North Pacific Fisheries Commission

3rd Meeting of the Small Scientific Committee on Pacific Saury
REPORT

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North Pacific Fisheries Commission
3rd Meeting of the Small Scientific Committee on Pacific Saury

13-16 April 2018
Tokyo, Japan

REPORT

Agenda Item 1. Opening of the meeting

1. The 3rd Meeting of the Small Scientific Committee on Pacific Saury (SSC PS03) took place in Tokyo, Japan on 13, 14, 16 April 2018, and was attended by Members from Canada, China, Japan, the Republic of Korea, the Russian Federation, Chinese Taipei, the United States of America, and Vanuatu. The Deep Sea Conservation Coalition (DSCC) attended as an observer. The meeting was opened by Dr. Toshihide Iwasaki (Japan) who served as the SSC PS Chair.

Agenda Item 2. Adoption of Agenda

2. The SSC PS03 agreed to add a new agenda item, "Review of data quality," as the new Agenda Item 6.1, with sub-items "Agenda Item 6.1.1 Catch statistics"; "Agenda Item 6.1.2 CPUE indices"; and "Agenda Item 6.1.3 Biomass index."

3. The revised agenda was adopted (Annex A).

Agenda Item 3. Meeting arrangements

4. Science Manager Dr. Aleksandr Zavolokin outlined the meeting arrangements.

Agenda Item 4. Review of Members' fisheries and research activities

5. China reported on its Pacific saury fisheries (NPFC-2018-AR-Annual Summary Footprint – Pacific saury (Rev. 1)). In 2017, China operated 55 fishing vessels in the Convention Area. The total catch was 48,458 tons. With regard to research activities, China has started collecting biological data as part of a fisheries-dependent survey.

6. Russia reported on its Pacific saury fisheries (NPFC-2018-AR-Annual Summary Footprint – Pacific saury (Rev. 1)). Russia explained that the difference between its catch data as compiled by the NPFC and its catch data as reported to the Food and Agriculture Organization of the United Nations (FAO) was due to the way in which catch is reported by Russian fishing vessel

owners. However, this does not pose an issue for the stock assessment because the stock assessment uses the catch data as reported to FAO, which has been reviewed and approved by the Russian Research Institute of Fisheries and Oceanography (VNIRO) and Federal Agency for Fishery. Russia also explained that it is currently reviewing the amount of catch taken from the Convention Area and catch taken from national waters. In addition, Russia reported that its catch had decreased in 2017, not only as a result of fewer fishing vessels and days, but also because of decreased CPUE.

7. Korea reported on its Pacific saury fisheries (NPFC-2018-AR-Annual Summary Footprint – Pacific saury (Rev. 1)). The total amount of catch for 2017 in the Convention Area and Russian waters were 12,471 and 2,882 tons, respectively. In 2017, Korea operated 13 Pacific saury fishing vessels and the total number of fishing days was 915.

8. Japan reported on its Pacific saury fisheries (NPFC-2018-AR-Annual Summary Footprint – Pacific saury (Rev. 1)). The preliminary estimate for the total amount of catch for 2017 was 84,528 tons. Japan operated 197 Pacific saury fishing vessels in national waters in 2017, which is fewer than in 2016, but the number of fishing days increased. Despite the increased overall effort, the catch amount decreased.

9. Chinese Taipei reported on its Pacific saury fisheries (NPFC-2018-AR-Annual Summary Footprint – Pacific saury (Rev. 1)). In 2017, Chinese Taipei operated 84 Pacific saury fishing vessels. The preliminary estimated catch for 2017 was 106,544 tons.

10. Vanuatu reported on its Pacific saury fisheries (NPFC-2018-AR-Annual Summary Footprint – Pacific saury (Rev. 1)). In 2017, Vanuatu made a similar fishing effort to 2016 but catch decreased to 4,437 tons. Vanuatu is currently not engaging in any research activities related to Pacific saury.

Agenda Item 5. Report and recommendations from the 2nd TWG PSSA meeting and intersessional work of the TWG PSSA

11. The Chair of the Technical Working Group on Pacific Saury Stock Assessment (TWG PSSA), Dr. Toshihide Kitakado (Japan), reported on the 2nd TWG PSSA meeting and the intersessional work of the TWG PSSA (NPFC-2017-TWG PSSA02-Final Report; NPFC-2018-SSC PS03-WP02-11).

12. The SSC PS03 adopted the report of the 2nd TWG PSSA meeting.

13. The SSC PS03 discussed the state of the stock assessment work. It recognized that the TWG PSSA has developed a good framework, consisting of an age-aggregated production model and three base case scenarios, and noted that the eventual goal is to conduct one integrated stock assessment for all Members.

Agenda Item 6. Update of the stock assessment using "provisional base models" (BSSPM)

6.1 Review of data quality

6.1.1 Catch statistics

14. China reported on its data collection system and coverage. The China Overseas Fisheries Association (COFA) collects commercial fisheries data via a log book system. Each vessel submits its log books to COFA, as well as weekly reports. Shanghai Ocean University collects scientific data and double-checks fishing positions using the Chinese government's vessel monitoring system (VMS). China has 100% data coverage.

15. Russia reported on its data collection system and coverage. Russia has an electronic reporting system and a VMS established by the Russian government. All vessels in national waters report their catch on a daily basis. Russia has 100% data coverage. Russia also operates an observer program.

16. Korea reported on its data collection system. Korea had two sources of catch information before September 2015, when the electronic logbook system was launched. The National Institute of Fisheries Science (NIFS) has collected the catch data by logbook, while Korean Overseas Fisheries Association (KOFA) has collected total catch data from fishing vessels. However, since the e-logbook system was launched, both total catch and logbook data are collected by e-logbook system, and its coverage is 100%.

17. Japan reported on its data collection system and coverage. Japan has two data collection systems: landing at ports (preliminary value) and official survey of the Ministry of Agriculture, Forestry and Fisheries (fixed data). It checks the data from the two sources against each other. The difference between preliminary and fixed data is less than 3%. The coverage of data is 100%. Official log books are also submitted one year after the completion of operations to verify positioning.

18. Chinese Taipei reported on its data collection system and coverage. Data is collected through an electronic log book system and from port landings. The data collected from the two sources are checked against each other. Chinese Taipei also operates a VMS. Data are reported daily. Data coverage is almost 100%. The data-holding organization is the Overseas Fisheries

Development Council.

19. Vanuatu reported on its data collection system and coverage. Some fishing vessels submit their catch log books each month, while others submit them after the completion of a fishing trip. Data coverage is 100%.

20. The Members discussed issues and concerns with respect to catch statistics used for Pacific saury stock assessment. They provided explanations and identified actions required to enhance catch data quality (Annex D).

21. The SSC PS03 recognized that there are uncertainties in Members' catch data and that it is necessary to continue to improve the quality of the data. In particular, China expressed concern that there may be a bias in the data, which could potentially result in a misinterpretation of the stock assessment results. China further expressed its concern on the frequent changes of the data in the annual reports of Japan and encouraged Japan to make efforts to clarify this issue. Japan pointed out that the difference in the data is less than 3% and has little effect on the stock assessment.

22. The SSC PS03 recommended that Members submit accurate catch data as soon as possible.

6.1.2 CPUE indices

23. CPUE indices were aggregated for stock assessment (NPFC-2018-SSC PS03-WP02) from CPUE standardization documents presented by China (NPFC-2018-SSC PS03-WP04), Russia (NPFC-2018-SSC PS03-WP08-09), Korea (NPFC-2018-SSC PS03-WP07), Japan (NPFC-2018-SSC PS03-WP05) and Chinese Taipei (NPFC-2018-SSC PS03-WP10).

24. The Members discussed issues and concerns with respect to the CPUE indices used for Pacific saury stock assessment. They provided explanations and identified actions required to improve the CPUE indices (Annex D).

6.1.3 Biomass index

25. Japan presented the biomass estimate from its fishery-independent surveys (NPFC-2018-SSC PS03-WP06).

26. The Members discussed issues and concerns with respect to the Pacific saury biomass index used for Pacific saury stock assessment. They provided explanations (Annex D).

6.2 Review of the existing model, stock assessment protocol and specification

27. The SSC PS03 reviewed and maintained the existing model, stock assessment protocol and specification.

6.3 Update of the analyses using a new set of data

28. The SSC PS03 updated the Pacific saury stock assessment, bearing in mind that there still exist data availability issues and technical issues with the CPUE standardization that remain unresolved.

29. China presented an update of the Pacific saury stock assessment using the Bayesian state-space production model (NPFC-2018-SSC PS03-WP12). China considered 11 scenarios (six scenarios using all available data that China considers to be the most likely and five alternative scenarios using the data proposed by individual Members). The six most likely scenarios showed relatively stable assessment results. Pacific saury did not experience overfishing. B/B_{MSY} ratio of Pacific saury showed a mixed picture depending on the scenarios. The q value for the survey biomass index was greater than 1. The results from the alternative scenarios were very sensitive to the input data and prior distributions of parameters.

30. Japan presented an update of the Pacific saury stock assessment using the Bayesian state-space production model (NPFC-2018-SSC PS03-WP13). The current median depletion level is within 13.4-20.8% of K for Japan's three base cases using data set 3 (CPUEs from Japan, Chinese Taipei and Russia, and Japan's biomass survey index). Also, the current median B_{2017}/B_{MSY} is 0.29-0.46. The current median F_{2017}/F_{MSY} is 1.77-2.30. The population is estimated as being severely depleted. A safer option would be the reduction of catch to keep the population at the current level or make it recover to a size above MSY. Given these results, Japan concluded that the Pacific saury population is overfished and the fishing pressure is in a state of overfishing, assuming that overfishing and overfished are defined as $F_{2017}/F_{MSY}>1.5$ and $B_{2017}/B_{MSY}<0.5$.

31. Chinese Taipei presented an update of the Pacific saury stock assessment using the Bayesian state-space production model (NPFC-2018-SSC PS03-WP14). In all models it examined, there was a declining trend for biomass since 2005. Although the absolute biomass estimates were sensitive to the uncertainty of survey q, the updated stock status is relatively pessimistic compared to the previous assessment. Given the current high fishing mortality and decreasing biomass trend, the stock will likely be severely depleted. Chinese Taipei believes that a precautionary approach to fishing effort control is needed.

32. The SSC PS03 agreed that the limit reference points have not been defined for Pacific saury, which prevents the determination of overfished or overfishing stock status.

33. Each Member who submitted a stock assessment for Pacific saury provided the model output in the table (Annex E) for three model scenarios, along with the Kobe plots for China and Japan's model outputs. The Kobe plot for Chinese Taipei's model output was not included as Members did not have sufficient time to review the sensitivity analyses. It was noted that model data sources may differ between assessment scenarios. Assessment details are available in working papers NPFC-2018-SSC PS03-WP12, NPFC-2018-SSC PS03-WP13, NPFC-2018-SSC PS03-WP14.

34. The SSC PS03 discussed the provided model output (Annex E) and agreed upon the following summary:

    i. There are wide variations in model output between the model configurations. The mean MSY estimates in the scenarios range from 37.7-57.6 (10^4 tons). The median MSY estimates in the scenarios range from 34.6-55.5 (10^4 tons). Mean F_{msy} estimates ranged from 0.11-0.68. Median F_{msy} estimates ranged from 0.10-0.53. Mean terminal year biomass in models with terminal year 2017 ranged from 41.6-260.8 (10^4 tons). Mean B_{2017}/B_{MSY} and F_{2017}/F_{MSY} ranged from 0.29-1.06 and 0.11-4.36, respectively. Median B_{2017}/B_{MSY} and F_{2017}/F_{MSY} ranged from 0.29-1.08 and 0.11-2.61, respectively.

    ii. The three model scenarios differed in their treatment of catchability (q) for the Japanese biomass survey. Model scenarios 1, 2, and 3 required catchability to be estimated but constrained to less than 1, fixed at 1, or estimated and allowed to be greater than 1, respectively. For all Members' base scenarios, models with q constrained to less than 1 had the highest estimates for B_{MSY}, B_{2017}/B_{MSY} and MSY, and models with q unconstrained had the lowest estimates for B_{MSY} and MSY. B_{2017} is the biomass in 2017. The reverse pattern was true for F_{MSY}.

    iii. Model scenarios submitted by Members differed in which CPUE indices were included in the models. Chinese model scenarios which included the 1980-1993 CPUE index from Japan estimated higher mean B_{MSY} and MSY than scenarios which did not include this index. Model scenarios excluding Chinese and Korean CPUE indices were presented in Japan's scenarios 1-3 and sensitivity scenario. Chinese Taipei updated its base case scenario and included the results in the table (Annex E).

35. Japan stated that 1980-1993 CPUE index is not appropriate because Japan considers that there are changes in catchability that cannot be standardized.

36. Canada, China and Korea stated the importance of making all the data available to all Members for the stock assessment.

6.4 Implication for management of Pacific saury fisheries

6.4.1 Stock biomass, fishing mortality and associated uncertainties

37. The SSC PS03 was unable to determine the stock status because uncertainties with the data remain unresolved, there is a lack of a standardized approach in terms of data usage and model configuration, and target and limit reference points have not been determined.

38. The SSC PS03 agreed on the importance of future projections of population dynamics. Some Members conducted and submitted future projections to the SSC PS03. However, the SSC PS03 decided not to include the future projections in this report because of the above uncertainties.

6.4.2 Biological reference points

39. The SSC PS03 agreed to maintain the MSY approach for the development of biological reference points, as discussed in the 1st Pacific Saury Stock Assessment Workshop.

40. The SSC PS03 recommended that the TWG PSSA seek the possibility to liaise with the Secretariat to conduct an initial literature review and survey of what kinds of target and limit reference points are used in short-lived pelagic species fisheries by other general RFMOs and other fishery management bodies, and requested that the SC set target and limit reference points for Pacific saury based on the TWG PSSA's work.

41. The SSC PS03 recommended that the determination of target and limit reference points should be done in conjunction with the development of harvest control rules with managers.

6.4.3 Risk analyses of alternative catch levels

42. The SSC PS03 recommended that risk analyses of alternative catch levels should be conducted in conjunction with the development of harvest control rules.

43. Japan noted that in the stock assessment report by Japan (NPFC-2018-SSC PS03-WP13), the population dynamics of Pacific saury were projected forward under some scenarios with respect to several levels of reduction/increase of catch as well as status quo. These figures are

generally useful for considering management implications *inter alia* for setting the catch limit. Japan's results showed that a continuation of the current level of catch causes a further decline in the population size to a severely depleted level. Japan therefore expresses its disappointment that the SSC PS03 was not able to reach any agreement to leave figures of future projections in the report due to the objection by some Members.

44. China stated that no conclusion can be made regarding stock status and projection. Pacific saury is a short-lived pelagic species with its stock status being more likely regulated by environmental conditions.

6.5 Possible improvements of the models within BSSPM

45. The SSC PS03 suggested that the models within the BSSPM could be improved by considering the inclusion of environmental variables, agreeing on common data sets, and integrating the results of the different models.

46. The SSC PS03 compiled a preliminary data template for initiating discussions on developing a single joint CPUE index, which may be amended at a later date based on intersessional discussions (Annex F).

47. The SSC PS03 agreed to consider developing other stock assessment models using more spatial/temporal information or age-structured models in the future.

6.6 Recommendations for future works

48. Based on the above discussions, the SSC PS03 recommended the following as possible future work:
    a. Continue to review and improve the quality of the data (see Annex D).
    b. Continue to improve CPUE standardizations.
    c. Hold further discussions on the possible inclusion of area-weighted CPUE in the CPUE standardization protocol.
    d. Develop a single joint CPUE index.
    e. Develop a standardized approach for conducting future projections.
    f. Recommend that the TWG PSSA seek the possibility to liaise with the Secretariat to conduct an initial literature review and a survey of what kinds of target and limit reference points are used in short-lived pelagic species fisheries by other general RFMOs and fishery management bodies.
    g. Develop harvest control rules in conjunction with managers.
    h. Determine fixed data sets and their usage for stock assessment.

Agenda Item 7. Review of CMM 2017-08 for Pacific saury

49. The SSC PS03 reviewed CMM 2017-08 and discussed whether or not revisions were necessary.

50. Japan proposed adopting a precautionary approach to sustain the Pacific saury stock and fishery based on spatial distribution of immature age-0 fish (NPFC-2018-SSC PS03-WP01). Based on its scientific surveys, Japan found clear differences in the spatial distributional patterns between age-0 and age-1 fish, and that age-0 fish tend to be distributed in more eastern areas. Japan believes it is necessary to avoid the further eastward expansion of fishing grounds to protect immature age-0 fish and maintain the sustainability of the fishery. Chinese Taipei supported setting a precautionary approach and suggested that the boundary could be considered at 170^0E due to large variations of age-0 fish distributions among years.

51. As the SSC PS03 has not yet made a decision on the stock status of the Pacific saury, the SSC PS03 left CMM 2017-08 unchanged at this point in time.

52. Japan stated that it has a strong concern over the decline in Pacific saury stock. The stock assessment results by Japan clearly show that the stock status is no longer healthy. A series of abundance indices and survey information shows pessimistic results. This indicates conservation measures set by CMM 2017-08 are insufficient. Japan states that there is an urgent need to strengthen the management measures of CMM 2017-08 to reduce the fishing mortality on the stock.

53. China stated that the current stock status of Pacific saury is not determined and did not experience overfishing from China's stock assessment. The current CMM 2017-08 is sufficient.

Agenda Item 8. Data collection and management

8.1 Fisheries information templates

54. Korea reported on progress made in the development of fisheries information templates for Pacific saury. The Members agreed on the revised template (Annex G) and the template development work has been completed.

8.2 Data security and sharing

55. The Science Manager presented the Interim Guidance for Management of Scientific Data Used in Stock Assessments, explained the data-related recommendations made by the TWG PSSA and encouraged the SSC PS to consider possible revision of the Interim Guidance.

56. The SSC PS03 reviewed the Interim Guidance for Management of Scientific Data Used in Stock Assessments and had no revisions.

57. Russia suggested replacing all vessel names and other sensitive information with hash values when sharing data for Pacific saury stock assessment. Japan explained that it needs to consult with managers before being able to endorse such a recommendation.

Agenda Item 9. Review/update of the 2017-2021 Work Plan

58. The SSC PS03 reviewed the 2017-2021 Work Plan and updated it as detailed in NPFC-2018-SC03-WP07.

Agenda Item 10. Scientific projects

10.1 Ongoing/planned projects

10.1.1 Stock assessment meetings

10.1.2 Spatial/temporal map of Members' catch and effort

10.1.3 Expert to review Pacific saury stock assessment

10.2 New projects

59. The SSC PS03 reviewed the list of projects and updated it as detailed in NPFC-2018-SC03-WP07.

Agenda Item 11. Other matters

60. No other matters were discussed.

Agenda Item 12. Recommendations to the Scientific Committee

61. The SSC PS03 recommends the following to the SC:
    a. The SSC PS03 requests the SC to endorse the revised CPUE Standardization Protocol for Pacific Saury.
    b. The SSC PS03 recognized the necessity to share data for the Pacific saury stock assessment, and agreed that such data should only be shared within the TWG PSSA and be disseminated in accordance with the Interim Guidance for Management of Scientific Data used in Stock Assessments.
    c. The SSC PS03 agreed to create a joint spatial/temporal map of Members' catch and effort on Pacific saury with a spatial resolution of one degree grids and a temporal resolution of one month. The Corresponding Group on Data Collection Template for Pacific saury will conduct this work.
    d. The SSC PS03 agreed to move forward in a new direction to aggregate catch and effort data over Member's fishery to draw a single joint CPUE index to resolve different patterns

in standardized indices among Members and to increase spatial and temporal coverage of catch and effort data. The SSC PS03 agreed to share catch and effort data by month and one degree grids, and to conduct a CPUE standardization based on the data after the 2018 SC meeting.

e. The SSC PS03 endorsed the updated 2017-2021 SSC PS Work Plan (NPFC-2018-SC03-WP07).
f. The SSC PS03 requested the SC to consider revision of the 2017-2021 Work Plan with regards to detailed processes to enable the TWG PSSA to fulfil its duties more efficiently.
g. The SSC PS03 endorsed the updated list of projects from the SSC PS as detailed in NPFC-2018-SC03-WP08.
h. The SSC PS03 agreed to hold a data preparation meeting in November or December 2018 for finalizing data sets for CPUE, biomass index, and catch series, and stock assessment meeting in the first quarter of 2019.
i. The SSC PS03 requests the SC to set limit and target reference points and develop harvest control rules in conjunction with managers.
j. The SSC PS03 endorsed the data information template for Pacific saury (Annex G).

Agenda Item 13. Next meeting

62. The SSC PS03 requests the guidance of the SC for determining the date and location of the next meeting.

Agenda Item 14. Adoption of the Report

63. The SSC PS03 Report was adopted by consensus.

Agenda Item 15. Close of the Meeting

64. The SSC PS03 closed at 20:21 on 16 April 2018.

Annex A – Agenda
Annex B – List of Documents
Annex C – Participants List
Annex D – Summary of the discussions on data quality (Agenda Item 6.1)
Annex E – Summary of the estimated key parameters and Kobe plots by China, Japan, and Chinese Taipei
Annex F – Prototype of the template for data sharing for a single joint CPUE index and a spatial/temporal map of Members' catch and effort on Pacific saury
Annex G – Data information template for Pacific saury

Annex A

AGENDA

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Agenda Item 3. Meeting arrangements

Agenda Item 4. Review of Member's fisheries and research activities

Agenda Item 5. Report and recommendations from the 2nd TWG PSSA meeting and intersessional work of the TWG PSSA

Agenda Item 6. Update of the stock assessment using "provisional base models" (BSSPM)

- 6.1 Review of data quality
  - 6.1.1 Catch statistics
  - 6.1.2 CPUE indices
  - 6.1.3 Biomass index
- 6.2 Review of the existing model, stock assessment protocol and specification
- 6.3 Update of the analyses using a new set of data
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Agenda Item 7. Review of the CMM 2017-08 for Pacific saury

Agenda Item 8. Data collection and management

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Annex B

LIST OF DOCUMENTS

MEETING INFORMATION PAPERS

Number	Title
NPFC-2018-SC03-MIP01 (Rev 2)	Meeting Information
NPFC-2018-SSC PS03-MIP02	Provisional Agenda
NPFC-2018-SSC PS03-MIP03	Provisional Annotated Agenda
NPFC-2018-SSC PS03-MIP04	Indicative Schedule

REFERENCE DOCUMENTS

Symbol	Title
https://www.npfc.int/cmm-2017-08-pacific-saury-click-link	CMM 2017-08 for Pacific Saury

WORKING PAPERS

Symbol	Title
NPFC-2018-SSC PS03-WP01	Consideration of precautionary approach to sustain the Pacific saury stock and fishery based on spatial distribution of immature age-0 fish
NPFC-2018-SSC PS03-WP02	Pacific Saury Data for Stock Assessment
NPFC-2018-SSC PS03-WP03	Compiled data on Pacific saury catches in the northwestern Pacific Ocean
NPFC-2018-SSC PS03-WP04	Standardization of CPUE data of Pacific saury (*Cololabis saira*) caught by the Chinese stick-held dip net fishery
NPFC-2018-SSC PS03-WP05	Standardization of CPUE data of Pacific saury (*Cololabis saira*) caught by the Japanese stick-held dip net fishery during 1994 to 2017
NPFC-2018-SSC PS03-WP06	Pacific saury biomass estimated using fishery independent surveys by Japan with special consideration to uncertainties among stratification designs

NPFC-2018-SSC PS03-WP07	CPUE standardization of the Pacific saury (*Cololabis saira*) for the Korean stick-held dip net fishery in the Northwest Pacific Ocean
NPFC-2018-SSC PS03-WP08	CPUE standardization for the Pacific saury Russian catches in the Northwest Pacific Ocean
NPFC-2018-SSC PS03-WP09	CPUE standardization for the Pacific saury international catches in the Russian EEZ in the Northwest Pacific Ocean
NPFC-2018-SSC PS03-WP10	CPUE standardization of Pacific saury (*Cololabis saira*) for the Taiwanese stick-held dip net fishery in the Northwestern Pacific Ocean
NPFC-2018-SSC PS03-WP11	Summary of the TWG PSSA intersessional work to update Pacific saury abundance indices
NPFC-2018-SSC PS03-WP12	Updates of Pacific saury (*Cololabis saira*) stock assessment in the North Pacific Ocean (China)
NPFC-2018-SSC PS03-WP13	2018 updates of stock assessment for Pacific saury in the North Pacific Ocean by using Bayesian state-space production models (Japan)
NPFC-2018-SSC PS03-WP14	Stock assessment of Pacific saury (*Cololabis saira*) in the Western North Pacific Ocean through 2016 (Chinese Taipei)

ANNUAL REPORTS

Symbol	Title
NPFC-2018-AR Canada	2017 Annual Report of Canada
NPFC-2018-AR China	2017 Annual Report of China
NPFC-2018-AR Japan (Rev. 2)	2017 Annual Report of Japan (Rev. 2)
NPFC-2018-AR Korea	2017 Annual Report of Republic of Korea
NPFC-2018-AR Chinese Taipei	2017 Annual Report of Chinese Taipei
NPFC-2018-AR Russia	2017 Annual Report of Russian Federation
NPFC-2018-AR United States of America	2017 Annual Report of United States of America
NPFC-2018-AR Vanuatu	2017 Annual Report of Vanuatu
NPFC-2018-AR-Annual Summary Footprint – Pacific saury (Rev. 1)	2017 – Annual summary footprint for Pacific saury in the NPFC Area of Competence

REPORTS FROM WORKING GROUPS AND SSCs

Symbol	Title
NPFC-2017-TWG PSSA02-Final Report	Report of the 2nd TWG PSSA meeting

Annex C

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Annex D

Summary of the discussions on data quality (Agenda Item 6.1)

Issue	Note/Explanation	Action
Catch		
Gap in China's catch data for the 2003-2011 period	China explained that the data for this period has been aggregated and submitted to the Ministry of Agriculture, and that once it is reviewed and approved, China will report it to the NPFC. Furthermore, China explained that only one or two Chinese fishing vessels operated during this period and that they were only engaged in experimental fishing, not full-scale commercial fishing. The catch level was therefore very low.	China will report catch data for the 2003-2011 to the NPFC once it is reviewed and approved.
Frequent changes of Japan's statistics, including unexplained changes in historic catch levels between different annual reports.	Japan explained that it takes time to double check the data from the two sources and therefore it first reports a preliminary value before reporting a fixed value at a later date. Japan also explained that the review of NW and CA data for 2015 and 2016 are almost complete, and that if any changes are made to the data, which is unlikely, they will be minor. Furthermore, Japan explained that the 2017 catch statistics will likely be confirmed in a year.	Japan stated that it will make an effort to improve its data collection and reporting system. SSC PS03 recommends establishing a mechanism whereby when Members make updates or notice updates made by other Members, they should notify the Secretariat, which will in turn notify all Members.
Amendments of catch statistics of Japan for 2016, Russia for 2014 to 2016, and Chinese Taipei for 2016	Japan explained that the initially-reported amount was a provisional estimate based on port landing, while the updated amount is the final, fixed data based on interviews with fishermen. Russia explained that the initially-reported amounts are based on the data from Russia's Center of Fishery	Discuss data updating guidelines in the data preparatory meeting.

	Monitoring and Communication, while the updated amounts are the final official figures reported to the FAO. Chinese Taipei explained that the change was less than 500 tons, and that it updated the amount after cross-checking e-log book data and landing data.	
CPUE index		
China shifted from experimental fisheries to full-scale commercial fisheries in 2012, with an increase in the number of Chinese vessels fishing Pacific saury, and that this should be addressed in the standardization.	Japan suggested either separating the CPUE data into two time series, one for 2003-2011 and the other for 2012 onwards, or simply eliminating the data for the 2003-2011 period. China disagreed, pointing out that the size of the vessels remained the same in the two periods, and that the increase in effort and catch efficiency only increased gradually, rather than suddenly, from 2012 onwards.	
Korea eliminated certain data due to uncertainties they contained. The nominal CPUE and its trend changed.	Japan considers it difficult to make judgments about Korea's CPUE standardization and that this standardization should not be included in the stock assessment.	Korea expressed its willingness to work with other Members to improve the quality of its CPUE standardization.
Concern over Japan's decision to eliminate the CPUE data from 1980 to 1993.	Japan explained that from the 1980s, the size structure of Japanese vessels changed significantly. Furthermore, new fishing technologies were introduced among Japanese vessels from the 1970s onwards, increasing their fishing efficiency. However, vessels' equipment records from before the mid-1990s are not available. Therefore, Japan determined that the data from 1980 to 1993 is likely to be biased and decided to eliminate the data from this period.	No consensus with respect to the action required. The concerned Members believed that, nonetheless, this data should be made available to the Commission. Another Member pointed out that, if Members will include this data in the CPUE standardization, they need to be very careful, as no Members other than Japan have data for this time period. Some Members recommended that, for the stock assessment,

		Members should follow the same method as Russia, which provided all historic data for consideration of the Commission, independent of what data it incorporated into its own CPUE.
Concern about Members' validation of conventional model selection criteria, e.g. AIC, BIC or R2, for CPUE standardization.	China recommended that all Members make their GLM and GAM estimates and results available.	
Biomass index		
Stratification design of the survey	China pointed out that Japan is applying post-stratification, which is not common for estimating biomass index. China recommended that Japan apply random stratification before conducting its survey. Japan explained that because the sea surface temperature fluctuates every year, it is difficult to decide on the survey points before the start of the survey.	

Annex E

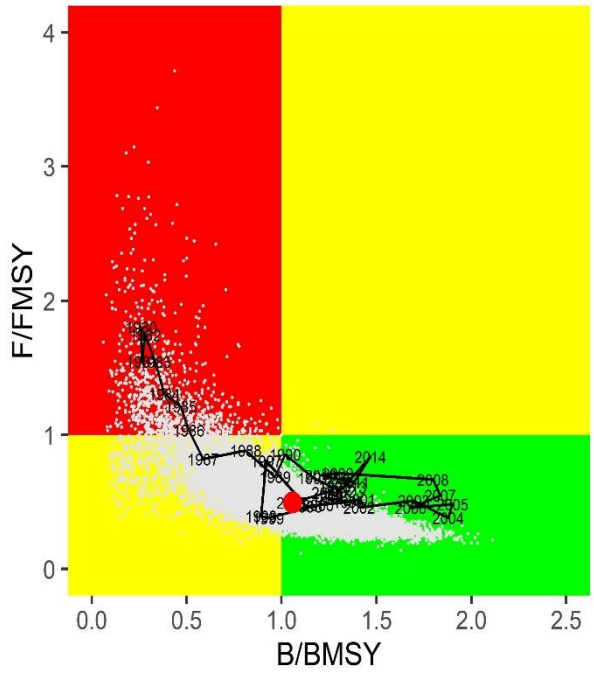
Summary of the estimated key parameters and Kobe plots by China, Japan, and Chinese Taipei

		China			Japan			Chinese Taipei		
Scenarios	Parameters	Mean	Median	CV	Mean	Median	CV	Mean	Median	CV
1	K (10000 mt)	648.02	565.15	0.47	853.9	722.4	0.493	500.10	477.90	0.23
	r	1.86	1.5	0.7	0.718	0.400	1.027	0.70	0.56	0.75
	Shape	0.41	0.19	2	0.592	0.376	0.945	0.63	0.52	0.72
	B1980/K (B1994/K)	0.11	0.11	0.43	0.459	0.431	0.475	0.80	0.60	0.84
	MSY (10000 mt)	57.59	55.52	0.29	37.7	34.6	0.638	42.47	41.33	0.34
	Fmsy	0.23	0.23	0.27	0.114	0.1	0.668	0.22	0.21	0.45
	Bmsy (10000 mt)	273.11	234.3	0.57	379.7	322.0	0.511	226.80	217.90	0.23
	B1980 (B1994)	66.99	60.75	0.44	305.3	273.3	0.368	394.90	294.60	0.86
	B2017	260.81	251	0.22	153.0	137.0	0.361	169.00	162.30	0.24
	F1980 (F1994)	0.41	0.39	0.37	0.119	0.122	0.253	0.11	0.08	1.17
	F2017	0.11	0.11	0.19	0.188	0.193	0.244	0.18	0.18	0.25
	B2017/K	0.44	0.45	0.25	0.214	0.208	0.454	0.35	0.34	0.25
	B2017/Bmsy	1.06	1.08	0.26	0.490	0.460	0.487	0.77	0.75	0.26
	F2017/Fmsy	0.11	0.11	0.19	2.319	1.765	0.756	1.01	0.86	0.71
	Assumption of q	q~U(0,1)			q~U(0,1)			1/q~gamma(0.01,0.01)		
	q	0.87	0.9	0.13	0.779	0.82	0.221	0.86	0.89	0.13
2	K (10000 mt)	542.75	493.5	0.39	755.8	602.8	0.540	454.90	433.40	0.22
	r	1.91	1.58	0.66	0.751	0.443	0.976	0.71	0.57	0.73
	Shape	0.38	0.2	1.76	0.612	0.404	0.908	0.67	0.55	0.71
	B1980/K (B1994/K)	0.12	0.11	0.41	0.409	0.38	0.511	0.79	0.60	0.83
	MSY (10000 mt)	54.24	53.24	0.24	37.9	35.6	0.545	40.81	39.97	0.30
	Fmsy	0.25	0.26	0.24	0.131	0.117	0.593	0.23	0.22	0.43
	Bmsy (10000 mt)	227.55	205.2	0.47	337.8	273.8	0.556	207.90	200.00	0.22
	B1980 (B1994)	59.12	54.16	0.41	222.5	217.4	0.137	354.10	268.90	0.86
	B2017	223.84	222.3	0.15	111.1	109.7	0.110	143.30	140.70	0.18
	F1980 (F1994)	0.46	0.44	0.35	0.152	0.153	0.126	0.12	0.09	1.06
	F2017	0.12	0.12	0.15	0.241	0.242	0.105	0.21	0.21	0.20
	B2017/K	0.44	0.45	0.23	0.186	0.182	0.449	0.33	0.32	0.25
	B2017/Bmsy	1.06	1.08	0.24	0.421	0.403	0.472	0.72	0.70	0.26
	F2017/Fmsy	0.51	0.47	0.38	2.461	1.980	0.660	1.10	0.95	0.63
	Assumption of q	q=1			q=1			q=1		
	q	1	1	0						
3	K (10000 mt)	205.24	186.9	0.47	534.8	384.7	0.723	207.00	188.90	0.42
	r	2.31	2.06	0.53	0.956	0.694	0.720	1.00	0.91	0.50
	Shape	0.75	0.35	1.63	0.716	0.556	0.779	1.13	0.98	0.62
	B1980/K (B1994/K)	0.16	0.14	0.43	0.298	0.273	0.575	0.66	0.54	0.68
	MSY (10000 mt)	44.09	43.35	0.13	49.1	42.9	0.509	40.01	39.91	0.13
	Fmsy	0.54	0.53	0.31	0.243	0.237	0.393	0.68	0.55	0.93
	Bmsy (10000 mt)	89.83	81.85	0.45	242.4	175.7	0.716	101.60	93.99	0.37
	B1980 (B1994)	27.66	25.13	0.4	107.8	94.0	0.440	139.90	101.30	0.94
	B2017	67.79	62.69	0.45	53.8	47.1	0.431	41.64	35.97	0.55
	F1980 (F1994)	0.98	0.95	0.33	0.344	0.354	0.274	0.48	0.05	2.02
	F2017	0.48	0.42	0.5	0.545	0.562	0.264	3.27	1.33	1.09
	B2017/K	0.34	0.35	0.3	0.134	0.134	0.498	0.20	0.19	0.30
	B2017/Bmsy	0.77	0.77	0.31	0.292	0.289	0.509	0.57	0.54	0.27
	F2017/Fmsy	0.88	0.81	0.38	2.519	2.295	0.417	4.36	2.61	0.92
	Assumption of q	q~U(0,3)			q~U(0,3)			1/q~gamma(0.01,0.01)		
	q	3.83	3.58	0.39	2.279	2.403	0.243	3.92	3.73	0.40
Sensitivity	K (10000 mt)	226.21	208.4	0.38	315.0	206.6	0.964	221.80	204.00	0.41
test	r	2.25	1.99	0.54	1.308	1.227	0.483	0.99	0.88	0.54
	Shape	0.59	0.34	1.36	0.933	0.867	0.625	1.07	0.92	0.63
	B1980/K (B1994/K)	0.15	0.13	0.4	0.275	0.262	0.502	0.66	0.53	0.70
	MSY (10000 mt)	45.26	44.54	0.12	52.0	47.2	0.476	40.21	39.90	0.14
	Fmsy	0.5	0.49	0.28	0.509	0.47	0.515	0.61	0.51	0.84
	Bmsy (10000 mt)	98.4	90.98	0.36	145.2	98.2	0.917	108.10	100.30	0.37
	B1980 (B1994)	29.72	27.06	0.41	64.7	48.5	1.036	149.30	108.30	0.95
	B2017	97.97	89.52	0.43	34.6	25.8	1.031	56.85	48.06	0.61
	F1980 (F1994)	0.91	0.88	0.34	0.733	0.686	0.490	0.42	0.25	1.98
	F2017	0.32	0.3	0.4	1.089	1.024	0.493	1.97	0.80	1.44
	B2017/K	0.44	0.44	0.25	0.135	0.137	0.443	0.25	0.24	0.36
	B2017/Bmsy	1	1	0.24	0.279	0.274	0.451	0.51	0.48	0.38
	F2017/Fmsy	0.32	0.3	0.4	2.286	2.121	0.345	2.75	1.69	1.12
	Assumption of q	No biomass indices used			No biomass indices used			No biomass indices used		
	q	1980-2017			1994-2017			1980-2017		
	Catch data	1980-2017			1994-2017			1980-2017		
	Abudance indices	JPN CPUE I (1980-1993) JPN CPUE II (1994-2017) CT CPUE (2003-2016) CHN CPUE (2003-2017) KOR CPUE (2001-2016) RUS CPUE I (1994-2002) RUS CPUE II (2003-2017) JPN Biomass (2003-2017)			JPN_CPUE (1994-2017) RUS_CPUE_only (1994_2017) CT_CPUE (2001-2016) JPN_Biomass (2003-2017)			JPN (1994-2017) RUS_only (1994-2017) KR (2001-2016) CN (2003-2017) CT (2001-2016) JPN_Biomass (2003-2017)		

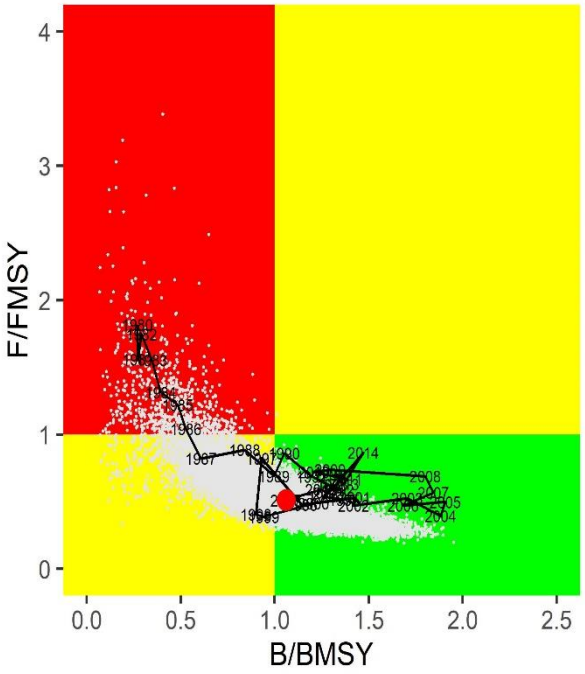
Note: For the consistency of metrics among various members, Chinese Taipei has provided the assessment outputs until 2017.

CHINA

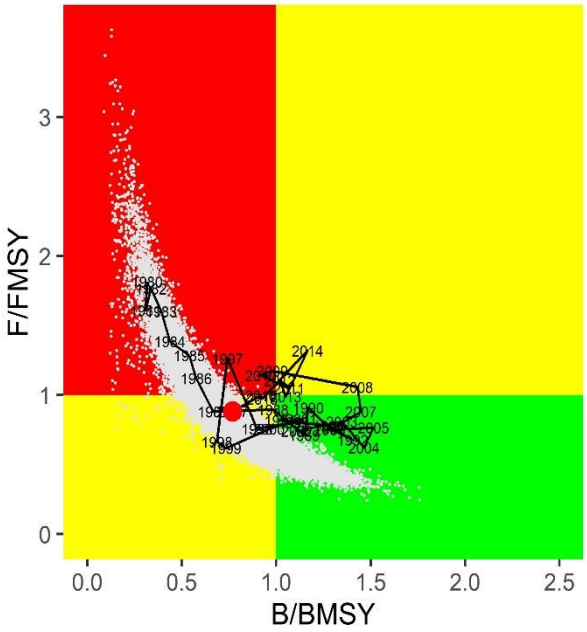
Model 1



Model 2

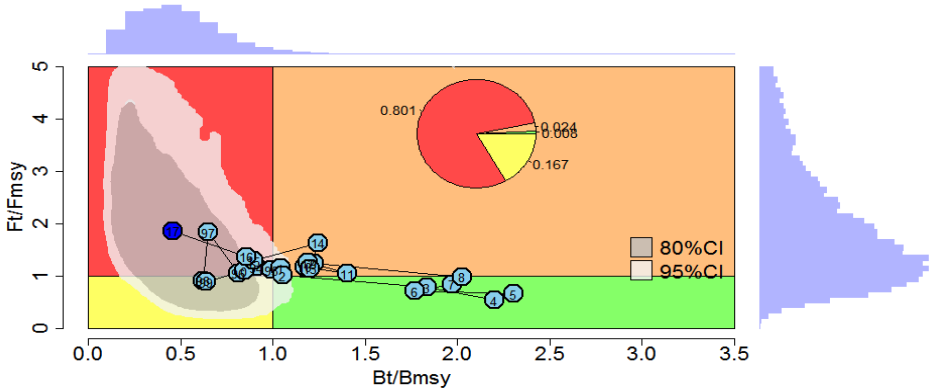


Model 3



JAPAN

Model 1



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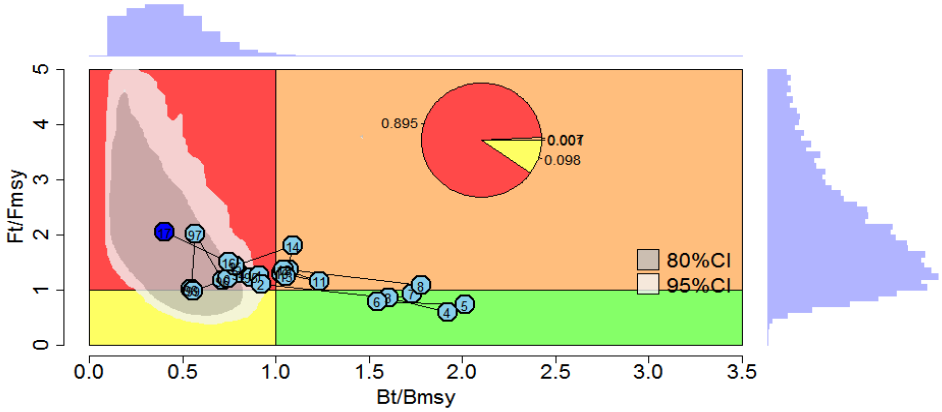

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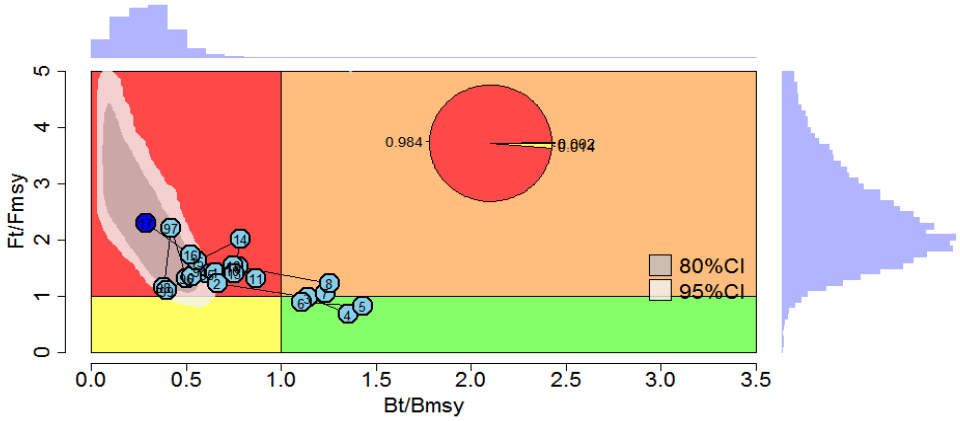


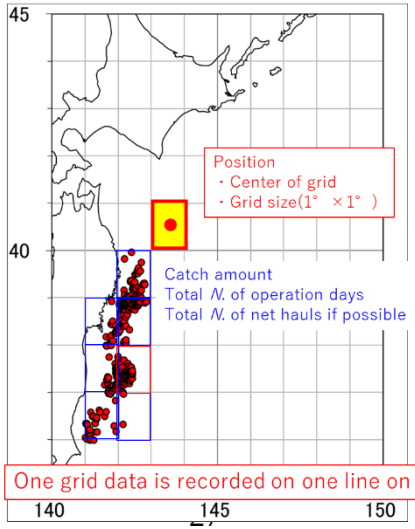
Annex F

Prototype of the template for data sharing for a single joint CPUE index and a spatial/temporal map of Members' catch and effort on Pacific saury

Member	Year	Month	Duration Month Early Middle Late Date	Center of grid		Mesh size of Grid	Catch amount (metric ton)	Effort		Remarks	Estimated catch by ages (N. Individuals)		Measurement length select (FL, TL, KnL, BL)	Estimated catch by length class in each 1cm (N. Individuals)																											
				Latitude (°N)	Longitude (°E)			Total operation days for all vessels	Total net hauls for all vessels		Age-0	Age-1		<15	15≤	16≤	17≤	18≤	19≤	20≤	21≤	22≤	23≤	24≤	25≤	26≤	27≤	28≤	29≤	30≤	31≤	32≤	33≤	34≤	35≤
Japan	2019	Oct.	Early	36.30	141.30	0.5°	348	11	105	Example	3,265	641,993	KnL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,453	######	######	######	######	0	0	0
Japan	2019	Oct.	Month	37.30	141.30	1.0°	2,425	98	968	Example	258,504	3,711,067	KnL	0	0	0	0	0	17,725	0	0	0	######	2,092	######	######	######	######	######	######	######	######	0	0	0
Japan	2019	Oct.	Month	37.30	142.30	1.0°	4,437	138	1,170	Example	52,193	1,093,407	KnL	0	0	0	0	0	0	0	0	0	0	0	0	######	######	######	######	######	######	######	###	0	0
Japan	2019	Oct.	Month	37.30	141.30	1.0°	6,253	498	5,526	Example	45,912	1,997,132	KnL	0	0	0	0	0	0	0	0	0	0	4,339	0	27,293	0	39,023	######	######	######	95,128	0	0	0
Japan	2019	Oct.	Month	38.30	142.30	1.0°	964	22	146	Example	290,628	1,138,466	KnL	0	0	0	0	#######	13,741	0	0	41,224	13,741	0	27,483	68,706	68,706	######	######	######	######	27,483	0	0	0
Japan	2019	Oct.	Month	39.30	142.30	1.0°	1,576	30	350	Example	110,008	2,326,253	KnL	0	0	0	0	0	0	0	0	0	0	0	0	36,487	12,162	######	######	######	######	83,507	0	0	0

Required item
If possible

hexadecimal number
37° 30' ⇒ 37.30
145° 30' ⇒ 145.30



One grid data is recorded on one line on the table

Annex G

Data information template for Pacific saury

Stick-held-dip net fishing information format

No.	Items	Example
1	**Vessel flag**	KR
2	**Vessel name**	77Dongnam
3	**Vessel call sign (if allocated)**	1ABC
4	**Vessel Reg No**	xxxxxxxx-xxxxxxx
5	**Lloyd's/ IMO Number (if allocated)**	xxxxxxx
6	**Light bulb types (traditional/ LED)**	traditional
7	**(if traditional bulb) Total light power (kW)**	xxx kW
8	**Date of Fishing Activity: date and time (UTC or Local time)**	4/14/18 12:00 AM
9	**Fishing position : latitude (DD,MM.mm)**	44, 10.10
10	**Fishing position : longitude (DD,MM.mm)**	153, 10.10
11	**Sea Temperature (°C)**	15
12	**Number of haul**	3
13	**Species code (FAO 3-alpha code) include bycatch species**	SAP
	Retained: Live weight (kg)	3000
	Discarded: Live weight (kg)	0
14	**(Bycatch) Species code (FAO 3-alpha code)**	OFJ
	Retained: Live weight (kg)	0
	Discarded: Live weight (kg)	10

Biological Data Collection

No.	Items	Example
1	**Sampled location (fleet/port/lab)**	fleet
2	**Fishing Date or Fishing position**	4/14/18 12:00 AM
3	**Length (FL,BL,TL in cm)**	FL 15
4	**Sex**	M (Male), F (Female), U (Unknown), I (Indeterminate)
5	**Maturity Stage**	1 (Immature), 2 (Developing/Resting), 3 (Developed), 4 (Ripe), 5 (Spent)
6	**Age (if possible)**	1