SOUTH PACIFIC COMMISSION

NINETEENTH REGIONAL TECHNICAL MEETING ON FISHERIES
(Noumea, New Caledonia, 3 – 7 August 1987)

Objectives and Proposed Guidelines for a Port Sampling Programme for Pacific Island Parties to the U.S. Multilateral Treaty

(Paper Prepared by the Secretariat)

Background

1.   The Tuna and Billfish Assessment Programme has made considerable progress in its ability to monitor and assess the pelagic fish resources within the South Pacific Commission region. Under direction from representative governments, this has largely involved compiling catch and effort data from logsheets of commercial vessels as required by licensing agreements. Other information sources on catch and effort are useful for resource assessment problems. Several regional meetings (SPC Meeting of Coastal States and Distant-Water Fishing Nations 1984, 18th RTMF) have identified the need for operating a sampling programme at ports of unloading, but access to data from unloading vessels has not been possible.

2.   In March of this year the U.S. and island governments signed a treaty for fishing rights of U.S. vessels within the region. The treaty requires that daily catch reports from U.S. vessels be supplied to the treaty administrator (FFA) in order to calculate individual country revenue earnings. The same information can be applied directly to the regional data base for scientific assessment purposes. The treaty also stipulates that the catch at unloading be made available for sampling purposes. No strict requirements were written into the treaty, however, as sampling was correctly presumed to be for scientific purposes. An informal meeting of Pacific Island Parties to the treaty, U.S. Government and industry, and regional scientists (from SPC and FAO) was held from June 29 - July 3 to discuss the implementation aspects of the treaty. At this meeting, the U.S. Government representative stated that they would set up a port sampling programme in order to collect information to supplement their pelagic resource assessment and research programmes. They also indicated that information they collected could be passed to appropriate regional research organisations and that specific data requirements could be met. This provides the region with a service that would improve the quality of the regional data base for assessment purposes.

3.   The treaty implementation meeting requested that the SPC prepare a document outlining port sampling objectives from a regional assessment standpoint for discussion and review at this year's RTMF. Furthermore, the meeting recommended that the SPC and representatives from the US Government (NMFS), who will be involved with setting up the sampling plan, work together on developing a programme to ensure that sampling standards are met. The following outlines the objectives of a port sampling programme and is a proposed guideline for port sampling activities.

Objectives

4.   The principal objective of port sampling for scientific purposes is to verify and assess the accuracy of data reported on daily catch forms. Results of analyses using data from the forms always carries the burden of unknown reliability. The treaty has specifically addressed the problem of total catch reporting accuracy so that data generated from U.S. vessels under the treaty can be regarded with confidence. There are, however, more fine-scale validation measures needed for standard resource assessment purposes and these can be carried out through sampling catches at unloading points.

5.   The two most important areas of verification beyond what is specified by the treaty include species composition of the catch—particularly between juvenile yellowfin and bigeye—and the size distribution of the catch. The vessel's crew cannot be expected to carry out these tasks. Therefore, field personnel at unloading points trained in scientific sampling methods are needed. The purpose for sampling for more accurate species composition of the catches is that, in order to conduct assessments of stocks, we need to know that the statistics used reflect the stock of the single species in question. Juvenile yellowfin and bigeye are not normally counted separately by fisherman because they are sold for the same price. The need for collecting length frequency (size distribution) information is to estimate the size specific fishing mortality. Such information is needed for analysing yield-per-recruit and for addressing interaction questions.

6.   In addition, the person involved with sampling the catch can also collect information on vessel changes that may affect its fishing effectiveness, as well as collect biological samples of fish as the need arises. The importance of having field staff located at points of unloading to inform the tuna industry of tagging programmes and to distribute rewards has been stressed, based on the experience of the early SPC Skipjack Survey and Assessment Programme's work.

7.   In summary, the objectives of a regional port sampling programme, in order of priority, are to :

- Verify catch report logsheets with unloaded weights to improve the overall accuracy of logsheet reports;

- make accurate species composition estimates of the catch;

- sample for the size distribution of the catch following a well-designed sampling procedure in order to get estimates of size specific fishing mortality;

- provide information on obvious changes in vessel attributes that affect fishing ability so that standardisation of effort measures can be made more accurately;

- collect biological samples from time to time as required;

- serve as a contact point for releasing tagging programme information, and distribution of rewards for recaptured fish, and thereby improve tagged fish recapture returns.

Proposed Activities

8.   Beyond what is legally required in the treaty, the following set of general procedures have been set up to assist the port sampler in organising records on vessel operations. While SPC involvement at the day to day level is not needed, as recipients of data from the programme, we need to know—and wish to participate in the development of—the sampling design details. A weakness in the Tuna and Billfish Assessment Programme's ability as a research agency in recent years has been the lack of contact with our data sources. Given the present situation, we would like to take the opportunity to come closer to current activities of the fishery.

9.   With the endorsement of Pacific Island Parties to the treaty, data generated by the programme will be incorporated into the data base located at the SPC. The priorities of data processing will follow the list of objectives given in the previous section. It is anticipated that the SPC TBAP would inform the treaty manager of progress and applications of port sampling data.

10.   Because vessels tend to aggregate where fishing is good, and schools of tunas vary in homogeneity of size and species composition, careful planning of sampling methods is needed to avoid serious biases and erroneous conclusions. The methods presented here are adaptations of those used by the Inter–American Tropical Tuna Commission (IATTC), International Commission for the Conservation of Atlantic Tunas and NMFS and will require further modification as necessary once the programme is operational. Tuna and Billfish Assessment Programme staff will participate in sampling experiments to improve data collection methods. The following sections and corresponding attachments are examples of the detailed information requested of a port sampling programme. They are intended as guidelines for discussion by this meeting and for further joint development among the agencies concerned.

Trip and Unloading Records

11.   Attachment 1 is a form for recording trip information and unloading data for individual vessels. The IATTC uses a similar form which serves as a central account of trip and unloading activities. One record summarizes a single trip and subsequent unloading session. All information on this form is derived from the vessel's logsheet and the cannery/transhipment unloading receipts. The column contents are self explanatory. The purpose of maintaining this account is to keep track of vessel trips and unloading of the catch from each trip for cross reference with the daily logsheet records. The form would also serve as a reference of vessel activities and indicate vessels that may no longer be operating (or unloading) in a particular area.

The Sampling Worksheet

12.   The form given in Attachment 2 is designed to set up the work plan for drawing samples. It incorporates logsheet information—time, area of catch, and fish-well loading information—so that specific wells can be identified for sampling during unloading. This data is then used to direct sampling by a specified time-area-(school-type) strata. It is used at the time of sampling and is filled out regardless of whether or not a sample was taken. The purpose of recording unloading specifics is to improve species composition and catch totals on a finer temporal and geographic scale. This is also used to keep track of the samples that were drawn and the sampling method that was used.

Sampling Fish

13.   Using the sampling worksheet, the sampler would decide which wells should be sampled to minimise bias and ensure wid geographic coverage. The decision should be based on defined time-area strata from which samples should be drawn. One approach to defining statistical areas has been to identify good fishing areas separated by somewhat poorer areas (Hennemuth 1957). A typical workload for an equivalent programme in the eastern Pacific is roughly 2 samples of 50 fish for each species per boat-trip. The samples should usually be drawn from different wells in order to cover a broader geographical area. Direction of the sampler's work should first consider covering as many different boats as possible before spending extra effort—by taking more samples or drawing more fish for each sample—on a single boat. Coan and Bartoo (1983), for example, demonstrated that for transhipped tunas, more accurate sampling was acheived by sampling more vessel-trips rather than increasing individual sample size.

14.   Three ways of drawing samples commonly used at tuna unloading points are :

- Grab sampling—used during offloading periods, samples selected as arbitrarily as possible. Probably the most common method used.

- Full-well sampling—a systematic sampling procedure whereby fish are enumerated and seected at set intervals until the whole well has been unloaded. This method is particularly desirable when the need to sample other wells or boats is not pending and the well represents a common capture area-time strata. In practice this method is rarely used because of time constraints.

- Size-sorted sampling—a stratified sampling method used when unloaders segregate size groups by market categories. Records of quantities unloaded by each category is needed.

15.   Special attention to sample design will be needed to accurately estimate juvenile bigeye and yellowfin mixes. One method to sample for the bigeye percentages in the catch would be to draw fish from the mix without identifying the species, measure then identify the species. This would continue until 100 total fish had been sampled or 50 bigeye had been identified, whichever came first.

16.   Measuring methods of the port sampler should be made available for review by SPC staff. Examination of problems encountered by certain techniques may lead to more effective methodology. For example, it may be advantageous to measure head length instead of the usual fork length because of measuring errors and difficulties due to distorted frozen fish. Attachment 3 shows a typical length frequency form. The entry procedure will use the top (header) information to link length frequencies to the main data base and for stand-alone analyses.

Other Tasks

17.   The port sampler would be required from time to time to report on changes made to vessels, advise fishermen of ongoing tagging programmes, and collect biological samples as the need arises. The sampler will have a commitment to receive regular correspondence and support, as advised by the treaty manager, from the regional organizations. It is at these times that the sampler should voice problems with certain tasks or methods so that viable alternatives can be considered. To obtain accurate statistics it would be better to receive complaints and small amounts of good data from the port sampler than silence and large amounts of questionable data.

Action Required

18.   The meeting is requested to consider the proposed port sampling procedure and to recommend that the South Pacific Commission participate in the port sampling programme to assist in the implementation of the treaty.

References

Coan, A.L. & N.W. Bartoo (1983). Effects of sample size on the accuracy of length-frequency sampling tunas transshipped to Puero Rico. ICCAT SCRS/83/59.

Hennemuth, R.C. (1957). An analysis of methods of sampling to determine the size composition of commercial landings of yellowfin tuna (*Neothunnus macropterus*) and skipjack (*Katsuwonus pelamis*). IATTC Bulletin Vol.II, No.5.

ATTACHMENT 1

Vessel _____   **Regional Register No.** _____

Depart		Arrival		Days Out	Days Fished	Hailed Tonnage				Wt. Code	Date Unldng Finished	Gross Landings (Pounds)				Cannery or Carrier Name	Desti-nation	Notes
Port	Date	Port	Date			SJT	YFT	BET	OTH			SKJ	YFT	BET	Other			

<div align="right">ATTACHMENT 2</div>

Well Loading, Unloading, and Sampling Worksheet

Vessel Name _____ Gear _____

Regional Register Number _____ Arrival Date _____

Name of Fishing Master _____

Logsheet Tonnage _____ Port _____

Cannery _____

Date Unloaded	Date of Catch	Statistical Area (grid)	Well No.	Skipjack Tons	Sample Taken	Yellowfin Tons	Sample Taken	Bigeye Tons	Sample Taken	Other Tons	Sample Taken	Comment Code

Unloading by Size Group Details				Comments
Well No.	Tons	Species	Percent by Size Group	

Sample Types :
FW – Full well, systematic sample
SG – Size group grab sample
RG – Random grab sample

Comment Codes :
0 – Length frequency sample
1 – Species composition sample
2 – Sampled without capture information
3 – No Sample

ATTACHMENT 3

Vessel_____ Sampler's Name_____
Month Sampled_____Date Captured_____ Catch SJT____YFT____BET_____
Area_____Cannery_____Well No._____School Type_____
Sampling Method_____Species____Remarks_____

350	400	450	500	550	600	650	700	750
351	401	451	501	551	601	651	701	751
352	402	452	502	552	602	652	702	752
353	403	453	503	553	603	653	703	753
354	404	454	504	554	604	654	704	754
355	405	455	505	555	605	655	705	755
356	406	456	506	556	606	656	706	756
357	407	457	507	557	607	657	707	757
358	408	458	508	558	608	658	708	758
359	409	459	509	559	609	659	709	759
360	410	460	510	560	610	660	710	760
361	411	461	511	561	611	661	711	761
362	412	462	512	562	612	662	712	762
363	413	463	513	563	613	663	713	763
64	414	464	514	564	614	664	714	764
365	415	465	515	565	615	665	715	765
366	416	466	516	566	616	666	716	766
367	417	467	517	567	617	667	717	767
368	418	468	518	568	618	668	718	768
369	419	469	519	569	619	669	719	769
370	420	470	520	570	620	670	720	770
371	421	471	521	571	621	671	721	771
372	422	472	522	572	622	672	722	772
373	423	473	523	573	623	673	723	773
374	424	474	524	574	624	674	724	774
375	425	475	525	575	625	675	725	775
376	426	476	526	576	626	676	726	776
377	427	477	527	577	627	677	727	777
378	428	478	528	578	628	678	728	778
379	429	479	529	579	629	679	729	779
380	430	480	530	580	630	680	730	780
381	431	481	531	581	631	681	731	781
82	432	482	532	582	632	682	732	782
83	433	483	533	583	633	683	733	783
384	434	484	534	584	634	684	734	784
385	435	485	535	585	635	685	735	785
386	436	486	536	586	636	686	736	786
387	437	487	537	587	637	687	737	787
388	438	488	538	588	638	688	738	788
389	439	489	539	589	639	689	739	789
390	440	490	540	590	640	690	740	790
391	441	491	541	591	641	691	741	791
392	442	492	542	592	642	692	742	792
393	443	493	543	593	643	693	743	793
394	444	494	544	594	644	694	744	794
395	445	495	545	595	645	695	745	795
396	446	496	546	596	646	696	746	796
397	447	497	547	597	647	697	747	797
398	448	498	548	598	648	698	748	798
399	449	499	549	599	649	699	749	799

INT.1-5　　6-10　　11-15　　16-20　　21-25　　26-30　　31-35　　36-40　　41-45

TOTAL NO. _____