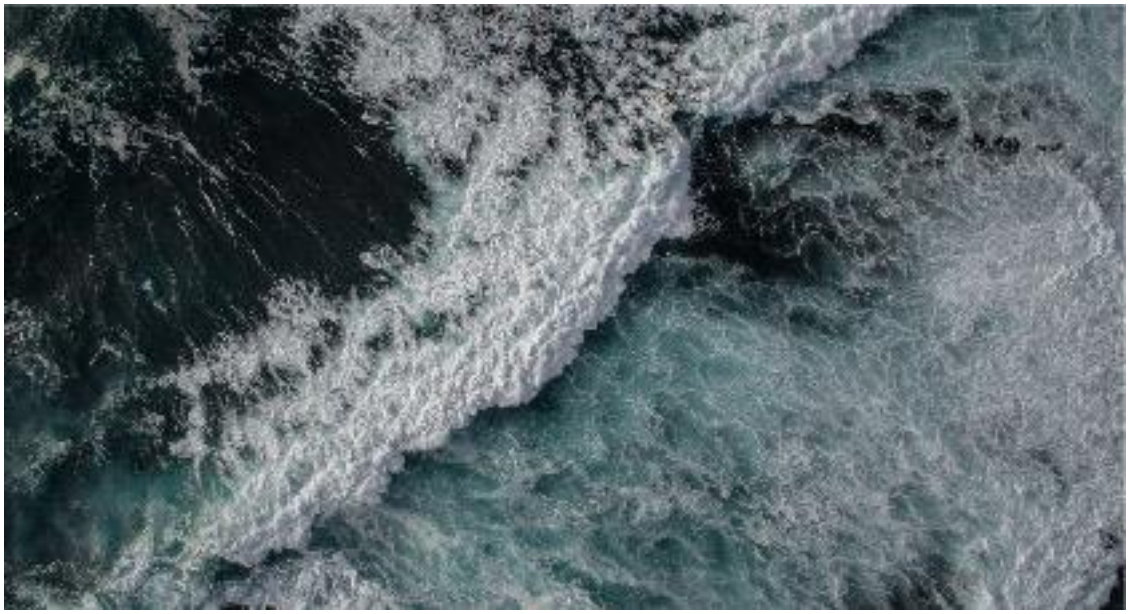
Baseline Review and Ecological Analysis



First regional expert workshop of the STRONG High Seas project 'Strengthening Regional Governance of the Oceans for the High Seas'

CPPS Headquarters, Guayaquil, Ecuador, 5-7 February 2019

1. First day

1.1 Description of the main advances of the STRONG High Seas Ecological Baseline analysis (preliminary report) – Gustavo Castellanos, WWF Colombia

The ecological baseline report under preparation within the STRONG High Seas project seeks to compile existing information for marine areas beyond national jurisdiction (ABNJ) in the Southeast Pacific region regarding the main characteristics of the marine environment and existing or potential human activities impacting these areas, and to translate it into simple language that is easily understood by decision-makers. The project has concentrated on FAO's geographic area 87, which extends from Colombia to southern Chile. The report contains different topics covering oceanography, distribution of the main organisms, areas of recognized ecological importance, areas of potential unrecognized ecological importance, key biodiversity characteristics (e.g. migratory routes of turtles and whales), distribution of the main living and non-living resources (for example, what is known about fishing areas, accompanying fauna and mineral resources), existing human activities (such as maritime traffic), future human activities, past and future trends of resources in ABNJ in the Southeast Pacific region, and information gaps. The main objective is to evaluate the status and pressures for each issue. The report ends with a concluding chapter providing future perspectives. The same exercise is being conducted for the Southeast Pacific.

For the development of the ecological baseline report, peer-reviewed scientific literature, global databases and regional and local sources and experts are used as sources of information, in line with the objective of the workshop.

Once the ecological baseline report is completed, it will provide a basis for future assessments which will focus on socio-economic aspects before policy recommendations can be made.

Comments

- Commitments of participants to identify information gaps
- Make sure that the documents are in the official languages of the regions, i.e. they should be published in English, French and Spanish. In our region, it is recommended to write them first in Spanish, involve local stakeholders in the drafting and then translate the document into other languages
- Have as central objective to match local and regional knowledge
- Give importance to social issues, seeking to identify the pressures for coastal communities
- Most of the information generated in peer-reviewed publications is not produced by people from the region, hence the importance of linking them
- It is a challenge to compile and present in a reasonable way the growing information about ABNJ in the region
- There are regional and global initiatives pursuing similar ends – integration is needed and sought
- There is regional expertise that needs to be highlighted and fostered
- An agenda is needed to identify information gaps and work together to try to fill them and create a regional network to share the information obtained by the different organizations
- Create a joint platform with CPPS that is effective in facilitating dialogue among nations and a practical mechanism for the exchange of information
- There must be a commitment from all parties to seek relevant information on ABNJ for the platform
- The documents produced by the different scientific projects must be easily accessible to the population of the region and in Spanish
- Take the information produced by the global scientific community and back it up with local knowledge from experts in the region, which in many cases is not published or is found in grey literature. This will enrich the document and adapt it to the needs of the region
- Important to include the social issue of access to and use of resources by coastal communities, such as artisanal fishing, which allows an understanding of the situation of fishery resources in these areas and gives a broader perspective to decision-makers

1.2 Review of Ecologically or Biologically Significant Marine Areas (EBSAs) and Migratory Connectivity in the Southern Pacific and Perspectives for the Future – Patrick Halpin, Director of the Progamme for Environmental Geospatial Analysis, Duke University, USA

Biodiversity in the ocean is not equally distributed, thus identifying these areas requires specific scientific knowledge and spatial analysis, just as human impacts on the ocean are not equally distributed.

Due to the growing and unlimited capacity to industrialize the oceans, the need arises to re-imagine how to effectively measure, monitor and sustainably manage 71% of the earth's surface. 60% of the ocean are ABNJ.

The EBSA (Ecologically or Biologically Significant Areas) process has been developed about 10 years ago, and as described by the Convention on Biological Diversity (CBD), EBSAs can be described within and beyond national jurisdiction (EEZ or ABNJ). Currently, thanks to the Ocean Biogeographic Information System (OBIS), there is sufficient data on marine biodiversity for decision-makers to plan regionally. Although they have a great deal of information, data for offshore areas in ABNJ, the middle water column and the high seas are still lacking. It is very important to understand that EBSAs are not marine protected areas, as they do not have established management, although some EBSAs have been identified within a protected area.

Criteria for EBSAs:

1. Uniqueness or rarity
2. Special importance for life history stages of species
3. Importance for threatened, endangered or declining species and/or habitats
4. Vulnerability, fragility, sensitivity, or slow recovery
5. Biological productivity
6. Biological diversity
7. Naturalness

The EBSA criteria identify areas with prioritized or endangered species, or those important to migratory species. 80% of EBSAs refer to the protection of migratory species as the justification for their identification, but ideally it would be to take into account connectivity processes. The Migratory Connectivity of the Oceans (MiCO) project is looking for corridors.

Currently there are 319 EBSAs that have been described around the world, of these 10.3% are in ABNJ, 22.3% have some or all of the area in ABNJ, others are in national waters. In the Eastern Tropical and Temperate Pacific there are 21 EBSAs.

EBSAs are classified by type:

- Type 1: Static characteristics such as a seamount or coral reef
- Type 2: Groups of characteristics such as a chain of seamounts or a group of fisheries
- Type 3: Ephemeral traits such as characteristics that change over time, e.g. seabird feeding areas that are highly productive during certain periods.
- Type 4: Dynamic characteristics, i.e. they move in the ocean as the transition zone of the North Pacific and the Sargasso Sea.

Classifying them helps to give precision to the interpretation of boundaries, the definition of areas and monitoring, as well as helps to identify tools and technologies to monitor the ecological state and human impact on these sites.

The workshop on EBSAs in the Eastern Tropical Pacific was carried out in the Galapagos Islands (August 2012), with the objective of describing the EBSAs of the region. All relevant documents are online on the CBD website (the Secretariat of the CBD is based in Montreal). While several sites were considered,

others were left for future review. New information is now available to update the regional description of EBSAs.

It is considered important to conduct a review of EBSAs, including geographic coverage, classification, biogeographic coverage, network and connectivity coverage, monitoring, next steps, and gaps in information.

It is equally important to include connectivity in the analysis process. Since many marine species migrate long distances through national and international waters, effective management of these widely distributed species requires shared information and international cooperation. 80% of EBSAs refer to migratory marine species as part of the justification for their classification. The development of Important Bird Areas (IBAs), Important Marine Mammal Areas (IMMAs), Important Turtle Areas (ITAs) and Migratory Ocean Connectivity (MiCO corridors) can directly inform the EBSA process and are used to justify their classification.

It is essential to investigate how EBSAs and emerging information from the migratory corridor can be used in regional ocean planning, which is a priority for sustainable ocean management in the region.

Comments

- *Would microbiological diversity be considered in these processes?*
  Yes, but a lot of work is needed in this area.
- *What is the conservation status of these areas and how are any recommendations implemented?*
  The CBD does not have a mandate, it is only one step for describing regions and their importance, but management should be considered separately. It is a process with a scientific and objective focus.
- *How does the workshop process to define EBSAs function?*
  The CBD convenes the workshops, experts are nominated from different sources and information is provided as a product. The success lies in the experts attending the workshops.

1.3 Overview of ENSO and its effects on the Southeast Pacific Region - Rodney Martinez, International Director, International Centre for Research on the El Niño Phenomenon (CIIFEN)

Sea level rose by a record 2 to 3 mm between 2017 and 2018, and the concentration of greenhouse gases also continues to rise. 2018 was one of the four hottest years in history. This trend continues to grow. These changes pose risks to marine ecosystems and their services. In the IPCC report there is no specific information on the Southeast Pacific, which may be a motivation to generate scientific information at the regional level.

There are uncertainties regarding climate change and how it affects the Southeast Pacific region. The first is that according to data presented by observations, while in other regions of the world the trend is toward an increase in ocean temperature, the Southeast Pacific shows cooling. This leads to the second uncertainty, which is that IPCC climate models, which show a general warming of the planet, contradict scientific observations.

There is a decadal and interdecadal fluctuation of the ENSO (El Niño – Southern Oscillation) processes and apparently the variability of the event has been amplified. These changes are attributed in part to the Central Pacific Ocean as it can contribute greatly to the fluctuations across decades in the Southeast Pacific. From an atmospheric point of view, there has been evidence that there is a very clear influence of a decadal fluctuation in climate. While the rest of the oceans are warming, the Southeast Pacific is cooling.

In recent decades there has been a period of persistent cooling, since 2000 the El Niño activity has weakened, especially in the Eastern Pacific, which shows a reduction in ENSO anomalies and a reduction in sea temperature anomalies in connection with El Niño events.

Is ENSO changing because of climate change?

Evidence suggests that according to findings presented by Dr. Shineng Hu, winds across Ecuador have been strengthened due to multidecadal fluctuations observed in the Eastern Pacific since the 1980s, which may be connected to the warming in the North Atlantic. Likewise, these multidecadal changes can change the mean La Niña state of prevailing cold conditions; that the Intertropical Convergence Zone (ITCZ) crosses Ecuador less frequently; that there is also a weak El Niño variability; and an ENSO-type change from the Eastern Pacific to the Central Pacific.

To this, many authors argue that climate change has influenced and changed El Niño. El Niño 2015-2016 to date is one of the least documented (Mike Phaden, Explaining Extreme Events from a Climate Perspective, 2016), there remains uncertainty as to how ENSO impacts will manifest in the Southeast Pacific.

Predicting ENSO on a global scale and its regional impacts remain a major challenge.

As the complexity of ENSO prediction increases, global and regional observing systems tend to decline.

Without more investment in observation and research in the Southeast Pacific, it will be very difficult to answer key questions for the management of large marine ecosystems, as well as the prediction of ENSO's regional and local impacts.

The region requires a scientific assessment to guide political negotiations and agreements related to the ocean.

There is no data sharing in the Southeast Pacific region and therefore no in-depth analysis or series of years that would increase information on the area. There are many scientific publications from international bodies that present erroneous data on the current situation in the Southeast Pacific.

CPPS has requested that no publication of the project be made without the endorsement of the staff of the region. For this there is a protocol to receive the publication and send it via the Ministry to each entity defined by a country and wait for comments from them.

1.4 Oceanographic Characteristics of Easter Island - Beatriz Yannicelli, Universidad Católica del Norte, UCN Chile

There are new studies in the Pacific on genetic diversity found in the water column, not only in hydrothermal vents. They show that there is a great diversity of metabolisms, known also as microbiological carbon pump, responsible for sequestering carbon dissolved in seawater from the atmosphere, which is no longer available so ceases to contribute to warming.

Until 10 years ago it was unknown that there is a zone of minimum oxygen also in the region of Easter Island, in which aerobic processes occur. This is an important issue for the BBNJ negotiations.

The biological processes that occur in the Pacific are particular and different; it is not possible to generalize forecasts regarding climate change.

It is important to look for the link between the micro and the macro at the plankton level. On Easter Island, for example, we have nutrients at a depth of 250 m, but there are no currents that take them to the surface. Hence, in oceanic islands, it is not enough to manage marine areas, but also the coastal zone and the issue of runoff have to be managed.

1.5 Potential and known impacts of maritime traffic in the Southeast Pacific and its potential effects on biodiversity (megafauna) - Fernando Félix, CPPS- Fernando Félix, CPPS

Collisions with whales, manta rays, turtles and other large numbers of megafauna is a growing global problem, which has to be addressed and to which solutions and management alternatives should be sought.

Every day boats are bigger, faster and marine species have less opportunity to avoid them. Collisions occur with all types of boats, affecting all species of whales. The North Atlantic right whale is particularly affected as collisions with boats are the main threat to this species classified as threatened and which population size is estimated at about 350 individuals. There is a lack of information to understand this problem in depth, such as species reports or information about where collisions occur and under what circumstances, to try to formulate mitigation mechanisms.

The main ports of the region are, in order of maritime traffic, in Panama, Peru, Chile, Mexico, Ecuador, Costa Rica, Colombia, Guatemala and El Salvador.

According to CPPS (2014), there are 26 cases of documented collisions in the region; six different species of whales throughout South America.

In Ecuador, satellite tagging of whales has been carried out to try to assess the risk of collisions, allowing animals to be tracked day and night for up to 6 months, regardless of climatic conditions.

In order to reduce the risk of collisions, it is necessary to regulate maritime traffic, which implies safety of navigation of the merchant navy, safety of the fishing fleet, especially the artisanal fleet, national security, protection of protected areas and endangered species. In some countries, they study the sites with the highest concentrations of whales and prepare schemes for the movement of boats away from these areas, thus avoiding collisions, which can be avoided by up to 95% when applying these measures. In the case of Panama, the International Maritime Organization (IMO) adopted traffic separation schemes in the Pacific and Atlantic as well.

The Marine Environmental Protection Committee (MEPC) of the IMO generated management measures which were not well accepted by countries. Similarly, the International Whaling Commission (IWC) created a working group on ship collisions (SSWG).

The IWC recommended increasing cooperation with IMO, intergovernmental organisations and non-governmental organisations at its meeting in June 2014 in Panama.

The speaker highlighted the ecological connectivity that exists between areas within and beyond national jurisdiction, shown through an example of the migration of a humpback whale between Ecuador and Chile and another one that migrated between Ecuador and Brazil, swimming around the Southern tip of the American continent. In some cases, whales move between oceanic basins when extreme climatic events such as El Niño occur.

For the blue whale there are movements between the Galapagos Islands (Ecuador) and Chiloé (Chile) and it can be said with high certainty that they feed to the 200 m depth of the South zone in Chile.

Challenges in the region are:

- Internalize the concept of ecological connectivity between EEZ and ABNJ to improve the management and use of BBNJ taking into account large-scale oceanographic processes and the seasonality of marine megafauna migrations
- The organization of maritime traffic in EEZs to reduce the risk of collisions with whales and other species of megafauna
- Promote interdisciplinary studies in areas adjacent to areas of national jurisdiction (e.g. oceanography, geology, biodiversity) to better understand ecological processes and identify new areas of importance to marine biodiversity that require management measures
- Promote the exchange of biodiversity data (punctual records, satellite tracks) and create alliances among researchers in order to strengthen databases and carry out new regional analyses
- Strengthen regional maritime institutions through CPPS as a platform for managing processes related to BBNJ (e.g. Prepcom, EBSA, VMA, OBIS, etc.)

Comments

- *Why do collisions with whales occur, if ships have a very loud noise with their propellers moving, which can be detected before and at a long distance?*

Apparently the noise is dispersed and it is not clear to the whales where it comes from. They might also be engaged in other activities such as breeding, which distracts them.

- *Has citizen science been considered as a tool to obtain information?*
  There is information of this type particularly from ships of the Chilean Navy, which collect information on marine mammals.
- There is a voluntary climate network through low-cost rain gauges, which feed data through cellular networks.

1.6 Marine litter in the Southeast Pacific region - Martin Thiel, Universidad Católica del Norte, Coquimbo, Chile

Thiel (1983, 2003) states that coastal waters have a greater volume of garbage than offshore waters (+ 10 km), indicating that garbage comes from land. In the same sense, garbage to which marine organisms adhere shows that they come from outside waters. The problem is that plastic is found where biological productivity is, such as organic matter, larvae, eggs, etc.

After conducting studies of floating algae along the coast of Chile, they noticed the high presence of plastic waste that floated carrying also some organisms. Not being able to ignore the great problem of waste, they decided to create the Program "Waste Scientists on the Beach", which consists of using citizen science as a means to collect data on marine litter, working mainly with school children. The methodology is to use a network for one hour of sampling, characterizing and creating a database of the waste collected during the sampling, analyzing where it comes from and trying to demonstrate that the rivers move a lot of garbage to the sea; therefore, the sources are local and the sites closest to urban areas and coastal activity (port activities, aquaculture, coasts for recreational use) show the highest concentration of garbage.

Regarding islands, such as Easter Island, the result showed that the greatest amount of garbage comes from industrial fishing waste, i.e. foreign zones, distant sources.

When garbage reaches the sea, plastics are fragmented into small pieces and concentrate in the centre of the Pacific gyre, where Easter Island is located. So a study of the entire coast of Chile showed 25 units of microplastics/m^2, while the island was around 800 microplastics/m^2.

According to the literature, the greatest impact of plastics is on sea turtles. They are affected both by entanglement and ingestion. And the most worrying thing is that all sea turtle species reported in the region are affected. They also found that, in this area, 20 species of fish, five species of turtles, 53 species of seabirds and 19 species of mammals interact with plastics. A total of 97 species from the Southeast Pacific are reported in this study because they interact with plastic waste, either by entanglement or ingestion.

80% of the fish researched present microplastic content in their organism, mainly the fish present near the continental coast. In the case of birds, they present plastic ingestion mainly in the open ocean, the concentrations are very high in oceanic species. Mammals are affected by entanglement mainly in the continental coast.

Mangroves act as a trap that retains garbage, but there is very little information and more attention should be paid to them as this is a serious problem.

The results are shared with the media and the teachers who accompany the program. Think that plastic is NOT recyclable and it would be best not to use it.

2. Second day

2.1 Current Global Risks to Marine Mammals with an Emphasis on South and Central American Countries - Isabel Cristina Avila

Isabel Cristina Avila presented the first documented inventory of threats to marine mammals, the purpose of which is to provide a systematic and spatially explicit view of the documented threats currently affecting marine mammal species, at specific locations, through the development of a series of risk maps.

Definition of threat: a stressor, action or event that has harmful effects. At the individual level, alterations, changes in behaviour and distribution, disease, injury or death occur. At the population level, there is a decrease in reproductive success, gene flow or population size.

Isabel Cristina Avila reviewed 3,300 documents and extracted information from 1,783 that showed some degree of threat. The information was referenced in maps of threats and risks intercepting its location with the presence of the species. Threats were included for 121 species, 99% of all recognized marine mammal species.

The structure of the database classifies threats into: bycatch and interactions with fishing gears, direct capture, pollution, transit and transport, pathogens and introduced species, resource depletion and physical-oceanic alteration. Each of these classifications has threat subclasses. In addition, they identified the sources of threat or activities causing the threat.

Bycatch and interaction with fishing gear was the most impactful threat, followed by pollution, direct capture, maritime traffic and transport. In terms of threats, fishing, residential and industrial development, hunting and tourism were found to be the main sources.

It was found that globally almost all marine mammal species (98%) are affected by at least one threat and 51% of the central habitat of marine mammals is being affected (all threats to species combined), placing the mammal community at high risk in 47% of coastal waters.

With information from 11 countries in South America and seven in Central America, it was found that bycatch and interaction with fishing gear is also the main threat in the region and that almost all marine mammal species in South Central American countries (49 spp., 78%) were affected by at least one threat between 1991 and 2016. As for sources of threats, the main ones are anthropogenic activities, mainly fishing and industrial urbanization/development. The bottlenose dolphin and the Galapagos sea lion are exposed to the greatest number of threats.

In conclusion, bycatch is affecting 44 species, especially common and bottlenose dolphins, and the risk zone is concentrated mainly in Brazil and the Pacific coast of Central America. The direct capture affects 21 species, presenting a greatest threat to the West Indian manatee and bottlenose dolphin and the area of greatest risk is southern Chile. Pollution is affecting 27 species and the most affected species are the silver dolphin, the white buffalo, the manatee and bottlenose dolphin and the hotspot for this threat is in southern Brazil. Transit and transport is affecting 27 species, especially the manatee and humpback whale and Brazil is the hotspot for this threat. Pathogens and introduced species affect 17 species, the bottlenose dolphin being the most affected, in the area of Brazil. Decrease of resources affects 10 species in the region; the most affected were the silver dolphin and the manatee in the region of Brazil. The physical-oceanic alteration, as El Niño phenomena or changes in currents, affects nine species, especially sea lions, mostly in Chile.

Comments

- *Have the threats for the last period decreased?*
  Data from the last four years are required to complete the dataset for the decade, which is necessary to come to a conclusion.
- *Which fisheries have the greatest impact and in which areas are the greatest threats?*
  For this analysis all the fishing information was gathered. In the future it could be discriminated between fisheries, but not in the current analysis.
- *Is there any baseline analysis to know levels of affectation? For example, in the specific case of Ecuador and the spotted dolphin.*
  There is not a complete baseline for all the species and the vulnerability was not analyzed, it was more a state of the art and it was not possible to extract details by species.

2.2 Overview of tuna fisheries management in the Eastern Pacific Ocean (EPO) and IATTC's commitment to ecological sustainability

of its fisheries through new ecological risk assessment methods - Shane Griffiths, Inter-American Tropical Tuna Commission (IATTC)

The IATTC Convention covers 55 million km^2 and spans across national waters and ABNJ. It fulfils the mandates of the Antigua Convention that entered into force on August 27, 2010 and mainly ensures the long-term conservation and sustainable use of tuna and tuna-like species and other associated species in the Southeast Pacific. They are responsible for the conservation and management of tuna and tuna-like species, including the subfamily Scombrinae, Istiophoridae and Xiphiidae. They are also responsible for the conservation, but not the management, of associated species such as turtles and marine mammals.

The commission focuses primarily on three species of tropical tunas: Yellowfin, Skipjack and Bigeye.

The tuna fishery began with pole and line for Yellowfin, Skipjack and North Pacific Albacore, and trolling for Albacore. Currently the fishery is predominantly by purse-seine, followed by longline.

Sets in the purse-seine fishery are carried out for dolphins in connection with Yellowfin fisheries; on floating objects, in addition to non-associated sets, and e.g. for 2017 approximately 31,000 sets were carried out and a total of 615,000 tons of tuna was caught.

Regarding longlines (hooks), the greatest effort is made by Japan and is developed mainly in the projection of the Equator line and directed at bigeye tuna.

The main species of tuna caught in the Eastern Pacific Ocean (EPO) are:

- The skipjack (SKJ) reports many individuals caught up to 50 cm.
- The Yellowfin (YFT) has its highest proportion of catch associated with dolphin.
- The Bigeye (BET) was initially caught by longline and then additionally with purse seine. Species are caught measuring between 40 and 70 cm, which have taken it to overfishing levels.
- Bluefin (BFT) is mostly caught by purse seine and a little longline. About 3,683 tons per year on average.
- Albacore is caught with trolls, longlines and other gears.

Management of tuna fisheries in the EPO: These fisheries are mainly regulated by the carrying capacity of the vessels. They also manage temporary closures for purse-seine fishing. Vessels with a carrying capacity greater than 182 mt must stop their activity for 72 days each year, in one of two periods, in which fishermen may decide not to fish. There is also a closure of the sector known as "Corralito", a strip near Ecuador (where they catch bigeye (BET) between October 9 and November 8), a catch limit for China, Japan, Korea, Chinese Taipei and the United States for BET (less than 30% can be transferred between nations).

The use of fish aggregating device (FADs) increased fishing efficiency especially in SKJ, small BET and YFT. This is a delicate issue because you have vessels that deploy up to 700 FADs. As a result of this, there is an annual limit of sets on floating objects for class 6 vessels in the purse seine fishing for 2019 and 2020 calculated at 15,723. Once this limit is reached, only dolphin-associated sets will be allowed for the rest of the year and all vessels without a Dolphin Mortality Limit (DML) must return to port.

The following are some ongoing projects to manage the fishery with Fish Aggregation Devices (FADs): Management of FAD deployments, such as quotas, etc.; biodegradable, untangled FADs; limiting the depth of FAD material, e.g. net meshes.

Comments

- *How can you be sure that the information placed in databases really corresponds to the catches by boat of each country when they are flagged to another country?*
  The reporting is done by flag first, then the quota.
- *Are bycatch levels documented?*
  There is a lot of data especially for purse seine fishing.
- *What does that mean, with such short fishing prohibition times?*

Specifically, the "corralito" to the west of the Galapagos Islands allows in that month to disperse the tuna from the area with the greatest fishing effort and give it time for growth. That month plus the closure periods (72 days), add up to a total of three months of fishing prohibition.

- *These measures are for IATTC countries, what other measures are there?*
  There are 21 member countries plus five cooperating non-members. Depending on the type of fishery, the countries have different measures.
- *Do you have a monitoring program specifically for these smaller vessels that calculates how much they actually extract?*
  There is a project under development that gathers information specifically on sharks in small-scale fisheries.

2.3 Migrations in the Marine Corridor of the Eastern Tropical Pacific - Alex Hearn, Universidad San Francisco de Quito

Migramar works in the Eastern Tropical Pacific and was initiated as an initiative between the governments of Costa Rica, Panama, Colombia and Ecuador in 2004. They signed the declaration of San Jose to conserve and use marine resources of the four countries in a sustainable manner and achieve connectivity between the Galapagos and Cocos Islands, since these are very productive areas in terms of fisheries, biodiversity and confluence of ocean currents.

The Migramar network has tagged about 1,000 individuals in the region, most of them hammerhead sharks, and has about 100 acoustic receivers, obtaining a lot of information from Galapagos Islands and their close relationship with individuals that migrate with Cocos Island.

In the Southeast Pacific region, it is difficult to estimate shark populations due to the lack of information, but apparently there are some declining trends, also of turtles even within marine protected areas (MPAs).

As for the migratory connectivity of species, a large number of movements have been found between the Galapagos Islands and Cocos Island by multiple species such as green turtle, leatherback turtle, giant manta ray, hammerhead shark, Galapagos shark, tiger shark, whale shark, humpback whale and silky shark.

The whale shark usually swims alone, but in the Galapagos Islands, although it is not a species aggregation, many individuals are seen between August and December. To date however the birth zone is unknown and data on new-borns are few.

As for Sphyrna lewini, large schools of adults are seen on the islands, while juveniles are seen on the coast.

For their part, manta rays move between the coastal areas of Ecuador and Peru. Hence they are compiling all the information to justify a swim way and to determine the socio-economic impact of that migration with a fishing approach, as well as the legal and political requirements for this initiative.

A migratory pathway is a transboundary area that links two or more hot spots between which endangered aquatic species migrate, with a management plan, indicators, and a monitoring system designed and implemented to reverse population declines of these species, eliminate IUU fishing, and where appropriate, ensure the sustainable exploitation of commercial resources.

Comments

- *Are there analyses of climate change affecting these elasmobranchs?*
  Basically, all analyses focus on the loss of habitat for these species.

2.4 Marine biodiversity associated to the tuna fisheries (purse seine and longline) in the Eastern Pacific Ocean – Shane Griffiths, Inter-American Tropical Tuna Commission (IATTC)

The IATTC is responsible for the conservation and management of tuna and tuna-like species and associated fish species (dolphins) which are impacted by the fisheries in the EPO. They are also committed to ecological sustainability and are party to the Antigua convention and must develop management measures for all species belonging to the same tuna ecosystem, as well as ecological risk assessment and ecosystem modeling.

As for current data and monitoring reports, catches are reported to the IATTC by national programs for the main species listed under the convention. Some additional species are reported, but often have poor taxonomic resolution (sharks).

Country reports provide information on species other than tunas, but on sometimes very general terms such as e.g. "sharks". While at the level of Class 6 vessels (>363 ton), observer coverage is 100%, on industrial longline vessels (>24 m LOA) the observer coverage is 5%. Some countries are building 23.9 m vessels, thus avoiding reporting to IATTC, which is a problem. Starting in 2018, the SAC (IATTC Scientific Advisory Committee) decided that set-by-set information be provided in order to obtain more accurate information on the type of species caught.

They do not conduct artisanal fisheries monitoring, especially for sharks, but there has been a project in Panama for two years, which includes Panama, Costa Rica, El Salvador and Guatemala, where shark sampling will be conducted for the artisanal fleet. There has been no specific monitoring of biodiversity, such as total numbers of species in the ecosystem, as they focus only on tuna and its associated species.

In terms of biodiversity for the purse seine fishery, between 1993 and 2016, 167 taxa are reported as part of the tuna fishery, including 49 large fish taxa, 39 shark taxa, 29 small fish taxa, 17 dolphin taxa, 11 tuna taxa, 7 ray taxa, 6 marlin taxa, and 5 turtle taxa, among others.

Longline fishing does not report interactions with birds, turtles or marine mammals, but with 49 other taxa. They know that there is a problem with the reports, since it is well known that worldwide this fishery captures particularly seabirds and turtles. This is something they are trying to change.

As a starting point for the assessment, the IATTC group took the Ecological Risk Assessment of Fishery Effects (ERAEF) as its frame of reference, trying to review all fisheries that may generate a risk. A Productivity Susceptibility Analysis, or PSA, is applied; however, this method only produces a relative measure of vulnerability.

Hence, a more reliable quantitative method is required. In 2017-2018, the **E**cological **A**ssesment of the **S**ustainabe **I**mpacts by **Fish**eries (EASI -Fish) was developed for the management of incidental species, which in the end provides the state of vulnerability of the species through a Koby (red - risk, green - desired) diagram.

2.5 Endangered species in ABNJ in the Southeast Pacific region - Arturo Mora, IUCN

The Red List is the world's largest inventory of the status of species. It focuses on threats and serves to identify conservation issues and priorities, and aides the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which regulates the commercialization of endangered species. The information found on red lists is important for species analysis, for conservation planning and priority setting, for international conservation policy, for informing private sector decision-makers, and for educating and raising public awareness.

There are about 130 specialist groups, which have assessed 90,000 species out of an estimated 1 million on the planet. Conservation success stories are e.g. the humpback whale that reduced its level of risk and is now in minor concern. Specialist groups also develop global action plans for the species.

The categories of real threat are Vulnerable (VU), Endangered (EN) and Critically Endangered (CR). In the Southeast Pacific, 1,829 species have been assessed, including 22 CR, 23 EN and 104 VU, with a total of 149 in the category of threat.

The following criteria must be taken into account prior to assigning a threat category to any species:

A. Population reduction
B. Restricted geographical range
C. Small and declining population
D. Very small and restricted population
E. Quantitative analyses

Evaluation of a regional list precedes the process of setting conservation priorities. It is limited to information on population size, decline, range and responses to threats. It also gives a relative estimate of the likelihood of extinction.

The red list of ecosystems has been implemented with a view to assessing habitats, but not much progress has been made in marine ecosystems.

There is an online course on the subject of Red Lists, and the entire database can be found at www.nationalredlist.org and there are also SSC (Species Survival Commission) Groups.

Comments

- *How is it weighted or valued when there is an absence of data?*
  The better the data is, the better is the evaluation. Success can also come when evaluating information from expert groups. Only if the information is very uncertain, one arrives at Deficient Data (DD).
- *In the Galapagos they had a damsel type fish, which has not reappeared in the last 10 years. When can it be declared extinct? Or change its current category?*
  The idea is to reevaluate locally at least every 5 years and regionally every 10 years.

2.6 Ocean acidification and its impact on marine biodiversity - Patricia Castillo, Universidad Laica Eloy Alfaro Manabí

See: EBIOAC (Equatorial Biome & Ocean Acidification), https://ebioac.weebly.com/

CO_2 in the pre-industrial era (1850-1890) was at 278 ppm. Today we are at 380 ppm and the trend is projected to continue to increase. Other factors that contribute to the acidification of the ocean are pollution, especially by plastic. It is estimated that for each plastic truck, 114 trucks of CO_2 are generated. The ocean absorbs a large amount of the CO_2 generated by human activity, about 30%. It is estimated that the level of acidification in the ocean by the end of the century will be more than 170% (IPCC).

The most impacted organisms are corals and Pteropods, which are indicators in temperate waters. The organism tries to compensate the changes by investing energy in the structure it is losing and not in reproductive issues, for example.

An alteration in larval development is predicted, which triggers malformation, impacts growth rates, causes low reproduction rates and interrupts the trophic chain. At the tissue level, there could be physiological alterations, such as damage to tissue and organs, alterations in behavior and sensory abilities, such as smell or vision, alterations in learning and lateralization or effects on the system of recognition of predators and prey. In general, acidification presents a threat to ecological balance.

Dupont, et al. 2014 presented the first evidence of altered sensory quality in a shellfish exposed to decreased pH due to ocean acidification.

There is a global ocean acidification network, for which information going beyond Sea Surface Salinity (SSM) and Sea Surface Temperature (SST) is necessary. Within the region, there is also the Latin American Ocean Acidification Network (LAOCA).

Proposed lines of research are:

- Experiments induced under ocean acidification conditions
- Monitoring pH, alkalinity, dissolved inorganic carbon (DIC) and pCO_2 as well as temperature and salinity

- Valuation and socio-ecological management

In 2014, Ecuador began research on acidification that seeks protocols for endemic species and looks into their physiological changes.

Comments

- *What measures should be taken into account?*
  There is a great lack of information in the coastal zone, where aquaculture takes place, so it is necessary to monitor and to compensate for the lack of information.
- *Why is acidification produced on a large-scale and who are the greatest pollutants?*
  The industrialized countries, major producers of CO_2, that have not signed international treaties.

3. Third day

3.1 Conservation and Sustainable Use of Marine Biological Diversity in Areas Beyond National Jurisdiction-ABNJ: Background and Progress of the Negotiating Process within the Framework of the United Nations - Gustavo Arévalo, CPPS

These negotiations mark a milestone in the history of ocean management after the United Nations Convention on the Law of the Sea (UNCLOS), not only because of the complexity of the issues involved, but also because of the time it has taken to develop this negotiating process. They seek to identify the regulatory gaps that exist under UNCLOS and possible solutions to address them.

Background of the negotiating process and its instruments

The year 2002 (Johannesburg Summit) is key because this is where discussions on marine biodiversity started and where the Johannesburg Declaration and Plan of Action were adopted. This Declaration assumes the commitment to maintain marine biodiversity in both EEZ and ABNJ and takes into account the factors that may affect biodiversity, proposing as a possible solution the establishment of a global network of marine protected areas.

In 2004, UN Resolution 59/24 created a group to address the topic of ABNJ. In 2011, the Negotiating Package was proposed, containing four elements that are the main points around which the negotiations revolve. They are: Marine Genetic Resources (MGR) and its benefit-sharing mechanism, Area-based Management Tools (ABMTs), Environmental Impact Assessments (EIAs) and Capacity Building and Transfer of Marine Technology (CB and TT). In 2015 the PrepComm (Preparatory Committee) is established based on the negotiating package. States that are part of UNCLOS as well as those that are not must participate in the negotiations of this agreement.

In the negotiations, the countries work organised in regional groups:

- Group of 77 and China
- African Group
- Alliance of Small Island States (AOSIS)
- Small Island Developing States (SIDS)
- European Union (EU)
- Caribbean Community (CARICOM)
- Observers: International Organizations and Non-Governmental Organizations

Elements to consider in the negotiations

- Marine genetic resources (MGRs), including benefit-sharing issues, and the use to be made of these resources for either scientific or commercial purposes, for example the pharmaceutical industry. The critical question for the negotiations is 'what is the legal regime applicable to

MGRs?'. Firstly, it is necessary to find a common definition of MGRs, with a view to harmonizing this concept among all States. Secondly, it is important to take into account the treatment that will be given to these resources, since MGRs can be accessed in three ways: in situ, ex situ and in silica.

- Area-based Management Tools (ABMTs), including marine protected areas (MPAs). The multiplicity of tools without a unifying criterion contributes to the fragmentation of the governance process.
- Environmental Impact Assessments (EIA). It is necessary to define and harmonize this concept.
- Capacity building (CB) and marine technology transfer (TT). There is a need for training and financing for the implementation of marine technologies, especially in developing countries.

Comments

- *What are the possibilities for scientific groups to participate in the negotiations?*
  Spaces are set aside at midday for participants to go and receive technical information (side events), but the scientific community is being sought to take part in the negotiations themselves.
- *What would be the mechanism of Control and Surveillance in these zones in ABNJ?*
  The creation of a scientific body has been proposed, which could offer recommendations to the countries to comply with the agreements, based on scientific monitoring or environmental impact studies.
- *How are economic, political, military and other interests handled in these negotiations?*
  The idea is to put those interests aside. This negotiation seems to be showing an interest in the sustainability of humanity.

3.2 CPPS Working Group on Marine Biodiversity - Gustavo Arevalo, CPPS

The CPPS reiterated in the Commitment of Galapagos for the XXI century its coordinated participation in multilateral initiatives. Hence its support for the topic of BBNJ; the CPPS working group on this issue aims to meet one week before the meeting at the United Nations in New York.

The CPPS reinforces the joint position of the four member countries.

3.3 Projects and Knowledge gaps in South America - A fisheries perspective - Shane Griffiths, Inter-American Tropical Tuna Commission (IATTC)

Projects and knowledge:

- Scientific observers aboard Class 6 vessels, with species-specific formats
- Tests with biodegradable and non-tangling materials, for the tropical tuna fishery with FAD in the EPO and to prevent ghost fishing
- Electronic monitoring (EM) of purse-seine vessel activities and catches (Ecuador)
- Post-release survival assessment of silky sharks caught by longline vessels in the EPO, using best handling practices (Ecuador, Panama, Costa Rica).
- Improving data collection from shark fisheries in Central America, quantification of biodiversity and catches from artisanal fisheries (Panama, Costa Rica, El Salvador and Guatemala).
- Sustainable management of tuna fisheries and biodiversity conservation in ABNJ (GCP/GLO/365/GFF)

Information gaps:

- Quantify IUU catches and recreational catches in EEZs and ABNJ, as management assessment of species requires mortality from all sources.
- Mesopelagic and bathypelagic forage species involved with epipelagic coupling (e.g. vertical migration of Myctophids as prey for tunas/beaks)

- Lack of information on basic taxonomy in the deep scattering layer (to quantify biodiversity)
- Estimates of biomass of migratory fodder species, which are among the highest biomasses of all animals in the world's oceans
- Key species (prey of large predators and predators of small fodder)

3.4 General Conclusions of the Plenary Workshop

- The EBSA criteria highlight areas with prioritized and threatened species, and areas of importance for migratory species, but the ideal would be to see their connectivity and look for the concept of corridors and periodically evaluate these areas.
- The prediction of ENSO on a global scale and its impacts at the regional level remains a major challenge. Nonetheless, global and regional observing systems tend to decline. Continuous in situ data collection is needed to validate global predictions.
- There is good technical information and scientific capacity in the region especially for EEZs that could nurture ABNJ processes, but there are still many gaps in information regarding this region; comprehensive analysis and dissemination is required.
- It is necessary to have databases (that are easily available) and their analysis, for which personnel is required.
- The region requires a scientific assessment to guide the negotiations and political agreements related to the ocean.
- Although data is shared in the Southeast Pacific region, it is not at an optimal level, there is no in-depth analysis or series of years to increase information on the area. Collaborative networks need to be strengthened and incentives need to be created for this to happen.
- The challenge in the region is to internalize the concept of ecological continuity between EEZs and ABNJ in order to improve the management and use of ABNJ, taking into consideration large-scale oceanographic processes and the seasonality of migrations of all kinds, including that of marine megafauna.
- Fisheries are perhaps the activity with the greatest impact in the region and with a possibility for management, followed by high expectations for mining and genetic resources. It also can't be ruled out that the land-based activities generating pollution also affect ABNJ.
- Maritime transport is also mentioned as a risk to ABNJ.
- There is a need to strengthen regional governance. Empowering people with the ocean, succeeding in educating the public about the ocean.
- Need to share experiences and information between the Atlantic region and this region under the project.

About STRONG High Seas

The STRONG High Seas project is a five-year project that aims to strengthen regional ocean governance for the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction. Working with the Secretariat of the Comisión Permanente del Pacífico Sur (CPPS; Permanent Commission for the South Pacific) and the Secretariat of the West and Central Africa Regional Seas Programme (Abidjan Convention), the project will develop and propose targeted measures to support the coordinated development of integrated and ecosystem-based management approaches for ocean governance in areas beyond national jurisdiction.

The STRONG High Seas project has the following overarching objectives:

1. Facilitate the development of improved management approaches for the conservation and sustainable use of biodiversity in areas beyond national jurisdiction in the Southeast Pacific and Southeast Atlantic regions;
2. Identify best practices and provide support to regional institutions and national authorities for implementing existing regional instruments;
3. Develop options for regional governance in a future international instrument under UNCLOS and transfer regional lessons learned to the global level to promote ocean governance.

For more information about the STRONG High Seas project, please visit the website or contact: stronghighseas@iass-potsdam.de

Partners of the STRONG High Seas project

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