Secretariat of the Pacific Community

6th SPC Heads of Fisheries Meeting
(9–13 February 2009, Noumea, New Caledonia)

Working Paper 8

Original: English

Increased demands for tuna fisheries data management in Pacific Island member countries

Marine Resources Division
Secretariat of the Pacific Community
Noumea, New-Caledonia

www.spc.int/mrd

Increased demands for tuna fisheries data management in Pacific island member countries

January 2009

Oceanic Fisheries Programme
Secretariat of the Pacific Community
Noumea, New Caledonia

CONTENTS

Summary

1.   Member countries and territories of the Secretariat of the Pacific Community (SPC) have been collecting data from their tuna fisheries since the 1970s. During this time, the SPC Oceanic Fisheries Programme (SPC-OFP) and its predecessor programmes have provided a number of data management services to ensure that data of an appropriate quality and accuracy are available on a timely basis. These data have been used for both national requirements and regional research and monitoring (e.g., regional stock assessments).

2.   In recent years, several factors have resulted in increased demands for tuna fisheries data management, both within the OFP and the national fisheries offices of SPC members. The main factors are (i) the increase in fishing activity and the types of tuna fishery data collected and (ii) the need to satisfy the data-reporting obligations as members of the Western and Central Pacific Fisheries Commission (WCPFC). In addition to these factors, the adoption of certain Conservation and Management Measures (CMMs) at the most recent WCPFC meeting, and recent decisions by the Parties to the Nauru Agreement (PNA), will require a considerable increase in observer activity, which will result in an increase in the amount of observer data to be collected and subsequently managed in the future.

3.   The SPC-OFP and national fisheries offices are currently facing important challenges to satisfy the requirements for tuna fishery data management and the most important problem is the lack of adequate resources to undertake the work required.

4.   Several specific recommendations to address these challenges are provided in this paper. Each SPC member has its own data management problems and it is recommended that a more formal review process (facilitated by the SPC-OFP) be developed to find the most efficient and effective solutions for data management in each country. The data management work undertaken by the SPC-OFP has increased substantially over the past decade without a corresponding increase in the resources required to undertake the work. To ensure that the SPC-OFP can effectively provide appropriate data management services in the near future, it is recommended that an additional data entry position and a new technical (auditing) position be recruited as soon as possible.

1.   Introduction

5.   Members of the Secretariat of the Pacific Community (SPC) have been collecting data from their tuna fisheries since 1970s. Until the early 1990s, the main type of data collected were Logsheets which were completed and submitted by vessels as a condition of their license. Since 1995, there has been a gradual increase in the collection of other important types of data, including port sampling and observer data. Observer data, in particular, provide considerably more detail of fishing activities and the catch than logsheets (at least 10 times the volume of data) and therefore require more resources to manage.

6.   In addition to the need to collect new types of data, fishing activities and catch have gradually increased in the waters of member countries over the past 20 years (Figure 1) – purse-seine fishing in particular has grown considerably during this period. The increase in fishing activity has resulted in a corresponding increase in the amount of data collected and subsequently managed.

7.   The data-reporting obligations [1] placed on member countries of the newly-establishment Western and Central Pacific Fisheries Commission (WCPFC) have also resulted in increased demands on SPC members with respect to data collection and management. In particular, the most recent WCPFC Commission Meeting[2], held in Busan, Korea over the 8-12 December 2008, adopted certain Conservation and Management Measures (CMMs) that will require a considerable increase in observer activity, which will result in a considerable increase in the amount of observer data to be collected and subsequently managed in the future.
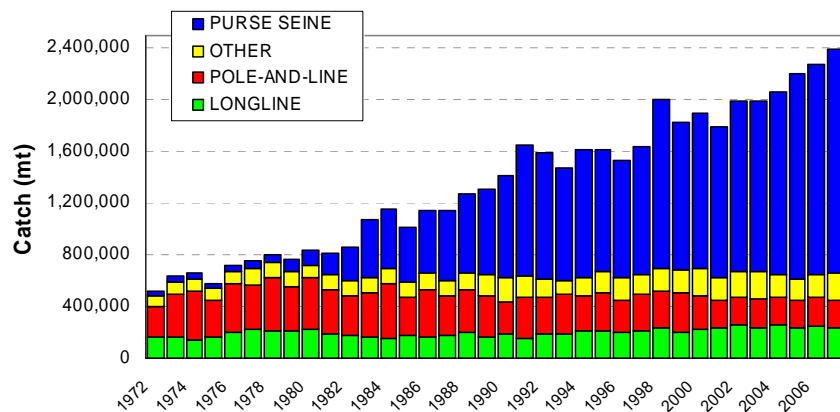

Figure 1. Annual tuna catch in the WCPFC Convention Area, by gear

8.   The various types of data collected provide invaluable information on the status of the fishery. For example, at the national level, tuna fishery data allow member countries to monitor trends in catch and effort levels in their waters which assist in managing their resource through the allocation of licenses. Tuna fishery data also provide important information for Monitoring, Control and Surveillance (MCS) activities and are used in economic and social science studies.

9.   At the regional level, tuna fishery data collected by member countries are used extensively for research and monitoring purposes. For example, the SPC Oceanic Fisheries Programme (SPC-OFP) uses the data to assess the state of exploitation of the stocks [on behalf of member countries and the WCPFC] and to study interactions between the different fleets operating in the region. Monitoring of the fisheries includes the biannual publication of statistics compiled from the catch and effort database in the WCPFC Tuna Bulletin and through publication of the WCPFC Tuna Fishery Yearbook.

10.   The recent requirements for improved quality and increases in the quantity of data collected (particularly observer data) will ultimately provide users with considerably more representative information from the region's tuna fisheries. However, it will mean that both member countries and SPC-OFP will need to carefully consider what procedures and additional resources (e.g. staff and equipment) are required to effectively manage their tuna fishery data in the future, and thereby ensure users have both accurate and timely data at their disposal.

---

[1]   See http://www.wcpfc.int/pdf/Scientific Data to be Provided to the Commission (as revised by WCPFC4).pdf

[2]   The Fifth Regular Session for the COMMISSION FOR THE CONSERVATION AND MANAGEMENT OF HIGHLY MIGRATORY FISH STOCKS IN THE WESTERN AND CENTRAL PACIFIC OCEAN –
see http://www.wcpfc.int/wcpfc5/index.htm

11.   The SPC-OFP has provided data management services to their member countries for nearly thirty years, although in recent times, some member countries have expressed a desire to be more independent in managing their data and have subsequently employed more resources in their offices to take on some of the data management responsibilities previously undertaken by SPC-OFP.

12.   The SPC-OFP has also recently taken on the role of data (and science) service provider for the WCPFC, which provides some indirect benefits to member countries, but add another layer of work and responsibility to deal with.

13.   The purpose of this paper is to review the current status and future challenges in tuna fishery data management in SPC members. Before outlining the options for data management available to members, the paper provides a description of the data management services provided by SPC-OFP. The paper concludes by listing the major challenges/issues in data management faced by members and SPC- OFP (in providing these services), and some recommendation for the way ahead.

2. Data Management services offered by SPC- OFP to SPC members

2.1 Data entry service

14.   SPC-OFP has been processing logsheet, observer, unloading and port sampling data on behalf of its members for over twenty years. Prior to 2002, original hard-copy or photocopied data forms would be sent to SPC-OFP through the postal system or take advantage of people travelling to get the data to SPC-OFP. The costs of sending large volumes of data were often expensive, and in recent years SPC-OFP has developed a system so that members can scan hard-copy data and send it electronically (either on CD or via the internet – see section 2.2).

15.   On receipt at SPC-OFP, the data are registered (to keep track of when each package arrived and where each package of data has come from), manually checked for accuracy and completeness, and prepared for data entry. Once this has been done, an acknowledgement message is transmitted to the sender to let them know that the data have been received and to advise them if any problems were encountered. The data are then entered into databases using systems developed by SPC-OFP database programmer/analysts. The data entry systems have comprehensive error-checking routines and the data-entry staff follow strict procedures to ensure the data are of the best quality. The SPC-OFP data-entry staff are skilled typists who have undertaken internal training to obtain the necessary knowledge to deal with the different types of data they are processing. For example, SPC-OFP data-entry staff are required to undertake the theoretical part of the observer training course and achieve an acceptable pass mark before they can start to enter observer data.

16.   Once the data have been entered, they undergo a post-entry data quality check and only then are the data transferred to the regional tuna fishery databases. In order to satisfy the requirements of members, the SPC-OFP send the processed data back to members on a regular basis with data query tools (see Section 2.4).

17.   A brief review of the expected demands on the SPC-OFP data entry service is included in **APPENDIX 1.**

2.2 Scanning and data transmission software via the internet

18.   In recent years, the SPC-OFP has purchased scanning equipment for member countries and developed specific software ("Scanning Logsheets, Observer and Port Sampling Data" - SLOPS) to facilitate the management of scanning tuna fishery data, which are then sent to OFP for processing. This initiative has resulted in significant cost savings for member countries since they no longer need to send hard-copy data via the postal system. It has also meant that data can be transmitted on a more timely basis and also provides a secure backup of the original tuna fishery data which can be archived more efficiently by member countries in electronic form.

19.   Once the data are scanned, they can be copied onto a CD and sent to SPC-OFP via the post or hand-carried by travelling staff. A more efficient means of sending the scanned data is via the internet, and this can be done through (i) a file attachment to an email message (if the scanned data are less than 2 Mb), (ii) FTP (File Transfer Protocol) transmissions via the internet using software such as CuteFTP, (iii) one of the web sites facilitating free data transmission (e.g. www.yousendit.com) or (iv) the establishment of a secure file server on a computer in the offices of the member country so that SPC-OFP can log in and download scanned data (e.g. FILEZILLA software). The main benefit of option (iv) over the other options listed above is that members need only scan the data and then inform SPC-OFP to connect and download the latest scanned data, which means that members do not need to take the time or bear the connect time costs associated with transferring the data. SPC-OFP has established a FILEZILLA server and procedures in the offices of one member for more than one year now, and it has proven to be very efficient.

20.   The cost to members for scanning and sending data to SPC-OFP is the time that needs to be allocated for staff to manage the system. This activity should not be underestimated, but if it is adequately resourced and undertaken on a regular basis, it will ensure that processed data are returned to members in a timely manner.

2.3 Tuna fishery data management procedures document

21.   In recent years, and in association with the Global Environment Facility (GEF) funded Oceanic Fisheries Management Project (OFMP), the SPC-OFP has established a "regional tuna fishery data template"[3] which provides guidelines for the establishment of procedures and strategies to support the collection, management and dissemination of tuna fishery data by SPC members. The template has been used to produce "national tuna data procedures documents", which outline in greater detail the in-country procedures for the collection, management and dissemination of tuna fishery data.

22.   With SPC-OFP guidance, comprehensive national tuna data procedures documents have been established in most member countries, but there is considerable work remaining to complete these documents – indeed these documents will be continually updated as the procedures for the collection, management and dissemination of tuna fishery data in the country continue to evolve in the future. The "Responsibility Matrix" is a tool developed by SPC-OFP to assist members review the human resources required for each data collection, management and dissemination task in national fisheries offices.

23.   The benefits of having a national tuna data procedures document include the following:

- Provides "one" document that contains all procedures for collection, management and dissemination of tuna data;

---

[3]   http://www.spc.int/oceanfish/Docs/Statistics/TunaDataTemplateV1.pdf

- Ensures consistency in the way staff work with data (e.g. ensuring regional standards);
- Ensures that established procedures are not forgotten as a result of staff turnover;
- Provides a means of showing staff where they fit into the overall process and an awareness of the work that other colleagues are responsible for;
- Provides a template that highlights areas that have yet to be developed;
- Provides a useful training resource for new staff.

24.   Members will be encouraged to continue to support this initiative with assistance from SPC-OFP in the future.

2.4 In-country database systems

25.   Since the early 1990s, the SPC-OFP have provided member countries with database systems to enter and extract summaries of their tuna fishery data. The first major system to be installed throughout the fisheries offices of SPC members was the **Catch and Effort Query System (CES)**, which is still in existence today. This system is distributed to members via a CD every 4-5 months with their logsheet data. This system allows member countries to produce summaries of trends in catch and effort data, produce graphs and maps showing the distribution of fishing effort and catch. The representativeness of the information produced in CES depends on the coverage and quality of the logsheet data provided.

26.   The first version of the **Tuna Fisheries Data Management System (TUFMAN)** was developed in 2004. This system was the first attempt to support the integration of all tuna fishery data in the one database system, and was made possible by the adoption of the regional standard data collection forms[4] by members over the previous 5-10 years. The TUFMAN system aims to provide SPC members with a tool to manage their own data from the point of data registry, through data entry and data quality checks, to the production of reports, graphs and maps of summaries tuna fishery data. The TUFMAN system is installed in the fisheries offices of most members that have significant tuna fisheries, but there remains considerable work to ensure that fisheries staff are comfortable using the system and are familiar with all of the features that are available to them. Getting the best out of TUFMAN sometimes requires changes to procedures in data collection, for example, and the evolution of the TUFMAN system has been closely linked with the work in developing the regional template and national tuna data procedures documents (see Section 2.3). The installation of the TUFMAN system requires a visit by SPC-OFP technical staff and follow-up visits are usually undertaken every 1-2 years thereafter (see Section 2.5).

27.   A new module for TUFMAN that supports the entry and management of observer data **(TUBS)**[5] is nearing completion. It is envisaged that this system will eventually be made available to members that have the necessary resources for entering and managing observer data in-country. An evaluation of whether the observer data management system can be effectively implemented in-country will be undertaken jointly by the national fisheries agency concerned and the SPC-OFP.

28.   The SPC-OFP also provides some members with systems that allow the extraction of summaries of observer data (**OBSERVER TRIP VIEWER** system and **ORSE**) and port sampling data (**LENGTH FREQUENCY QUERY SYSTEM**). As with logsheet data, the representativeness of the information produced from these systems depends on the coverage and quality of the data provided.

---

[4]   The regional data collection forms have been established through the SPC/FFA Data Collection Committee (DCC)

[5]   The contracted work to complete TUBS has been undertaken with funding assistance provided from the WCPFC-administered, Japanese Trust Fund (JTF)

29.   The SPC-OFP also develops and supports custom-developed database systems in special cases where the regional tuna fishery data collection forms are not used.

30.   The development and maintenance of database systems in the future may be constrained by increased commitments in other areas. The role of the OFP developers (which have numbered 3 staff for more 10-15 years) has evolved over the past 5 years with more time and resources spent in areas other than database development and management. For example, more time is now allocated to capacity building for staff from national fisheries offices, mainly related to ensuring SPC members satisfy their data-reporting obligations to the WCPFC. These changes are important and inevitable, but the downside is that less time is now available to undertake the necessary database system development and maintenance work.

2.5 In-country visits by SPC-OFP staff

31.   Most in-country visits by SPC-OFP staff to member fisheries offices are related to TUFMAN installation, maintenance and training. SPC-OFP also provides a service in assisting member countries to develop their national tuna data procedures document and in auditing data collection and management systems – both tasks typically necessitate a visit.

32.   The number of visits that are possible each year is determined by available travel funds and the availability of technical staff. SPC-OFP are now having difficulties in meeting the increased demand for such visits because of lack of resources.

2.6 Remote support for in-country database systems

33.   The time dedicated by SPC-OFP technical staff to remotely supporting national TUFMAN systems has grown substantially over the past 2-3 years. The reason for the increase in this activity is due to member countries embracing a more sophisticated data management system than existed previously, and more time is now required to explain the concepts and provide enhancements to cater for new requirements. Remote support of the TUFMAN system is generally accomplished through **email** messages and the transfer of updates using the data transmission facilities described in Section 2.2.

34.   Support is also provided through a bi-monthly email message providing member countries with tips on how to get the best out their TUFMAN system ("**TUFMAN tips**").

35.   In the past few months, a new facility has been trialed that allows SPC-OFP technical staff to login to a computer on the server in a national fisheries office and resolve database problems on-line which would be otherwise difficult and/or time-consuming with the existing resources. The available software (e.g. **TEAMVIEWER**) will potentially improve the service that SPC-OFP can offer members in supporting database systems in the future, particularly if the internet bandwidth continues to improve. However, the level of this service that can be provided in the future will be constrained by the availability of technical staff resources in the Programme.

2.7 Workshops and training attachments for developing capacity in data management

36.   In addition to training in-country, SPC-OFP offers training workshops and attachments at SPC Headquarters targeted at national fisheries data management staff. The Tuna Data Workshop (TDW) is now an annual event and provides participants with, inter alia, the opportunity to learn how to develop their data management systems and how to address the problems that arise. SPC-OFP also offers one-on-one attachment training at SPC Headquarters that includes components in data management.

37.   Section 2.4 mentioned the additional responsibilities of SPC-OFP technical staff with respect to (inter alia) capacity building. Capacity building is an important service to members, but the current resources are generally insufficient to meet the demand. Some consideration of how to resolve this issue is probably warranted.

2.8 Data management audits

38.   In recent years, some members have embarked on entering their tuna fishery data in their offices. In such cases, it would therefore be more efficient to send the processed data to SPC-OFP instead of hard-copy or scanned data, thus avoiding duplication of effort (by re-entering the data at SPC-OFP). However, to ensure that the data entered in national fisheries offices are of the required quality (e.g. accuracy, completeness) to import into the regional databases[6], SPC-OFP is obliged to conduct systematic "**audits**" of the data management systems before such data are imported.

39.   The areas that the data management **audit process** cover include:

- The database system must have appropriate data quality control (if the TUFMAN system is used, then this will satisfy this audit criterion);
- The data management procedures should ensure that all data received are entered;
- Several random samples of processed data are cross-checked with the hard-copy data to ensure they have been entered completely and correctly.

40.   Several **audits** have been conducted in national fisheries offices in the past. While improvements have been noted, significant problems remain, with the result that the nationally-processed data cannot be imported into regional databases – SPC-OFP are obliged to continue processing such data in Noumea.

41.   The data management **audits** should be considered by members as a tool for improving the quality of their processed data. This activity is likely to increase in the future, with more resource material becoming available to assist countries perform "**self-audits**" of their data management systems. The increase in data entered by members will relieve the data entry burden on the OFP (if the data are accepted through the **audit** process), although additional resources will be required to conduct the **audits** in national fisheries offices.

42.   It should be noted that the SPC-OFP currently does not have sufficient resources (technical staff) to conduct **audits** of member countries' data management systems in a systematic and comprehensive way.

---

[6]   The WCPFC specifically mention the need for quality data in their data-reporting obligations

2.9 Online web products

43.   The SPC-OFP uses its web site to, inter alia, disseminate reports of meetings of the Tuna Fishery Data Collection Committee, tuna fishery data collection forms, and Fork Length, the newsletter for observer and port sampling programmes, as well as secure web pages with detailed tuna fishery statistics specific to each member country.

44.   With regards to tuna data management, the SPC-OFP have published resource material presented in tuna data workshops and will continue to improve these resources in order to assist member countries better manage their data systems. In the future, for example, the SPC-OFP hopes to make available data collection and management "audit" tools to assist member countries improve their systems.

3.   Data Management in national fisheries offices

45.   While certain data management[7] procedures should be standard throughout the region, the approach to tuna data management within each national fisheries office will vary depending on the following factors:

- *The amount of fishing activity in their waters*
- *The amount and types of data collected*
- *The need to process data from foreign fleets active within and adjacent to their EEZ*
- *The resources (e.g. staff and equipment) they have available for managing data*

46.   Members situated in the main purse seine fishery (i.e. the equatorial zone) have more fishing activity in their zones than members in sub-tropical areas, where albacore tuna is the main target species for domestic and distant-water foreign longline fleets – there will be a larger quantity of data collected from countries based in equatorial waters.

47.   Most members have established fishery access conditions that require vessels licensed to fish in their waters fleets to submit logsheets. [There are a few exceptions for certain domestic vessels.] This means that the amount of logsheet data received generally reflects the level of fishing activity by licensed vessels. Licensed vessels from certain foreign purse-seine fleets provide all logsheets, regardless of where they fish, even though there may only be a fraction of their annual fishing activity in the waters of the member country; the processing of logsheet data for foreign vessels where activity is entirely outside their zone is usually of lower priority to the member country, even though such data are of equal importance to the SPC-OFP.

48.   Some countries do not have ports of unloading, so do not have national port sampling programmes, while some countries with ports of unloading have logistical problems in establishing port sampling programmes. Port sampling data are usually not processed by national fisheries offices since they are strictly used in stock assessments and have reduced direct value to the member country. National fisheries offices may process longline port sampling totals which can be used to reconcile logsheet trip catch and unloading totals. The main data management activities required for port sampling data by national fisheries offices, therefore, involves the preparation (scanning/photocopying) of data to be sent to SPC-OFP and the filing of data thereafter.

---

[7]   A brief description of what we mean by tuna fisheries "data management" is included in **APPENDIX 2**

49.   National observer programmes are now being implemented by many SPC members. It is therefore very important to ensure that the investment in observer data collection is not wasted by having an inadequate data management system.   At this stage, the SPC-OFP is responsible for processing all national observer programme data and has established a very experienced data management team to undertake the work involved. The SPC-OFP data management team comprises 3 database technical staff and 5 data entry operators[8]. In addition, the three OFP port sampling and observer experts provide advice on data quality issues as required. The data entry operators are required to complete the theoretical section of the observer training course, and achieve an acceptable pass mark before they can enter observer data. The data entry operators are also trained in undertaking the data quality control checks (e.g. using a series of data quality reports to check the data they have entered) necessary for ensuring the highest quality of observer data are available.

50.   In the future, some members may want to enter and manage their own observer data, and the OFP will be ready to assist in estimating the nature and extent of resources required to undertake this work, provide the database system and training and conduct audits on the data management system once it is in place. It is important to note that the management of observer data in national fisheries offices will require considerably more resources than is required to manage other types of tuna fishery data. The current data management options available to members have been outlined in **APPENDIX 3.**

51.   The options selected by a particular members will primarily depend on the factors listed at the start of this section but will include other factors. SPC-OFP can provide information to assist members to reach a decision on the options that will provide them with the most efficient way of approaching management of their tuna fisheries data. However, the main requirement is that a commitment must be made to allocating the necessary resources to ensure that the data management system will function correctly and provide data of the appropriate quality (e.g. accuracy and completeness) to users.

4.   Data Management challenges/issues encountered by members and SPC-OFP

52.   The past two Tuna Data Workshops [9] (TDWs) conducted by SPC-OFP have provided participants with the opportunity to discuss problems they have encountered in tuna data management in their countries. The workshops produced priority lists of the problems and attempted to provide solutions to these problems. Based on the experience within the SPC-OFP and the information provided from the TDWs, **APPENDIX 4** and **APPENDIX 5** have been compiled to provide a list of the major issues/problems currently encountered in data management throughout the region. An attempt has been made to provide options for addressing these problems in the right-hand column of these tables. This list is not complete and members will no doubt have other issues/problems to add.

53.   In summary, the primary challenges currently encountered in national fisheries offices and at the SPC-OFP relate to **having adequate resources available to undertake the required data management work**[10]. One clear solution to addressing this major problem is to put more emphasis on the review of available options to undertake data management for each member country and this can be achieved with a more formal review process to ensure the most efficient approach is adopted.

---

[8]   A sixth data entry operator has recently been employed but will not enter observer data until she is trained

[9]   See the report and presentations of the First and Second Tuna Data Workshops (TDW-1 and TDW-2) at http://www.spc.int/oceanfish/Html/Meetings/TDW1/index.htm
http://www.spc.int/oceanfish/Html/Meetings/TDW2/index.htm

[10]   Resources include (i) staff to undertake the work, (ii) equipment, (iii) funds to conduct workshops and training attachments, (iv) funds to travel to member countries offices for database system installations, training and audits

54.   A major challenge that both members and the SPC-OFP face in the next few years will be how to cope with the substantial increase in observer data management required as a result of the recent PNA and WCPFC decisions11 regarding increased observer coverage of purse-seine fleets.

5.   Recommendations

55.   Members are invited to comment on the issues raised in this paper.

56.   There are now greater obligations falling on members to provide more data of a higher quality than ever before, and recent WCPFC decisions mean that these obligations will increase in the years to come. The data entry service of the SPC-OFP has reached the limit of its resources with respect to the processing of observer data and any increase will mean extensive delays in providing members and scientists with processed observer data. Each member has its own data management problems and it is recommended that a more formal review process be developed to find the most efficient and effective solutions for data management in each country. In this respect, members are encouraged to use the OFP knowledge and expertise to address their requirements.

57.   The following specific recommendations are offered:

- Members should advise the SPC-OFP if they intend to enter observer data and a formal review process looking at the resources required to manage observer data in-country will subsequently be scheduled;

- Members are encouraged to contact SPC-OFP for assistance in reviewing their data management systems (in general) to ensure the most efficient options have been selected;

- Members should ensure they allocate the necessary resources to undertake data management according to their requirements for the data;

- In conjunction with the points above, the SPC-OFP should formally review their data entry resources to ensure they can adequately service member country requirements for tuna fishery data management [particularly in view of recent WCPFC decisions];

- The SPC-OFP should continue to explore different avenues to improve the efficiency of tuna data management throughout the region;

- It is strongly recommended that an additional technical position (Fisheries Data Audit Officer) is employed at the SPC-OFP to cope with the current data management demands from within the Programme, from members, from FFA and from the WCPFC.

---

[11]   The Fifth Regular Session for the COMMISSION FOR THE CONSERVATION AND MANAGEMENT OF HIGHLY MIGRATORY FISH STOCKS IN THE WESTERN AND CENTRAL PACIFIC OCEAN – see http://www.wcpfc.int/wcpfc5/index.htm

APPENDIX 1: Can the SPC-OFP data entry service continue to meet the demands for processing fishery data?

58.　　The purpose of this review is to provide a summary of trends in the tuna fishery data processed by SPC-OFP on behalf of member countries and highlight where there may be problems in satisfying the demand for future data processing with existing resources.

59.　　Figure 2 provides a breakdown of the amount of logsheet, port sampling and observer data processed per year by the SPC-OFP. These graphs clearly show the increase in data entered over time and how the entry of some types of data are prioritized over others from year to year depending on the priority and/or the backlog of data that have built up in the previous year. For example, a backlog of logsheet data meant that these data were clearly higher priority than port sampling and observer data in 2006, while observer data were of higher priority in 2007.

60.　　The SPC-OFP has settled on a schedule of data entry within the calendar year which suits the requirements of provision of data to the users. From January until July each year, priority for data entry is given to logsheets and port sampling data in order ensure the most recent data are available for the stock assessments and the preparation of national fishery reports for the Scientific Committee meeting in August. Thereafter, from September to December, observer data entry is given the highest priority.
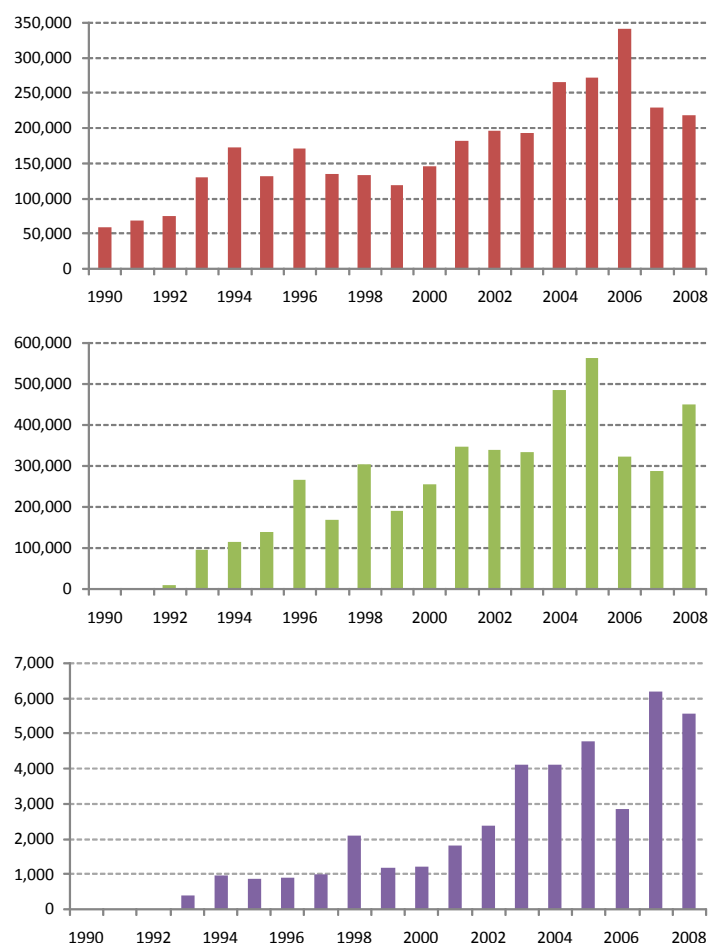

Figure 2. Annual trends in data processed by SPC-OFP data entry staff

Top　　– Number of logsheet sets processed
Middle　– Number of port-sampled length data processed
Bottom　– Number of observer-reported sets processed

61.   Figure 3 provides an indication of the trends in the amount of logsheet, port sampling and observer data processed per year in one graph, Figure 4 shows the number of data entry staff employed per year since 1990, and Figure 5 shows the trends in average delay in the provision of logsheet data back to member countries per year. Comparison of these three graphs provides some interesting insights into the potential problems faced by the SPC-OFP in servicing member country data management. For example, Figure 5 shows that the average delay increased steadily from 2000 until 2003, until more data entry staff were employed in 2003, after which the delay reduced substantially. In more recent years (2006-2008), the amount of observer data continued to increase with a corresponding increase in the delays in providing data to member countries and scientists, despite data entry staff numbers numbering 5-6 people.

As at the end of 2008, it was clear that available data entry resources at the SPC-OFP had reached a threshold with respect to catering for the demand in processing data, mainly due to the increase in observer data.
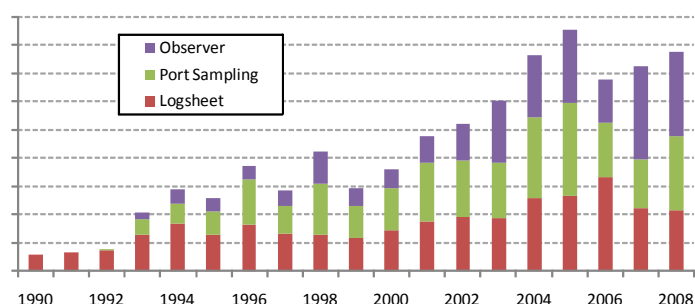

Figure 3. Annual trends in all data types processed by SPC-OFP data entry staff
(this graph attempts to show a trend in composite data processed,
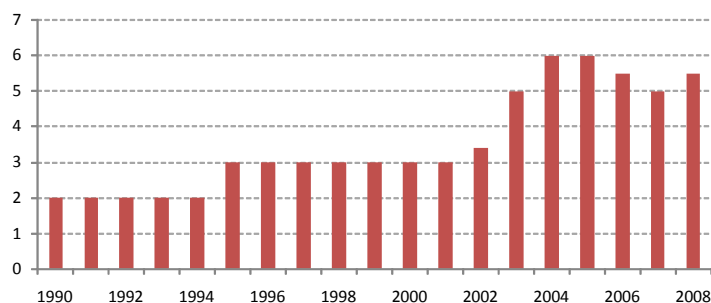but it should not be viewed as an indicator of the actual "volume" of data processed)

Figure 4. Annual trends in SPC-OFP data entry staffing levels
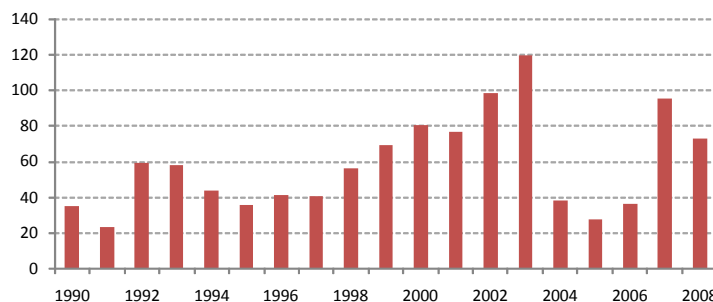(total number of personnel available per year)

Figure 5. Annual trends in the average delay (days) in processing LOGSHEET data
(determined by subtracting the date that logsheets were received from the date entered)

62.   Table 1 further highlights the current problems with processing of observer data. The SPC-OFP typically processes most of the national observer data in the months of September-December, and have recently finished this activity (December 2008) in order to concentrate on processing logsheet and port sampling data. However, as Table 1 shows, there is a considerable backlog of observer data yet to be entered, and we have not yet received all observer data for 2008 activities. Based on the time it takes to enter an observer trip, it would take approximately 4 months full-time for 5 data entry staff to clear this backlog. The plans to increase observer coverage as a result of the recent WCPFC Commission meeting decision will mean substantially more data will need to be processed in the future, but the resources to enter these data are already beyond the threshold for providing timely data to users.

Table 1. Outstanding observer data entry, as at January 2009

Year of trip	PICT National Observer data received at SPC but not yet entered (Trips)	US Treaty and FSM Arrangement observer "size" data not yet entered (Trips)
2006	36	71
2007	130	84
2008	134 (prov.)	43 (prov.)
Total	**300**	**198**

APPENDIX 2: What is "Data management"?

63.   "**Data management**" refers to the work involved in managing, checking, correcting, securing and storing tuna fisheries data after they have been collected. A **database system** is a tool that facilitates the management of data. With respect to tuna fishery data, "management" can include the following activities:

- Registering data received from fishing companies, observers and port samplers
- Pre-data entry error checking (manually checking the data collection forms)
- Entering data into a database system
- Using a database systems to undertake data quality control checks to identify and correct problems
- Filing hard-copy data in a suitable filing system (archiving)
- Backing up the database in a secure manner
- Preparing data to be sent to SPC, FFA or the WCPFC

64.   Data management is important because it ensures:

- Data are stored in an "efficient" form (e.g. in an integrated manner)
- Data are of the highest "Quality" (e.g. retain their accuracy)
- Data can be reconciled
- Data are complete (e.g. represent the desired coverage)
- Data are readily accessible (i.e. facilitates dissemination)
- Data are secure

65.   Data collection is an investment and the "management of data" protects and enhances that investment – the benefits of having a data collection system are lost if the data are not correctly managed.

APPENDIX 3: Options available to SPC members for data management

Data type	Options
LOGSHEETS	Logsheet data are used by member countries in a variety of ways, such as monitoring trends in catch and effort, for compliance purposes, in stock assessments 1. Outsource logsheet data entry to SPC The resources for entering logsheet data are insufficient so the member country chooses to use SPC to process their data, with the processed data provided back to the country with the Catch and Effort Query System (CES) and/or an import into the in-country TUFMAN system (yet to be implemented). The member country would still be responsible for certain data management activities, such as manual checking of the logsheets (and liaison with fishing companies in the event of any problems), data registration, scanning and filing of the original versions of the logsheets. 2. Enter logsheet data for the national fleet only The data-reporting obligations to the WCPFC mean that there is a high priority for monitoring the national fleet (throughout the WCPFC Convention Area) so a member country can choose to allocate resources to enter the logsheets for the national fleet only (using the TUFMAN system, for example), but outsource the entry of logsheets for foreign fleets to SPC (see 1. above). In some countries, the amount of logsheet data for national fleet is manageable, but the entry of logsheet data from the foreign fleets is beyond their resources. Additional data management tasks would be required with this option, such as post-processing data quality control checking. Note that the logsheets entered in the member country may still need to be scanned and sent to SPC, unless the data management system (e.g. data entered) in the country has been **audited** to ensure the appropriate quality has been achieved (e.g. accuracy, completeness). If a country's data management system is deemed acceptable through the **audit process**, then the export of the processed data from TUFMAN and forwarding on to SPC be will an additional data management task. 3. Enter logsheet data for the national fleet and EEZ-only logsheet data for the foreign fleets In order to monitor the catch and activities of foreign fleets in their zones, member countries can choose to enter the logsheet data for their national fleet (see 2. above), and enter the logsheet-reported activities for fishing in their zone only, using a database system such as TUFMAN. [The TUFMAN system has a special feature which facilitates the entry of EEZ-only activities]. Countries will still be required to prepare scanned or photocopied logsheets covering the foreign fleets to SPC since the entire logsheet is not entered under this option. 4. Enter all logsheet data The countries that have adequate resources to enter logsheet data may choose to enter all logsheets for domestic and foreign vessels. If a country's data management is deemed acceptable through the **audit process**, then the export of the processed data from TUFMAN and forwarding on to SPC will be an additional data management task, otherwise, countries will be required to prepare scanned or photocopied logsheets to SPC. .

Data type	Options
PORT SAMPLING	Port sampling data (size data) are mainly used in stock assessments and have limited direct use to member countries. Port sampling data are usually comprehensive and often require considerable time to entry. 1. Outsource port sampling data entry to SPC Due to its relative importance, Port sampling data entry is usually undertaken by the SPC-OFP. The member country would still be responsible for certain data management activities, such as manual checking of the port sampling data (e.g. accuracy, completeness), data registration, scanning and filing of the original versions. 2. Enter port sampling totals The entry of port sampling totals into a database system such as TUFMAN does not required considerable resources, but offer member countries with a independent method of reconciling the longline catch reported on logsheets and the unloaded catch reported by agents/fishing companies. Note that the port sampling data management activities related to sending data to SPC (as listed in 1. above) would still be required. 3. Enter all port sampling data The entry of all port sampling data is currently occurring in only one country with adequate resources to process and use the data. If a country's port sampling data management is deemed acceptable through an audit process, then the export of the data entered in that country and forwarding on to SPC will be an additional data management task (Otherwise, countries will be requested to prepare scanned or photocopied port sampling forms and transmit on to the SPC-OFP).
UNLOADINGS	Unloadings data are primarily used to cross-check the catch reported on logsheets, to adjust the catch (in weight) reported on logsheets and is an important source for determining annual catch estimates; these data therefore have an important direct use for member countries. Unloadings data are not usually comprehensive so the data entry is usually manageable. 1. Outsource unloadings data entry to SPC If it is not possible to process unloadings data in the member country's office then SPC-OFP will take care of this service and provide the processed data back to the member country for inclusion in their TUFMAN system, for example. The member country would still be responsible for certain data management activities, such as manual checking of the unloadings data (e.g. accuracy, completeness), data registration, scanning and filing of the original versions. In some member countries, electronic unloading data are provided by the fishing company/agent in a non-standard format, and the SPC-OFP provide a service of converting these data into a standard format which can be imported into the member country's TUFMAN system. 2. Enter all unloadings data The entry of all unloading data is currently occurring in several countries, since it is not an onerous task and there are important benefits for using these data within the country. If a country's unloading data management is deemed acceptable through an audit process, then the export of the data entered in that country and forwarding on to SPC will be an additional data management task (Otherwise, countries will be requested to prepare scanned or photocopied unloadings data for transmission to the SPC-OFP).

Data type	Options
OBSERVER	Observer data provide the only means of verifying operational data at the set level and provide much more detail information of the fishing operation and the catch than operational data – these data are therefore very important to member countries and scientists. 1. Outsource Observer data entry to SPC A great deal more resources are required to successfully manage observer data in member countries offices than would be required for processing logsheet data, so the SPC-OFP have undertaken the observer data entry on behalf of member countries up until now. The member country would still be responsible for certain data management activities, such as the debriefing process, the manual checking of the observer data (e.g. accuracy, completeness), data registration, scanning and filing of the original versions, and transmitting the scanned data to SPC. 2. Enter all observer data It is not currently possible to enter observer data using the TUFMAN system as yet, but this module will be available shortly. The member country and the SPC-OFP will formally review the resources required to manage observer data prior to installation of the TUFMAN Observer component. Once in operation, if a country's observer data management is deemed acceptable through an audit process, then the export of the data entered in that country and forwarding on to SPC will be an additional data management task (Otherwise, countries will be requested to prepare scanned or photocopied observer data for transmission to the SPC-OFP, as is case at the moment).

APPENDIX 4: Major issues/problems in tuna data management currently encountered by members and the SPC-OFP

Issue/Problem	Options for resolution
Not enough staff to perform the necessary data management duties in member countries offices	(see APPENDIX 5)
Staff in member country offices do not have a good understanding of the TUFMAN system	• SPC-OFP to determine the extent of this problem through a survey • SPC-OFP to provide the necessary training with follow-up visits, ensuring that member countries have a complete understanding and are comfortable with the system. • SPC-OFP to provide training resource material • SPC-OFP to provide training (where possible) during regional Tuna Data Workshops (TDWs)
Lack of **funds** available to the SPC-OFP to visit member countries offices. Lack of **staff** to service member countries' requests for visits	• Review and better rationalise travel (perhaps some travel will not be possible) • Review the demand for visits and seek additional funding where warranted • If necessary, recruitment of additional staff at the SPC-OFP will be an option that requires further investigation
Lack of **funds** to conduct training courses Lack of **staff** to conduct training courses	• Review the demand for conducting regional and national training courses in member countries, and seek funding where warranted • Review the demand for conducting training attachments at SPC and seek additional funding where warranted
SPC-OFP data entry service stretched to the limit, mainly due to the recent increase in observer data	• Look to member countries to process some of the data (although this will result in the need for more resources both in member countries, for data entry, and in the SPC-OFP, to import and check the processed data through the audit process) • The SPC-OFP to formally review the demand for data entry in the coming years and seek funds for additional resources to meet that demand
Technical staff at SPC-OFP stretched in covering the data management work required. This includes, • Database development • In-country database support • Training (regional and national workshops and attachment training) • Conducting audits • In-house data management support • Member-country data management support • Data management support for the WCPFC	• Create an additional position within the SPC-OFP to share the load • Review and better rationalise the work required amongst existing technical positions, if possible • Determine whether there is certain work that can be discontinued or undertaken elsewhere. For example, seeking funds to outsource some of the database development work through short contracts
In some cases, the SPC-OFP do not receive scanned/hard-copy data in a timely manner	• Review and improve procedures in member countries to ensure the data are scanned and sent to SPC-OFP on a regular basis • Review existing resources in member countries offices and consider changing staff duties or employing additional staff to ensure the necessary activities are covered

Issue/Problem	Options for resolution
	• Review procedures within the SPC-OFP to ensure there is a system to follow-up data provisions by member countries.
Member countries need to receive processed data from SPC-OFP in a timely manner	• SPC-OFP should ensure that member countries are reminded of the schedules for the provision of data • SPC-OFP should ensure they have the adequate resources to support the data management requirements of member countries • SPC-OFP should ensure that they distribute the processed data and associated database systems in a timely manner

APPENDIX 5: Specific issues/problems in tuna data management identified by participants to the First Tuna Data Workshop (TDW-1), 23-27 October 2006, Noumea, New Caledonia.

Issue/Problem	Options for resolution

Inadequate number of staff in member countries offices to cover data management duties	• Consider using the SPC-OFP data management services
	• If the need for the data is important, inform the users and senior staff of the problem, who would need to …
	   o Seek funds
	   o Recruit more staff
	• Consider "multi-skilling" by cross-training with other agencies to provide staff available to do the necessary work
	• Build cost of managing data into license fees.

High volume of data means it is impractical to process data in the offices of member countries (cost-benefit)	• Outsource data processing and management (e.g. regional agencies – SPC-OFP) • Target the more important requirements in data and reduce collection if possible • Review and improve data management practices • Hire more staff • Seek funds - both international and regional • Justify at management level the importance and need of recruiting additional staff • Harmonise data management processes (regionally) where this may help – e.g.: common database with universal support – TUFMAN
Over-worked staff, due to taking on additional duties	• Inform senior staff of the problem • Inform regional agencies of the problem (where relevant) • Seek funds • Provide incentives - bonuses, longer leave days, etc. • Hire more staff • Consider delegating some duties of the "over-worked" staff to other staff. • Educate senior staff on importance of data so that these data staff resources remain at high priority in their budgeting and management decisions
Inadequate pool of candidates to select from (in recruitment process)	• Widen recruitment coverage • Recruit from other member countries • Hire best candidate (that may not be qualified) then train them/provide them with educational opportunities to be qualified for the job. • Ensure selection criteria are appropriate, then select carefully • If appropriate staff remain hard to get then consider longer and more comprehensive than usual training • Outsource work
Retention of skilled staff	• Awareness raising of issue with senior staff • Improve incentives (increase pay, bonuses, travel opportunities, educational opportunities, promotion opportunities, etc.) • Training and education of other staff members
Inadequate opportunities for training/up-skilling	• Consider assistance provided by regional agencies (RFMOs) • Take advantage of workshops of SPC/FFA, etc. if local opportunities are not available.
Lack of data collection and management procedures / manuals	• Inform senior staff of problem

Issue/Problem	Options for resolution
	• Formal proposal to regional agencies (RFMOs) to develop appropriate materials • Develop training procedures/ manuals in-house • The outcome of the workshop will provide the procedures manual