
Recommendations						
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	SC made recommendations for the Commission, TCC, and FAC
Media Communication						
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	SC drafted and endorsed a press release about SC activities during its SC09 meeting