

PANAMA AUTHORITY OF AQUATIC RESOURCES (ARAP)

SMALL PELAGICS FISHERY ACTION PLAN (FAP) FOR SARDINE (*CETENGRULIS MYSTICETUS*), THREAD HERRING (*OPHISTONEMA SP.*) AND BUMPER FLAY (*CHLOROSCOMBRUS ORQUETA*) IN THE PANAMANIAN PACIFIC.

BACKGROUND

In the Gulf of Panama , the small pelagic fishery since the 1960s is a pillar of the Panamanian reduction industry that manufactures fishmeal and fish oil for domestic consumption and export.

By using the catch per unit effort, it has been possible to estimate the biomass vulnerable for the fisheries, in each year since 1995. It is noteworthy that the vulnerable biomass is not equivalent to the total biomass, as verified in the hydroacoustic evaluation carried out since 2017

In fact, this study shows biomasses well above the exploited range, even if we consider the lower level of the confidence interval.

	Sardine		Herring	
	2017	2018	2017	2018
Average biomass	233,138	249,851	151,042	180,493
Upper limit	342,509	372,787	209,927	264,864
Lower limit	123,767	126,915	92,157	96,122
Real Capture	39,150	52,431	38,122	37,887

NUMBER AND TYPE OF VESSELS

There are currently 30 vessels dedicated to the small pelagic fishery, 20 fishing licenses for Industrial ships and 10 small-scale fishing licenses. The catches are made with purse seines for industrial vessels and manual nets for small scale vessels.

Start and close Fishing seasons.

The fishing season takes place usually from April 11 to October 31. For the opening of the annual fishing season of anchovies, herring and bumper play, a pre-season fishing small pelagic exploration cruise is developed. The average total length of the target species in the technical report, must be above the minimum size established in Executive Decree No. 107 of March 29, 2016. The closure of the fishing season is established, according to scientific reports based on the monitoring and investigation made by the Development and Investiation General Direction (DGID) of the ARAP on the fishery during the fishing season. In both cases a Resolution issued by the Integral Management General Direction (DGOMI) of the ARAP is the mandatory document.

LEGISLATION

Decree Law 17 of July 9, 1959, establishes the faculty of the Executive Branch regulates and points out the necessary restrictions with respect to the working days for fishing and the closure, the minimum size of the species and the meshes of the nets, the methods and the fishing gear allowed and prohibited and the limitations of capture or intensity of fishing.

Executive Decree 124 of 1990, establishes in its articles the following zones forbidden to industrial fishing: In the Golfo De Montijo, from Punta Calabazal to Punta Corotú ; in the Bay of Parita, from Punta Lisa to the Buoy of Aguadulce and the Buoy a line perpendicular to the Coast; in the Chame Bay, from Punta Chame to Tamborcillo Island; in Pásiga from Chepillo to Punta Mangle, at depths of less than two (2) fathoms during the three months following the period of annual recruitment of white shrimp; in the Maestra all the mouths of the rivers between Punta Mangle and Punta Brujas; in the Gulf of San Miguel, from the population of the Congo River to Punta Buena Vista to Punta Monosenega ; in the area of Búcaro in Los Santos from Punta Tiñidero to Morro de Venado.

DEVELOPMENT PERSPECTIVES

Have an order that allows a responsible fishing activity. The Plan foresees annual reviews that may lead to a gradual increase in the improvement and application of updated scientific knowledge and the collection of additional information required to improve the management program. Thus, achieve the sustainable development of the fishery.

OVERALL OBJECTIVE

Maintain the fishery for small pelagic, sardine (*Cetengraulis mysticetus*) and herring (*Opisthonema sp*) biological, ecological, social and economically sustainable in the Panamanian Pacific .

LINES OF ACTION

Focus of the Fishery Action Plan.

This Plan has been designed considering the importance of the small pelagic fishery and the situation described for the resources in question, in order to ensure their conservation and sustainable use within an ecosystem framework. In this sense, the institutions in fisheries and aquaculture will be strengthened through the integration of state entities and the participation of different entities related to the activity; the ordering of small pelagic fisheries will give, through a comprehensive approach, the organization of fishermen, which will be strengthened with a business sense. This Plan was designed considering three (3)

components: Biological, Ecological and Socio-Economic. In various meetings between ARAP and stakeholders (FISHING COMPANIES) and NGOs, the stages and steps that should structure an action plan were consolidated; as the problem of the fishery, the purpose, goals, operational objectives, management standards, management measures, strategies for the development of the Management Plan, performance verifiers, program monitoring program and research program.

DEVELOPMENT OF THE SMALL PELAGIC FISHERY ACTION PLAN.

The Small Pelagic Action Plan responds to the alert call in which the populations of small pelagic fish are found in the Panamanian Pacific, due to the need to improve fishing regulations, allowing a responsible activity and how long it takes to recover populations that are being captured.

The purpose of this Action or Management Plan is "To maintain an anchovy fishery (*Cetengraulis mysticetus*) and herring (*Opisthonema sp*) biological, ecological, social and economically sustainable in the Panamanian Pacific ". Together, these strategies reflect the purpose statement. Assuming that the key objective of any fisheries management plan is to achieve the sustainable development of the fishery, the biological, ecological and socio-economic goals should always be considered as important limitations for the system. On the other hand, the operational objectives are identified as the measurable changes that will be reached when the fishery management plan is successful. These have been written considering the following formulation characteristics:

- Specific: Refers to a clear objective.
- Measurable: that it is possible to be measured with some indicator and reference point to verify if the achievement has been reached.
- Agreed: through the commitment between the interested parties.
- Realistic: with the scales of time and resources.
- Time-dependent: subject to a time scale that allows you to establish your achievement.

In relation to the strategies, these correspond to the practical details and the steps involved in the implementation of the management plan over time. In this case, planning is planned in which each management measure is broken down into a series of specific tasks, indicating for each one of them, who will be the participants, when it will be completed and who will be responsible for carrying out the homework.

GOVERNANCE OF THE MANAGEMENT PLAN

The Management Plan will be implemented by the fishery and the Authority will follow up on its implementation according to what is established in each of the components in mentioned plan.

The Authority of Aquatic Resources will establish a commission, whose functions will be to annually monitor the implementation of the Management Plan for the Small Pelagic Fisheries, which should make recommendations necessary for the integral update, or parts of the Plan, which will require, based on the reports resulting from the implementation of the plan issued by each Directorate General.

The Commission should be composed of the operational directorates of the ARAP, two representatives of the fishmeal and fish oil processing companies, a representative of the small-scale pelagic fishermen, a representative of the fishermen of small inshore fishery pelagics and a representative of the NGOs , chosen among those interested, with demonstrated involvement in the fishery and legally constituted. Ordinary meetings will be held every three (3) months. In the case of extraordinary meetings the call for small pelagic will be made at the request of three (3) of its members and with a minimum of two (2) weeks in advance.

STRATEGIES TO DEVELOP THE FISHERY ACTION PLAN (FAP)

1.- Biological component

STRATEGIES	ACTIVITIES	PARTICIPANTS	TERM	RESPONSIBLE
1.1 Establish for each fishing season a Maximum Allowable Catch (CMA) range for anchovy and herring based on hydroacoustic evaluation carried out by the companies in coordination with the ARAP, at the beginning of each fishing season	Annual evaluation of anchovy and herring stock abundance through hydroacoustic evaluation.	ARAP / Others	In Progress	Development and Investiation General Direction (DGID) of the ARAP / Fishing and Producing Companies.
1.2 Only twenty (20) Industrial vessels and inshore (artisan) vessels authorized by the ARAP may fish for anchovies and herring so as not to increase, under any circumstances, the level of fishing effort.	Regulation and compliance with the regulation to restrict fishing effort in the number of vessels with fishing licenses	ARAP / Others	Inmediately	Surveillance, Inspection and Control General Direction of ARAP (DGIVC) and Ordenation General Direction of ARAP (DGOMI)

1.3 Maintain the same storage capacity, currently operational, in the eventual replacement of vessels (Maximum capacity of 188 cubic meters) and activities so as not to increase, under any circumstances, the current level of effort.	Limit the hold capacity of the vessels to 188 m3 as established by the Executive Decree.	ARAP / Others	Inmediately	DGOMI of the ARAP
	Application and control of the management measure.	ARAP / Others	Inmediately	DGIVC of the ARAP
1.4 Start the fishing season when the average size of the pre-season sampling of the anchovy, in April of each year, exceeds 12.5 cm. to maintain the status of good productivity of this resource, and establish a dissemination program	Perform the pre-season trips in order to estimate the average population size of anchovy and herring.	ARAP / Others	Months of January, February and March of each year.	Development and Investiation General Direction of ARAP (DGID)

aimed at different users to support the control of the capture of the species	Generate a report on the results of on-board samplings during pre-season cruise.	ARAP / Others	In the first week of the month of April.	DGID of the ARAP
	Officialize by resolution the opening of the fishing season.	ARAP / Others	As of the official delivery of the pre-season report.	DGOMI of the ARAP
	Prepare and execute the program to disseminate the management measure.	ARAP / Others	In the fishing period.	DIFOPAT of the ARAP
	Application and control of the management measure.	ARAP / Others	Once the Plan comes into effect	DGIVC of the ARAP

STRATEGIES	ACTIVITIES	PARTICIPANTS	TERM	RESPONSABLE
1.5 Prohibit the capture of schools of herring whose average size is less than 17.0 cm in total length while carrying out more precise biological-fishery studies for the genus <i>Opisthonema sp.</i> by means of a program for the diffusion directed to different users of these fisheries to support the control	Application and control of the management measure.	ARAP / Others	In the fishing period	DGIVC of the ARAP
	Prepare and execute the program for the dissemination of the management measure.	ARAP / Others	Once the Plan comes into effect	DIFOPAT of the ARAP
	Generate reports on the size structure of the fishery.	ARAP / Others	Quarterly basis	DGID of the ARAP
	Develop and execute the Control and Surveillance program.	ARAP / Others	Once the Plan comes into effect	DGIVC of the ARAP
	Generate Control and Surveillance reports.	ARAP / Others	By season	DGIVC of the ARAP
1.6 Control catches of the <i>Centengraulis</i> species <i>mysticetus</i> when the spawning period begins or by means of the evaluation of the quarterly data provided by the companies, when this results equal to or less than 15% of the maximum CPUE observed in short tons per trip during the season, whichever occurs first	Continue running the monitoring program	ARAP / Others	Annually	
	Design and execute strategies for the dissemination of the management measure	ARAP / Others	Once the Plan is approved	
	Generate reports on the stock size structure	ARAP / Others	Quarterly basis	
1.7 Implement a program of education and training for fishermen on the effects of fishing for the change of vision that is intended to be generated with education for users and others involved, generating in them a greater awareness of the negative effects caused by extraction permanent juvenile	Generate a proposal for program content	ARAP / Others	First year of approval of the plan.	DIFOPAT of the ARAP
	Program design	ARAP / Others	Second year of approval of the plan	DIFOPAT of the ARAP
	Execution of the program	ARAP / Others	Second year of approval of the plan	DIFOPAT of the ARAP
1.8 Update the catch and effort database	Maintain the collection of information on daily	ARAP / Others	Quarterly basis	ARAP / companies

every 3 months to maintain the collection of information provided by the companies with the purpose of monitoring the fishery on the daily catches made during the fishing season by vessel, by fishing area and by species	landings by vessel, by area and by species.			
1.9 Maintain the historical data on the search time between sets to guarantee the updating of the information and with this generate maps of the fishing areas. Within the On-Board Observer Program (POB)	Generate daily reports in the POB	On-Board Observer Program (POB) / Others	Every week of the fishing season	NGOs in conjunction with companies
	Update the database of the daily reports of the POB	ARAP / POB / Others	All weeks of fishing season	NGOs in conjunction with companies
	Raise the fishing effort database in search hours.	ARAP / POB / Others	Quarterly basis	NGOs in conjunction with companies
	Create a map of the fishing areas	ARAP / POB / Others	Annually	NGOs in conjunction with companies
	Prepare a monthly report on the effort per month per area per species	ARAP / POB / Others	All months of the fishing season	NGOs in conjunction with companies
	Prepare a summary of the fishing effort during the season, which will be delivered to the ARAP	ARAP / POB / Others	One month after the end of the season	NGOs in conjunction with companies
1.10 Implementation of technologies by companies for the input of data in the capture zones (physical, chemical and biological parameters)	Take the sea surface temperature by fishing areas.	Companies	Per set	Business
	Prepare a summary of the cold days during the dry season of the year	Companies	First week of the month of May of each year	Business
	To raise a historical record of the flows of the rivers that flow into the main fishing areas	Companies	First year of approval of the plan	Business
1.11 Implement the fishing logbook to collect information on fishing activities in	Design the fishing log database	ARAP / Companies	From the fishing season 2019	DGID of the ARAP / Companies
	Implement the fishing log between the	ARAP / Company	Fishing season 2019	DGID of the ARAP / Companies

the sea, mainly the date of capture, time of capture, fishing area, catch by species.	captains of the boats bolicheras			
	Update the database per month	ARAP / Others	Monthly	DGID of the ARAP
	Prepare the monthly CPUE report by area by species	ARAP / Others	Quarterly basis	DGID of the ARAP
	Collection of artisanal fishing data.	ARAP / Others	Quarterly basis	Regional Directions of the ARAP
1.12 Follow up the structure of sizes and maturity stages of the target species by incorporating the identification of each herring species to collect information on the variation of the sizes and maturity stages of the target species throughout the fishing season.	Perform biometric sampling by species in both the POB and plant	ARAP / Others	Monthly	DGID of the ARAP
	Update the database of the biometric samples that are made both in the POB and those that are made in plant by the ARAP.	ARAP / Others	Monthly	Regional Directions of the ARAP
	Prepare the report on size structures	ARAP / Others	By season	DGID of the ARAP
	Prepare the annual summary on population size structures.	ARAP / Others	Three months after the fishing season ends	DGID of the ARAP

2. Ecological component

STRATEGIES	ACTIVITIES	PARTICIPANTS	TERM	RESPONSABLE
2.1 Perform sampling of the accompanying fauna of the target species on board fishing vessels in order to monitor bycatch	Implement biometric sampling in fishing vessels	ARAP / Others	From the next fishing season, after the plan has been approved	DGID of the ARAP.
	Trainings by the companies to the crew for data collection and collaboration with the Authority	Companies	From the pre-season 2019, after the plan was approved	Business
	Generate technical reports on species composition and size structure	ARAP / Others	Annually	DGID of the ARAP.
2.2 Identification and counting of the seabirds that are grouped in the sets within	Identification and the count that on-board	Company / NGOs	From the first year that the Plan is approved.	Companies / NGOs

the framework of the (POB) in order to monitor the species and the quantities of birds that, during the sets made by the fishing vessels, are grouped with the purpose of feed.	observers perform on birds.			
	Generate technical reports on the identified species	Companies / NGOs		Companies / NGOs

3. Socio-economic component

STRATEGIES	ACTIVITIES	PARTICIPANTS	TERM	RESPONSABLE
3.1 Ensure compliance with the regulations in order to ensure that there is no overfishing, and, therefore, minimize risks of collapse and loss of jobs	Compliance with the norm to restrict the fishing effort in the number of vessels with fishing license	ARAP / Others	Righ now	DGIVC and DGOMI of the ARAP
	Application and control of the management measure	ARAP / Others	Righ now	DGIVC of the ARAP
3.2 Training program for captains and crews to improve the professional level and to reinforce the ability of fishermen to carry out their work with application, seriousness, honesty and efficiency, preserving the sustainability of the activity	Design and elaboration of labor survey	Companies	As of the second year of validity of this Plan.	Business
	Application of the survey	Companies	As of the second year of validity of this Plan.	Business
	Generate training talks that reinforce labor competencies and job security	Companies	As of the third year of validity of this Plan.	Business
	Evaluation of the results of the presentation of talks	Companies	As of the third year of validity of this Plan.	Business

REVISION OF THE MANAGEMENT PLAN (FAP)

An annual evaluation will be carried out that involves the review of the results based on the proposed activities. In addition, a five-year review of the general plan is contemplated to consider, if necessary, updating it. Otherwise, it should be revised when it is precautionary to do so, in addition to when new information or scientific information is available.

In conclusion, the adoption of the Management Plan for the small pelagic fishery, includes the establishment of fisheries management measures, necessary for anchoveta, herring and orqueta species, in a manner that is related to the availability of resources that will result in prevent overexploitation of fishery resources, without excluding biological assessment of resources, environmental and socio-economic aspects related to the activity.