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**SCIENTIFIC ADVISORY COMMITTEE**

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# DOCUMENT SAC-16-05

## PROPOSAL: INTEGRATED PORT-SAMPLING PROGRAM FOR DATA COLLECTION FOR SCIENTIFIC RESEARCH IN SUPPORT OF FISHERIES MANAGEMENT OF THE TROPICAL TUNA FISHERY IN THE EASTERN PACIFIC OCEAN

The purpose of this document is to present a proposal prepared by the scientific staff in response to the task given on paragraph 8 of Resolution C-24-01, adopted by the Commission at its 102nd Annual Meeting in 2024.

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**SUMMARY**


This document presents a proposal prepared by the scientific staff in response to the task given on paragraph 8 of Resolution C-24-01, adopted by the Commission at its 102nd Annual Meeting in 2024. Paragraph 8 requires the scientific staff to perform the analysis of components, actions, technical feasibility, implications for scientific output and budget needed to merge objectives and actions of the Enhanced Monitoring Program and the Traditional Port Sampling, including any suggested improvement to the latter. This proposal also addresses recommendations of the October 2023 external review of the

data used in the tropical tuna stock assessments.

The IATTC currently implements three port-sampling protocols designed to provide information to meet distinct objectives for the tropical tuna species caught by purse-seine vessels: 1) estimating the species and size composition of catches at the fleet level; 2) estimating catches at the trip level for bigeye tuna in support of the individual vessel threshold (IVT) management measure; and, 3) testing a morphometric data collection protocol for tropical tunas and bycatch species.

Scientific analyses related to the development of the sampling protocol for trip-level estimates of bigeye tuna, implemented by the Enhanced Monitoring Program (EMP), identified several potential areas of improvement to the sampling protocol for fleet-level species catch estimation. Key features of the improved protocol include random selection of trips, wells, and fish groups within the well. The purpose of these and other features is to: 1) minimize bias by eliminating opportunistic data collection practices; 2) allow greater flexibility in stock assessment modelling by removing temporal and spatial sampling restrictions; and 3) reduce the estimated variance on species composition estimates for the floating-object (OBJ) fishery by obtaining greater within-well sampling coverage for OBJ-set wells.

The scientific staff proposes the creation of the Integrated Port-Sampling Program as the operational platform that implements the collection of port-sampling data under the improved sampling protocol. This program would be responsible for a target sample size of 450 trips and 1,350 wells of Class-6 vessels, annually, maintaining rigorous data collection aligned with scientific research and management needs, as well as being able to adapt to changes in data requirements over time. Class 1-5 vessels are currently not included in the proposed Port-Sampling Program due to logistical constrains; however, a pilot study on how best to address these logistical constrains will be conducted.

The data collected by the Integrated Port-Sampling Program will be used to estimate fleet-level catch by species, and the variance on those estimates, and update the morphometric relationships necessary for stock assessment modelling. In relation to the IVT, the Integrated Port-Sampling Program would provide coverage of prioritized vessel trips similar to or greater than that expected by the EMP in 2025, and would generate data that can be used to estimate bigeye catch per trip from a model of the well-level relationship between port-sampling and observer data.

An annual operating budget of USD$ 460,000 is proposed to cover staffing and operating expenses, with an emphasis on utilizing the capabilities previously established by the EMP.

Through the implementation of the Integrated Port-Sampling Program, the IATTC aims to improve scientific research capacity and management practices for the sustainable exploitation of tuna resources in the eastern Pacific Ocean.

## 1. BACKGROUND

Port-sampling data collection for IATTC scientific research currently involves the implementation of three sampling protocols, carried out during the catch unloading of purse-seine vessels, with three different purposes:

1. fleet-level catch estimation of species and length composition of the three tropical tuna species (yellowfin (YFT), bigeye (BET), skipjack (SKJ)) for all components of the purse-seine fleet;
2. trip-level BET catch estimation of prioritized vessels in support of the Individual Vessel Threshold (IVT) management measure; and,
3. morphometric relationships (length-weight) of the three tropical tuna species and prioritized bycatch species.

The implementation of the protocol for (1) is a task of the field office staff, commonly referred to as the Traditional Port Sampling (TPS). For (2) and (3), the protocols are implemented by a provisional sampling program created under Resolution C-21-04 and known as the Enhanced Monitoring Program (EMP).

### 1.1. Traditional Port-sampling

The TPS pertains to the collection of length data and counts of fish by species in order to estimate the species and length composition of the three tropical tunas (BET, YFT, SKJ) in the purse-seine fleet catch. The data collection is stratified according to 13 areas, 12 months and three set types (OBJ, DEL, NOA)[1], as well as two vessel size categories (Classes 1-5; Class-6). Under the TPS protocol, a well is considered sampleable if it contains catch from the same stratum (i.e. same set type, month and area).

The TPS is a task fulfilled by field office staff, with two personnel in Manta, two in Mazatlán, one in Playas and one in Manzanillo. These staff members work an eight-hour day, within a normal daytime schedule, five days a week. Within this schedule, the field office staff have a lot of important responsibilities. Their daily tasks include processing and editing of observer data, collection of logbook data, administrative duties and port sampling.

Because the timing of sampling is driven by the work schedule of field office staff, given their other tasks and their scheduled work hours, there are opportunistic aspects to the TPS data collection, with selection of wells on a given day being influenced by availability at the time the samplers are present, and the strata (e.g. area, month, set type) requiring samples. Because multiple vessels can be unloading several wells with catch from the same stratum at the same time, the decision of which well(s) to sample may be subjective, which has the potential to introduce bias into the fleet-level catch estimates. Additionally, the TPS protocol provides limited sampling coverage within the well. The TPS sample size, in terms of the number of fish sampled from a well, depends on the expected number of species in the well and the set type associated with the well catch (appendix of Special Report 18). For example, for a sample from an OBJ-set or NOA-set well that is thought to contain more than one tropical tuna species, 50 fish of each species are to be measured (if possible) and a count of species from 400 fish is obtained, for a total of around 500 – 550[2] fish. If one of the species in the catch is rare, the species identification of an additional 200 fish may be obtained, for a total of around 700 – 750 fish. Thus, a sample of fish under the TPS protocol almost always comes from within a single quarter of the well. However, as discussed below, strong patterns in species composition in OBJ-set wells have been demonstrated to occur and sampling a single quarter of the well may not give a representative sample.

### 1.2. Enhanced Monitoring Program

The EMP is a provisional sampling program established in 2023 under Resolution C-21-04 in order to fulfill the Commission's request to the IATTC scientific staff for the Best Scientific Estimate (BSE) of BET catch per trip and per vessel, in support of the individual-vessel catch thresholds (IVT) management measure (SAC-14-10, SAC-14 INF-I). The EMP carries out the implementation of the sampling protocol designed to collect data from a subset of trips of Class-6 vessels that had historically high catch of BET in the eastern Pacific Ocean (EPO). Approximately 30 prioritized vessels unloading in Manta and Posorja, Ecuador, are the focus of this effort.

The EMP protocol specifies that trip selection focus on those trips with OBJ-set catch, that were fishing in the western part of the EPO (west of 95°), with a random selection of 8 wells per trip. Each well is

[1] OBJ, sets on tuna associated with floating objects; NOA, sets on unassociated schools of tuna; DEL, sets on tuna associated with dolphins.

[2] For 2 – 3 tropical tuna species, and 50 measured per species, there would be 100 – 150 fish measured. Adding the count for species of 400 fish, there would be 500 – 550 fish in the sample.

systematically sampled from the beginning to the end of the unloading process. One out of every 30 containers[3] of fish unloaded from the well is sampled, where the species identification of every fish in the container, and the weight in kilograms of every tuna in the container (or length for the largest fish), are obtained. The number of fish sampled per well by the EMP depends on the number of containers sampled per well and the number of fish in each container. On average, the EMP sampled about 900 fish per well, with at least 550 fish sampled per well for 75% of the wells.

The EMP sampling protocol is implemented by a dedicated team of sampling technicians (SAC-14 INF-I). This team is available at any day and hour, without a specific daily schedule within a 40-hour work week. This availability ensures the random selection of wells for sampling, regardless of when the unloading starts or how long it takes to unload all the fish from the well, while also fulfilling the request made by the fleet to not interfere with the duration and logistics of the unloading process. During 2023 and 2024, the EMP operated with sampling technicians based in Manta and in Posorja (SAC-15 INF-H). For 2025, due to a reduction in the budget, the EMP does not have sampling technicians based in Posorja anymore and will operate solely with the remaining team of 12 samplers - 6 teams of two people each - based in Manta (SAC-16 INF-H).

Additionally, starting in 2025, thanks to a voluntary contribution from the United States, the EMP has included the collection of morphometric data for BET, YFT and SKJ, in addition to the opportunistic collection of this type of data for bycatch species (SAC-15 INF-H, SAC-16 INF-H). Morphometric data are being gathered in Manta, Ecuador, and in Mazatlan, Mexico, by a two-samplers team in each port.

### 1.3. Purpose of this document

The purpose of this document is to present a proposal prepared by the scientific staff in response to the task given on paragraph 8 of Resolution C-24-01, adopted by the Commission at its 102nd Annual Meeting in 2024. Paragraph 8 requires the scientific staff to perform the analysis of components, actions, technical feasibility, implications for scientific output and budget needed to merge objectives and actions of the EMP and the TPS, including any suggested improvement to the latter. This proposal also addresses the results of the first external review of the data used in stock assessments for tropical tunas in the eastern Pacific Ocean, held in October of 2023. The recommendations included: 1) a review of the TPS protocol, in light of the findings from analysis of high-resolution sample data collected during the EMP pilot study; and, 2) the update of morphometric relationships using datasets that are sufficiently large to identify sources of variation (spatial/annual/seasonal/fishery/sampling method).

This document is organized as follows. Section 2 outlines the potential for improvements to the TPS protocol and presents the sampling protocol designed by the scientific staff considering those improvements. Section 3 presents information on the integrated port-sampling program that is proposed to implement the improved protocol. Section 4 outlines how the integrated port-sampling program and improved protocol will support the IVT. Section 5 provides information on the uses of the data collected by the integrated port-sampling program for science and management. Finally, Section 6 presents the budget for the integrated port-sampling program.

## 2. IMPROVED SAMPLING PROTOCOL FOR FLEET-LEVEL SPECIES CATCH ESTIMATION

### 2.1. Potential for improvements

Scientific research related to the development of the trip-level sampling protocol used by the EMP identified several potential areas of improvement for the TPS protocol relevant for fleet-level catch estimation. The three main areas of improvement identified were:

[3] Further details of the sampling protocol can be found in SAC-14 INF-I.

a) **Minimize opportunistic aspects of the protocol:** Using of a sampling protocol that is based on random selection of trips, wells, and groups of fish within a well, would minimize the possibility for bias to be accidentally introduced into the data collection process. Additionally, adopting such a sampling protocol would allow estimation of the variance on the estimated species catch, which is not possible under the TPS protocol.

b) **Increase flexibility in trip and well selection:** By removing the area constraint, as well as the month constraint, that are part of the TPS protocol for well selection, there would be an increase in the number of wells that could be sampled. The 13 areas considered by the TPS protocol are no longer used in the tuna stock assessments, and thus, the TPS protocol imposes a structure on the data collection that is no longer useful for species catch estimation.

c) **Increase the within-well coverage for OBJ-set wells:** Results of the EMP pilot study, as well as simulations conducted with observer data, showed that increasing the extent of within-well sampling coverage for wells with OBJ-set catch, to sample the entire well catch, will lead to fleet-level estimates of species composition with lower estimated variance.

### 2.2. Considerations for an improved sampling protocol

Based on the identified areas of improvement, and on logistical aspects, a sampling protocol for fleet-level species catch estimation was developed, considering the following:

- The improved sampling protocol must not interfere with the regular at-port unloading process.
- The priority for estimation of annual fleet-level species catch is for the fisheries (i.e., areas x time periods x set types) used in the tuna stock assessments.
- The improved sampling protocol must be flexible as regards areas and time periods, in contrast with the static structure of the TPS protocol, because the definition of the stock assessment fisheries, especially their spatial structure, is expected to evolve over time as new data and scientific understanding become available.
- Since the random selection of trips and wells will require knowledge of well-level catch characteristics prior to the arrival of the vessel at port, Class-6 vessels will be initially the component of the fleet to be sampled. The 100% observer coverage of Class-6 vessels allows for the use of at-sea weekly radio reports for the provision of the required information.
- The random selection of trips and wells requires samplers to be available at any day and time, and for as long as needed.
- Annual funding for sampling, similar to the amount of the 2025 proposed budget for the EMP, which included collection of morphometric data, is being considered.

### 2.3. The improved sampling protocol

The IATTC staff is recommending the implementation of the improved sampling protocol for fleet-level catch estimation. This protocol includes components of the EMP protocol. This protocol will produce high-quality data to support both the tropical tuna stock assessments and the IVT.

The proposed sampling protocol is structured in three stages, which will generate data from about 450 trips and 1,350 wells of Class-6 vessels, annually. Details of the protocol can be found in SAC-16 INF-J. A brief summary of the three stages of the sampling protocol are as described below:

1) Trips: To make random selection of trips logistically feasible, a cluster sampling protocol will be used. To implement this protocol, trips are grouped into clusters. Each cluster will contain trips from the entire year, from the beginning of the year to the end of the year. Within each cluster,

trips are ordered from first to last based on their estimated arrival date to port. At the assumed level of funding (Section 6), three clusters of 150 trips each will be sampled, where the three clusters will be selected at random from among all possible clusters of trips. (A minimum of two clusters is required to be able to obtain an estimate of variance on the fleet-level species catch.)

The exact arrival date of each trip will not be known in advance. However, a proxy for an approximate arrival date can be obtained from data in the observer at-sea reports (Informes Desde el Mar or IDM), which are submitted by observers on a weekly basis. Using those data, an estimate of how much catch a vessel has on board, relative to its capacity (i.e., percent full) can be computed, and trips can be ordered according to the date at which they were estimated to be 'nearly' full (e.g. above a threshold of 90% full).

2) Wells: Select three wells per trip, at random, from each trip selected in (1).

3) Fish: Collect one cluster sample of groups of fish (e.g. containers of fish) from each well selected in (2), where the cluster to be sampled is selected at random. The general concept of a cluster sample here is the same as in (1), but instead of each possible cluster sample being a collection of trips, it is a collection of groups of fish. For example, in the case where the catch is unloaded from the well using containers, each cluster sample is a collection of containers of fish.

Based on the level of fishing activity in 2022 and 2023, the proposed sampling protocol would be expected to achieve around 70% coverage of trips and over 15% coverage of wells, annually, from among the trips and wells that would be possible to sample[4]. At this level of coverage, the results of the simulation study presented in SAC-16 INF-J indicate that the improved sampling protocol should:

a) Provide sufficient data with which to make reliable estimates of fleet-level species catch, and their variances, for relatively common species in the primary stock assessment fisheries of the three set types.
b) Generate improved port-sampling data, at the well level, that can be used to develop new species catch estimation models which take advantage of multiple data sources, such as port-sampling and observer data.
c) Provide a sampling framework that can be adapted, if necessary, to address new data needs for catch estimation, for both species and size composition.

Unlike with the TPS protocol, Class 1-5 vessels are currently not considered for the improved protocol, since implementation of the improved protocol requires information on operational characteristics associated with the catch in each well, prior to the vessel's arrival to port, as well as near-real time information on the total trip catch. Nevertheless, additional collaboration from the fleet, with the provision of this information while at sea, could allow the addition of this component of the fleet to the protocol in the future. A pilot project will be undertaken to: 1) determine how best to collect well-level operational characteristic and trip arrival dates, and 2) evaluate various within-well sampling protocols for the Class 1-5 vessels.

## 3. INTEGRATED PORT-SAMPLING PROGRAM

The characteristics and qualities of the improved protocol represent operational requirements that cannot be met with the limited resources available for implementing the TPS protocol. The random selection of trips, the random selection of three wells per trip, and the within-well sampling coverage of wells with OBJ-set catch require an operational structure similar to that already well-established by the

[4] Trips of some vessels are unloaded in ports that are outside the area that can be covered by the IPSP. In addition, mixed-set type wells will not be sampled. For further details, see SAC-16 INF-J.

EMP. In this regard, based on the experience gained and the capacity built during the implementation of the EMP, the staff is proposing the establishment of the Integrated Port-Sampling Program (IPSP), as a platform within the IATTC Data Collection and Database unit for data collection required for scientific research in support of tropical tuna stock assessments and the IVT.

Based on the operating structure proposed and detailed below, the IPSP will have the capacity to implement the improved sampling protocol for fleet-level species catch estimation (hereafter referred to as the IPSP protocol), with the annual coverage of 450 trips and 1350 wells, while also fulfilling other sampling needs for scientific research, such as the collection of morphometric data. In support of the IVT, the IPSP will generate data that can be used to obtain model-based trip-level BSE catch estimates for all prioritized vessel trips. Also in support of the IVT, the IPSP will have the capacity to occasionally sample extra wells per trip (beyond the three wells specified by the IPSP protocol) for a few trips of prioritized vessels to obtain BET trip-level catch estimates that are based exclusively on port-sampling data.

### 3.1. Operational structure of the IPSP

#### 3.1.1. Core team

The establishment of the EMP by the Commission, and its implementation over the past three years, have provided a unique opportunity for capacity building in port-sampling. Taking into consideration the human capital, knowledge and procedures developed by the EMP, the IPSP is proposed with a similar operational core team. The IPSP core team will consist of a program coordinator, a field operations manager, a data handler, and a team of 15 sampling technicians operating in Manta, Mazatlan, Manzanillo and Posorja; the tasks and responsibilities of each of these positions is described in the table below. The distribution of sampling technicians among the four ports where the IATTC has port sampling activities will be based on the historical number of trips unloading in each location. The sampling technicians will be fully dedicated to the implementation of the IPSP protocol, being able to sample at any day and time, within a 40-hours-per-week work schedule.

| Position | Location | Responsibilities |
|---|---|---|
| Program coordinator (1) | Headquarters, La Jolla, USA | - Liaison between the scientific staff and the field operations team.<br>- Development, in coordination with staff from the various programs in the Science Division, of sampling protocols, operational procedures, forms and other tools required for data collection, databases, data entry, and data reporting, based on the staff requirements for scientific research in support of management.<br>- Evaluation and update of sampling procedures.<br>- Preparation of the annual budget, budget execution, staff payroll, and expense reports.<br>- Coordination with the field operations manager and data handler for the implementation of activities on the field.<br>- Preparation of reports for SAC and Annual Meeting.<br>- Communication with CPCs regarding scientific support of management measures. |
| Field operations manager (1) | Manta, Ecuador | - Work planning for sampling technicians and designation of tasks based on unloading activities in port.<br>- On-site verification of the correct implementation of the protocol, and identification of improvements for the |

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|---|---|---|
| | | process.<br>- Secure the provision of goods and services in the field for the proper performance of activities<br>- Preliminary data validation.<br>- Collaborate in the development and improvement of sampling tools, data collection procedures, sampling protocol design. |
| Data Handler (1) | Manta, Ecuador | - Transcribe, keypunch, verify and organize the data collected by the sampling technicians.<br>- Classify, organize and digitally archive the different sources files used (audio recording, sampling sheets, video recording, photos).<br>- Collaborate in the development and testing of data entry programs. |
| Sampling technician (15) | Manta, Manzanillo, Mazatlan, Posorja | - Implementation the sampling protocols.<br>- Report of any novelty, new findings during the sampling activities to Field Operations Manager.<br>- Collaborate in sampling procedures improvements. |

## 4. IPSP SERVICES AND PRODUCTS PROVIDED TO THE IVT

For BET trip-level BSEs in support of the IVT measure, the IPSP protocol, with its random sampling of trips from the entire Class-6 vessel fleet, would result in a coverage of 'highliner'[5] vessel trips unloading in Manta and Posorja, that is similar to, or higher than, what is expected from the EMP in 2025. At an expected coverage of Class-6 vessel trips of around 70%, vessels making 4 or more trips per year would be expected to have, on average, at least two trips sampled per year (as long as those vessels unload in ports covered by the IPSP). For some of those vessels, this coverage would be equivalent to the number of trips sampled by the EMP in 2023 and 2024. Also, as was the case for the EMP in 2023 and 2024, the IPSP will have permanent staff in Posorja, and therefore the capability of sampling any trip of a highliner vessel unloading in Posorja that is selected under the IPSP protocol.

Since the IPSP wells-per-trip coverage will be lower than with the protocol implemented by the EMP (three wells sampled per trip instead of eight), the scientific staff are developing a model for the well-level relationship between the species composition estimates from the EMP data and the catch data collected by the observers (SAC-16 INF-I). This model will allow the staff to make species catch estimates for the unsampled wells and trips of highliner vessels, for those vessels previously sampled by the EMP in 2023 - 2025. Further details are presented in Section 5 of this document.

Finally, due to the design of the IPSP protocol, with the proposed budget shown in Section 6 it is expected that for a small number of the trips of highliner vessels that are selected under the IPSP protocol, the IPSP will be able to sample an additional five wells per trip, for a total of eight wells per trip. For those trips, the BSE of the BET trip catch can be based solely on port-sampling data. This efficiency is made possible because the within-well protocol of the IPSP for OBJ-set wells is the same as that used by the EMP. Thus, for this small number of trips, the data collected, and the BET catch estimation, will be identical to what would have occurred were the EMP still in operation.

[5] Class-6 purse-seine vessels that historically caught levels of BET that could put them at risk of exceeding the IVT, as referred in SAC-15 INF-K and SAC-16 INF-S.

## 5. SCIENTIFIC OUTPUTS WITH DATA COLLECTED BY THE IPSP

### 5.1. Catch estimation at the fleet level

Fleet-level species catch, as well as size composition, will be estimated by tuna stock assessment fishery, using the data collected by the IPSP. Several different methods for species catch estimation will be developed, including methods that rely solely on the IPSP port-sampling data, as well as methods that are based on multiple data sources, such as the IPSP port-sampling data and observer data (or in the case of Class 1-5 vessels, logbook data). Under all these approaches, it will be possible to obtain estimates of the variance on the estimated quantities. A benefit of the IPSP sampling protocol is that estimates of species catch can be based solely on the IPSP port-sampling data and the sampling probabilities specified by the IPSP sampling protocol (an example of this type of approach is presented in SAC-16 INF-J). These estimates can be used as a benchmark for evaluation of multi-data source modeling approaches.

As regards to fleet-level catch estimation for the Class 1-5 vessels, pending the results of the pilot study mentioned in Section 2.3, the catch composition for Class 1-5 vessels can be estimated using several approaches. For example, the estimation can proceed as is currently done when no port-sampling data for Class 1-5 vessels are available. Specifically, the sample data from Class-6 vessels fishing in the same area and time period, with the same set type, are used to obtain estimates for Class 1-5 vessels. In addition, methods will be developed that rely on multiple data sources, including port-sampling data.

### 5.2. Catch estimation at the trip level

As noted in Section 4, the scientific staff are working to develop a model for the well-level relationship between species composition estimates from port-sampling data and catch data collected by observers, which can be used to predict the species composition of unsampled wells and trips from observer data for a trip-level BSE. Thanks to the EMP, the staff have been able to build a database of high-quality port-sampling data for OBJ-set wells of highliner vessels that has the necessary within-well coverage. Since the IPSP protocol will continue with the same within-well sampling coverage, it would generate the same high-quality port-sampling data for OBJ-set wells to update the current EMP - observer data relationship (SAC-16 INF-I) over time, improving the model for trip-level BSEs related to the IVT. This is an advantage because, as illustrated in SAC-16 INF-I, the port-sampling – observer relationship can differ by vessel. Thus, the historical EMP data will contribute to better estimation of vessel-specific differences in the relationship among highliner vessels. Because the IPSP will randomly select trips for sampling from among those of all Class-6 vessels, port-sampling – observer data models can be developed over time for any of the three tropical tuna species and for any of the three set types, if required.

### 5.3. Morphometric relationships

The morphometric measurements collected by the IPSP, by area and time period and set type, will be used to refine length-weight, length-length, and weight-weight relationships for the three tropical tuna species and for prioritized bycatch species. As part of this research, an analysis of temporal and spatial variability in those morphometric relationships will be conducted. The morphometric relationships for the tropical tunas are used in both the fleet-level species catch estimation (to convert sampled lengths to weights) and in the stock assessment models. The revised relationships will replace those currently in use, which are outdated by several decades.

## 6. BUDGET

Leveraging the Commission's previous investment in the creation and implementation of the EMP allows for efficiency in the development of the IPSP, thanks to the use of existing equipment and established

operating practices, as well as highly qualified personnel who do not require training or adaptation to the work required. Given this, and considering logistical expenses associated with the sampling activity, the proposed yearly budget for the operation of the IPSP is USD$460,000, as detailed in the table below.

| Category | Budget |
|---|---|
| Operational expenses | $ 21,209.52 |
| Samplers | $ 270,166.48 |
| Field operations manager | $ 32,792.00 |
| Data handler | $ 16,832.00 |
| Program coordinator | $ 119,000.00 |
| **TOTAL** | $ 460,000.00 |