REPORT OF THE INTERNATIONAL WORKSHOP TO DEVELOP TRANSBOUNDARY APPROACHES FOR REDUCING RISKS TO LARGE WHALES IN THE EASTERN PACIFIC BASIN (NOAA / CPPS).
15-16 August 2013, Salinas, Ecuador
CONTENTS

I. INTRODUCTION 3

II. PARTICIPANTS 3

III. OPENING 3

3.1. Objectives and scope 3

IV. INTRODUCTION TO MARINE SPATIAL PLANNING 4

V. SOUTHEAST PACIFIC MARINE MAMMAL ACTION PLAN: REGIONAL CONSERVATION PRIORITIES 5

VI. NOAA FISHERIES INTERNATIONAL SCIENCE STRATEGY 5

VII. NOAA FISHERIES OFFICE OF INTERNATIONAL AFFAIRS 6

VII. EASTERN PACIFIC WHALE ECOLOGY. BREEDING AND FEEDING GROUNDS, MIGRATION ROUTES. TRANSBOUNDARY FOCUS 7

IX. BLUE WHALE CRITICAL AREAS IN SOUTHERN CHILE 8

X. THE ECOLOGY OF THE CENTRAL AMERICAN DOME 8

XI. ASSESSING THE RISK OF COLLISIONS BETWEEN SHIPS AND HUMPBACK WHALES OFF PANAMA 9

XII. ASSESSING THE RISK OF SHIPS STRIKING LARGE WHALES IN MARINE SPATIAL PLANNING 9

XIII. BREAK-OUTGROUPS. Day 1. 10

XIV. IMPORTANCE OF A REGIONAL DATABASE FOR LARGE WHALE MANAGEMENT (EG. SIBIMAP/GEOPORTAL/ EBSAS). INFORMATION GAPS ON MARINE MAMMAL MIGRATION CORRIDORS, THREATS, POPULATION STRUCTURE, ETC. RESULTS FROM THE UNEP/CPPS PROJECT ON HABITAT MODELING (MAXENT). 10

XV. SPECIES DISTRIBUTION MODELS: MAXENT VERSUS GAMS. LARGE WHALE RISK ASSESSMENT FOR THE EASTERN TROPICAL PACIFIC 11

XVI. BREAK-OUTGROUPS. Day 2. 12

Appendix 1. LIST OF PARTICIPANTS 16

Appendix 2. AGENDA 20
I. INTRODUCTION

The Executive Secretariat of the Southeast Pacific Action Plan and scientists at the National Oceanic and Atmospheric Administration’s (NOAA) Southwest Fisheries Science Center organized an International Workshop to Develop Transboundary Approaches for Reducing Risks to Large Whales in the Eastern Pacific Basin (NOAA/CPPS). The workshop was held at the Barceló Miramar Hotel in Salinas, Ecuador, on 15-16 August 2013.

Spatial planning has become an important management tool to address sectoral issues in the marine environment (e.g., shipping, fishing, military use, conservation, etc.). It can help reduce the degree of overlap among activities, which reduces conflict among users and contributes to the conservation of threatened species. Risk assessment is a basic requirement of marine spatial planning because it links the spatial and temporal distribution of ecosystem components to human activities.

In eastern Pacific waters, there are nine species of large whales. Some species feed in temperate waters and migrate to tropical waters for breeding. Other species can be found across broad regions in all seasons. These distribution patterns influence the risk of interactions with fishing gear and ship strikes. For example, humpback whales breed along the coasts of Peru, Ecuador, Colombia and Panama, resulting in a concentrated distribution that overlaps with both fishing and shipping activities. Southern right whales are similarly concentrated along the coasts of Chile and Peru. Blue whales occur in both coastal and offshore areas, such as the Costa Rica Dome.

The main objective of the workshop was to share new tools available to identify priority habitat for whales and conduct risk assessments with government officials responsible for implementing spatial planning and managing marine biodiversity. In addition to assessing risk, these tools can be used to explore alternative management strategies and identify information gaps. Consequently, these tools can be used to prioritize management actions and identify areas in which data collection is necessary.

II. PARTICIPANTS

The workshop was attended by delegates from Chile, Colombia, Ecuador and Panamá, as well as representatives of different Ecuadorian governmental and non-governmental organizations. Representatives from the United States’ National Oceanic and Atmospheric Administration (NOAA) and the Permanent Commission for the South Pacific (CPPS) also attended the meeting. Scientific experts from Costa Rica, Chile and Panama gave presentations about their research. The list of participants is included in this report as Appendix 1.

III. OPENING

Opening remarks were given by Dr. Jessica Redfern, Marine Mammal Spatial Habitat and Risk Program Leader at NOAA’s Southwest Fisheries Science Center, and Dr. Marcelo Nilo, Director of Scientific Affairs at the Permanent Commission for the South Pacific (CPPS). Both welcomed the participants and agreed on the importance of this event to promote the management of marine mammals and other highly migratory species in the eastern Pacific.

3.1. Objectives and scope

Mr. Fernando Felix, CPPS Projects Coordinator, explained the objectives and scope of the workshop. In particular, he emphasized:
• the importance of using spatial planning to reduce conflicts among sectors associated with the marine environment
• the challenges that highly migratory species, such as whales, represent for management
• that all countries within the distribution range of these species share responsibility for their conservation
• the need for dynamic management that incorporates temporal and spatial variability.

He also briefly reviewed the Workshop Agenda, which included institutional presentations by CPPS and NOAA, marine spatial planning case studies from several countries, the importance of collecting the data needed to support marine spatial planning, species distribution models (GAM vs MaxEnt), and risk assessment for whales in the eastern Pacific. The workshop agenda is included as Appendix 2.

IV. INTRODUCTION TO MARINE SPATIAL PLANNING. Jorge Jiménez.

The increased use of the marine environment during the last several decades demands the development of a planning process that can reduce conflicts among users and impacts on the environment. Marine Spatial Planning (MSP) is a process that seeks to develop spatial and temporal patterns of environmental use that meet pre-defined economic, ecological and social objectives. It is a process that requires broad political support and a coordinating entity that includes representatives from all major sectors.

The MSP process seeks to answer four fundamental questions: a) What is the area of interest? b) What is the desired future state of the area? c) How do we achieve the desired state? d) How do we know that we are making progress toward achieving the desired state? The desired state of an area reflects the goals of different users and the pressures on the area, such as climate change, socio-economic trends, etc. Developing a solution that can accommodate different goals requires negotiation and conflict resolution; consequently, development of the solution should include cost-benefit economic valuations and social considerations.
The MSP process must use the best available spatial data on species distributions and environmental use to assess the compatibility of activities with the desired state. Key elements of the process include assessment of spatial scenarios of environmental use, the establishment of a governance scheme, development of processes to monitor the state of the area, and development of processes to periodically readjust the distribution of environmental uses, and a mechanism for communicating the progress of the process.

V. SOUTHEAST PACIFIC MARINE MAMMAL ACTION PLAN: REGIONAL CONSERVATION PRIORITIES. Héctor Huerta.

The conservation of marine mammals and their habitats requires permanent national and regional cooperation programs. The Permanent Commission for the South Pacific (CPPS) has been implementing activities for the conservation of marine mammals since the five signatory countries of the Lima Convention (1981) adopted the "Action Plan for the Conservation of Marine Mammals in the Southeast Pacific" PAMM/PSE in 1991. The main objective of the Plan is to assist participating governments in improving marine mammal conservation policies and provide a framework for regional activities that require global and international cooperation.

The main activities resulting from this plan include training, expert meetings and pilot projects. For example, a Technical Scientific Committee on Marine Mammals was recently created. This Committee will provide advice to the CPPS Executive Secretary on priority species for conservation, interactions between species and fisheries or aquaculture, education and training, and updating the information on marine mammals in the Regional Information System on Marine Biodiversity (SIBIMAP). Other activities include the development of SIBIMAP and broad-scale spatial planning for large whales in the eastern Pacific conducted by UNEP/CPPS/Spain.

VI. NOAA FISHERIES INTERNATIONAL SCIENCE STRATEGY. Keith Chanon

Keith Chanon described how NOAA Fisheries uses science to conserve living marine resources and implement ecosystem-based approaches to management. NOAA Fisheries' International Science Strategy was prepared in 2011 and is intended to increase support of scientific collaborations with foreign nations and international organizations. The Strategy categorizes NOAA Fisheries' international science activities into the following four categories:

1. Regional agreements
2. Bilateral and multilateral collaborations
3. International marine science organizations
4. Assisting other nations

With the establishment of the Strategy, NOAA Fisheries created an internal competitive funding process to increase international research. Annually, NOAA scientists can compete for $25,000 to support small-scale research projects. Currently, NOAA Fisheries is engaged in several research projects in Latin America focused on sea turtles and marine mammals, including plans to provide a training course on fisheries stock assessment methods in Argentina and Chile in early 2014. For additional information about NOAA Fisheries' international science activities, see: http://www.st.nmfs.noaa.gov/international/index
NOAA's Fisheries Service is responsible for the management, conservation and protection of living marine resources within the United States' Exclusive Economic Zone (water three to 200 miles offshore). Under the Magnuson-Stevens Act, the US fisheries law, the National Marine Fisheries Service (NMFS) assesses and predicts the status of fish stocks, ensures compliance with fisheries regulations and works to reduce wasteful fishing practices. Other legislation, such as the Marine Mammal Protection Act and the Endangered Species Act, seek to recover protected marine species (e.g., whales, dolphins, turtles) without unnecessarily impeding economic and recreational opportunities.

NOAA Fisheries also promotes international collaboration because many marine species cross international boundaries. The Office of International Affairs represents the United States at regional fisheries management organizations and other international bodies and secures equitable access for the United States to shared fish resources. They also have a responsibility to ensure that seafood is safe, sustainable and legal because approximately 91% of the U.S. seafood supply comes from imports (about $10 Billion). Efforts supported by NOAA Fisheries are underway in many developing countries to build capacity for safe, legal and sustainable fisheries.

International living marine resource management is important for a number of reasons. International law gives all nations the right to fish on the high seas, commensurate with a duty to cooperate. The present status of worldwide fisheries points to the need for better international marine resource conservation. The most recent statistics (2009) show that 57% of fish stocks are fully exploited, 30% are overexploited and 13% are underexploited. The consumption of protein from fish also continues to increase. This sort of scarcity often leads to competition and conflict. This competition has led to increasing instances of illegal, unregulated and unreported (IUU) fishing that countries have an increasing responsibility to address. Trade restrictions are a means of addressing IUU fishing, but these measures are often difficult to implement.

NOAA Fisheries has a long history of working collaboratively with other nations to address international marine mammal conservation. These collaborative efforts include: negotiation and implementation of international agreements to protect and conserve marine mammals; sharing of scientific expertise through publications, international workshops, and participation in scientific committees of international research and management bodies; providing funds and technical expertise to build marine mammal research and management capacity in developing nations; technical or logistical support for response to foreign mass stranding events and research on critically endangered foreign marine mammal species; direct support for cooperative marine mammal research in international and foreign waters. To strategically coordinate these diverse activities, NOAA Fisheries Office of International Affairs (F/IA) developed the *International Marine Mammal Action Plan* to guide and fulfill the agency's international obligations to protect and conserve marine mammals and to reduce the impacts of human activities on marine mammals.

The Action Plan leverages and coordinates NOAA Fisheries science and policy strengths to achieve the marine mammal conservation goals and mandates within the Marine Mammal Protection Act (MMPA). The Action Plan meets the MMPA's primary marine mammal conservation goals to:

- Maintain marine mammals as functioning elements of their ecosystem(s) and preserve the health and stability of the marine ecosystem(s).
• Reduce the adverse impacts of fishing and other practices on marine mammals to sustainable, and ultimately insignificant, levels.
• Recover marine mammal populations and protect essential habitats.
• Promote international efforts to encourage research on, and conservation of, marine mammals.

Marine mammals face threats in international waters that are the same as or similar to the threats they face in U.S. waters. For 40 years, NOAA Fisheries has implemented the domestic provisions of the MMPA to address these threats; however NOAA Fisheries’ implementation of the MMPA’s international goals has lagged behind its domestic efforts. Therefore, the core of the Action Plan is an overarching objective to conduct research and collaborate with international partners to conserve marine mammals in international or foreign waters, emphasizing the recovery of depleted or endangered marine mammals and its Seven Strategic Priorities. The Seven Strategic Priorities were selected because they represent the greatest international threats facing marine mammals. The Action Plan’s Seven Strategic Priorities are the foundation to improve research and understanding of marine mammal biology, advance the stewardship of marine mammals globally, and increase cooperation and collaboration with national and international partners, to effectively conserve and manage marine mammals.

1. Reduce the bycatch of marine mammals in international and foreign fisheries to sustainable levels.
2. Improve our understanding of climate change impacts on marine mammals.
3. Reduce prey depletion as a threat to marine mammals by considering predator/prey relationships as part of an ecosystem approach to fishery management in international and foreign fisheries.
4. Reduce the threat of marine debris to marine mammals by decreasing the input of debris—including derelict fishing gear—into the ocean.
5. Reduce the number of vessel strikes in international and foreign waters.
6. Prevent habitat loss, degradation, and disturbance through marine spatial planning and marine protected area designation.
7. Improve our understanding of and response to the occurrence of disease and die-offs in marine mammal populations.

The Action Plan is the basis for our current work in Peru and Chile to test bycatch mitigation measures to reduce the entanglement and mortality of cetaceans.

VIII. EASTERN PACIFIC WHALE ECOLOGY. BREEDING AND FEEDING GROUNDS, MIGRATION ROUTES. TRANSBOUNDARY FOCUS. Fernando Félix

Approximately 40 species of cetaceans have been reported in the eastern Pacific, including 9 species of large whales. Most of these species are highly migratory or widely distributed and occur within and beyond areas under national jurisdiction. The eastern tropical Pacific is a breeding area for migratory whale populations from both hemispheres. There are coastal species (humpback and southern right whales), pelagic species (sperm whales), species with coastal and pelagic distributions (blue whales), and species that have different ecotypes in different regions (Bryde’s whales). Despite significant progress in recent years, our understanding of population structure and abundance for most species in this region is still poor.

The main conservation problems for large whales species include bycatch in artisanal gillnets, ship strikes and noise pollution.
Management of these species is challenging because it must address seasonal, interannual, and decadal changes in species distributions and operate at large spatial scales. Implementation of effective management measures in this region are particularly challenging because of the lack of information, weak or non-existent legal frameworks, lack of political will, poor monitoring and lack of enforcement.

IX. BLUE WHALE CRITICAL AREAS IN SOUTHERN CHILE. Rodrigo Hucke-Gaete.

The Chiloense marine ecoregion has many unique features. Located in the north-Chilean Patagonia, it has attracted the interest of scientists, industry, authorities and the community. This area was recently discovered to contain an important feeding and breeding area for Southern Hemisphere blue whales; it is also used seasonally by humpback and sei whales. The upwelling processes in this area and the fjords support major breeding and nursery areas for fish species. This area also includes local indigenous communities that have a unique ancestral culture. For these and other reasons, this area was recently included in the description of Ecologically and Biologically Significant Areas (EBSA) by the Convention on Biological Diversity (CBD). However, the integrity of these ecosystems has become jeopardized in recent decades through increasing human activities, such as aquaculture (especially salmon), industrial and artisanal fisheries, tourism and maritime traffic. These activities generally overlap geographically and some are not sustainable or appear to be incompatible.

The Blue Whale Center, WWF-Chile and the Universidad Austral de Chile have been promoting a coastal management process, called Marine Protected Areas of Multiple Uses (AMCP-MU), for a decade. Zoning is one of the most important and complex components of this process; it is essential because it defines the functional operation of the MPAs. The appeal of multiple use MPAs is their ability to balance the need for conservation with use of marine resources. Their emphasis on moderate and sustainable resource use, application of precautionary principles and an ecosystem-based management approach results in pragmatic solutions and consensus among different users. Scientific research is increasing our understanding of how whales use this area and their life history. This information can be used to support the coastal management process; the process would also benefit from integrating information from other parts of the Southeast Pacific to identify and define critical habitat for these species. Ultimately, the implementation of effective conservation measures will depend on collaborations between countries.


The existence of a highly productive area off Central America has been known for decades and is referred to as the Costa Rica Dome or Central American Dome. More recently, the importance of this region has been recognized for highly vulnerable species, such as the blue whale and the leatherback turtle.

Important fisheries are associated with this region; they fish in the dome from July to October and in surrounding areas for the rest of the year. The oceanic and coastal areas in this region are connected by the seasonal Tehuantepec and Papagayo winds, which generate a system of circular currents (gyres) that move to the Dome.

Although this information is still fragmentary, it is clear that the complex Dome-Gyres environment is of great ecological importance. Managing this area is challenging because it is located primarily on the high seas in areas of heavy fishing activity and marine traffic.
The Convention on Biological Diversity (CBD) has recognized the importance of this area and included it in the list of potential Ecological and Biological Significantly Areas in the Eastern Pacific. The Central American Commission on Environment and Development has also shown an interest in including the Dome in its regional marine program. Collating existing information for this region and collecting new data are critical for future management and conservation.

XI. ASSESSING THE RISK OF COLLISIONS BETWEEN SHIPS AND HUMPBACK WHALES OFF PANAMA. Héctor Guzmán

The International Maritime Organization developed guidelines for minimizing the risk of collisions between ships and whales in 2008 and several countries have succeeded in implementing Traffic Separation Schemes (TSS) to organize vessel traffic in whale feeding and nursery areas. Panama has one of the busiest commercial routes in the world with over 15,000 transits per year, currently 53% Panamax vessels. Panama recorded 13 whale casualties in just 2 ½ years; these casualties prompted the Panama Maritime Authority to work with scientists from the Smithsonian to design three TSSs in the Pacific. Specific goals were to increase navigation safety, increase the distance between vessels and 13 sensitive marine protected areas and reduce potential whale-vessel collisions. Real-time AIS ship data and satellite tracks of whales showed that 53% of whales interacted with vessels during a 22-day period. The designation of a 65 mile TSS in the Gulf of Panama can reduce the area of interaction by 93% and reduce whale-vessel interactions by 95%. The proposal to establish these TSSs is under consideration by IMO and is scheduled for approval by the Navigation Safety Sub-Committee next September.

XII. ASSESSING THE RISK OF SHIPS STRIKING LARGE WHALES IN MARINE SPATIAL PLANNING. Jessica Redfern.

Marine spatial planning provides a comprehensive framework for managing multiple uses of the marine environment and has the potential to minimize environmental impacts and reduce conflicts among users. An example of the connections between users of the marine environment and the possibility for conflict recently occurred in Southern California when the California Air Resources Board implemented the Ocean-Going Vessel Fuel Rule. The rule required large, commercial ships to use cleaner-burning fuels when traveling close to the mainland coast. Before implementation of the rule, a majority of ships traveled through the traffic separation scheme adopted by the International Maritime Organization in the Santa Barbara Channel. Following implementation, a higher proportion of ships began traveling south of the northern Channel Islands. This shift resulted in increased shipping traffic in military ranges and raised concerns for maritime safety; it also raised concerns about the risk of ships striking large whales.

Spatially explicit assessments of the risks to key marine species from human activities are a requirement of marine spatial planning. Dr. Redfern presented an assessment of ship-strike risk for humpback, blue, and fin whales in alternative shipping routes derived from patterns of shipping traffic observed before and after implementation of the fuel rule. Specifically, Dr. Redfern and colleagues developed whale-habitat models and assumed ship-strike risk for the alternative shipping routes was proportional to the number of whales predicted by the models to occur within each route. They also estimated the potential for conflict between shipping and other uses (military training, fishing, and resource conservation) due to overlap with the routes. Dr. Redfern showed how these analyses can be used as powerful tools for balancing user-user and user-environment conflicts when evaluating optimal shipping routes.
XIII. BREAK-OUTGRUPS. Day 1.

On the last part of the first day, participants worked in groups to address the following questions:

What are the greatest threats to large whales in your country?

There was general consensus among all countries about the threats to large whales. Threats included:

1) Ships striking large whales.
   - We cannot even begin to estimate the magnitude of this problem because there is no binding protocol that governs reporting these events. It is unlikely that these events are voluntarily reported because of fear of punitive consequences.
   - There is also a lack of control over the location of traffic and ship speeds.

2) Interactions with industrial and artisanal fisheries.
   - Industrial: there are reports of sperm whale bycatch in long line fisheries.
   - Artisanal: there are reports of using noise (explosions) to drive sperm whales away from fishing operations. (FIP 2001-31; CCAMLR Science)
   - Active and abandoned nets can result in entanglement.

3) Lack of compliance with whale, bird and aquatic reptile watching regulations may make these activities unsustainable in critical areas.

4) Presence of Tatoo Virus and other dermal diseases. We have no idea of their prevalence, epidemiology, etc. Cause: water pollution (antibiotics, pesticides in the food web, aquaculture, etc.).

5) Lack of information on factors recognized as threats in other parts of the world (e.g., Navy exercises).

6) Other: debris, noise.

Can those threats be addressed using a marine spatial planning approach? Why or why not?

There was general consensus among all countries that marine spatial planning could be used to address the threats. There was also agreement that the information and tools needed to begin making decisions exist. The importance of the following activities was emphasized:

- Assessing the risk of ships striking large whales
- Regulating tourism activities in space and time so that they are more sustainable
- Creating georeferenced databases that can be used to evaluate and manage potential impacts on the marine environment and large whale species.
- Increase the exchange of information between institutions.

Are ongoing MSP processes addressing marine biodiversity issues in your country?

- In Chile, MSP is included in the National Policy of coastal border zoning.
- In other countries, the MSP concept does not exist.

XIV. IMPORTANCE OF A REGIONAL DATABASE FOR LARGE WHALE MANAGEMENT (E.G., SIBIMAP/GEOPORTAL/EBAS). INFORMATION GAPS ON MARINE MAMMAL MIGRATION CORRIDORS, THREATS, POPULATION STRUCTURE, ETC. RESULTS FROM THE UNEP/CPPS PROJECT ON HABITAT MODELING (MAXENT). Fernando Félix

Management of large whales requires biological and ecological information, as well as information about threats to the species. It also requires moving from traditional
national approaches to a regional approach that encompasses the whole range of the species. Finally, management should incorporate spatial planning tools, including effective monitoring and a mechanism to determine whether the desired results have been achieved.

Databases on cetaceans, sea turtles and marine and coastal protected areas were developed within the framework of the Information System on Marine Biodiversity and Protected Areas (SIBIMAP) by CPPS in 2009 to support the implementation of regional programs on marine biodiversity. SIBIMAP has over 16,000 geo-referenced data points for 34 cetacean species in the eastern Pacific. This tool is available online and is publicly accessible. SIBIMAP data were used in a UNEP/CPPS/Spain project that focused on spatial planning for large whales in the eastern Pacific. As part of this project, MaxEnt was used to develop habitat models for five species of large whales (blue, humpback, Bryde's, sperm and Southern right whales). The models predict the probability of occurrence using presence-only species data and environmental variables. Maps of predicted occurrence were created for January to June and July to December. These maps were used in a workshop that focused on describing areas of biological and ecological significance (EBSA) in the tropical and temperate Pacific Ocean. The workshop was organized by the Convention on Biological Diversity (CBD) and held in the Galapagos during August 2012.

SIBIMAP is a platform that integrates data collected in the eastern Pacific. Habitat modeling studies have been conducted using these data and the necessity of using these models in spatial tools for large-scale planning has been demonstrated. Strengthening SIBIMAP requires the collaboration of researchers and institutions to update and expand the data. Political will is required to start using the syntheses of SIBIMAP data (e.g., the habitat models) in management.

XV. SPECIES DISTRIBUTION MODELS: MAXENT VERSUS GAMS. LARGE WHALE RISK ASSESSMENT FOR THE EASTERN TROPICAL PACIFIC. Jessica Redfern.

Marine spatial planning provides a comprehensive framework for managing multiple uses of the marine environment and has the potential to minimize environmental impacts and reduce conflicts among users. Dr. Jessica Redfern presented an overview of the scientific tools that can be used to support marine spatial planning, including modeling species distributions, identifying priority habitat, mapping the distribution of human activities, and assessing risk. She then applied these tools to humpback, blue, Bryde’s, and sperm whales in the eastern tropical Pacific Ocean (ETP).

Marine spatial planning requires a quantitative representation of species distributions; these representations are typically created using species distribution modeling. Obtaining the data needed to develop these model scans be difficult because systematic surveys are expensive and cover a small fraction of the world’s oceans. In contrast, non-systematic data are less expensive to collect and may be more readily available. Dr. Redfern presented preliminary results from a study led by Dr. Paul Fielder to compare species distributions derived from generalized additive models (GAMs) that use systematic data to predict species density and MaxEnt that uses presence-only data to predict the probability of a species occurrence. Comparisons were made using 10 years of systematic data collected in the ETP by NOAA’s Southwest Fisheries Science Center and over 1,100 non-systematic sightings collected by individual researchers. The comparisons suggest that remotely sensed and modeled environmental data result in predictions that are as good as or better than predictions made using in situ environmental data; this result is important because in situ data are rarely available for non-systematic data. The comparisons also suggest
that the MaxEnt predictions are as good as or better than the GAM predictions when both techniques use systematic data. Comparisons of predictions made by MaxEnt using non-systematic versus systematic data are underway. In general, these comparisons emphasize the importance of supporting systematic marine mammal surveys, obtaining non-systematic sightings from a larger area for all species, and recording effort when collecting non-systematic data.

Dr. Redfern noted that the identification of priority habitat requires input from both policy makers and scientists. Specifically, there is a policy component to setting the conservation targets that define priority habitat; ultimately, these targets must reflect societal values. Scientific analyses can help determine how to meet these targets. Mapping the distribution of human activities also requires input from these two groups. In particular, policy makers and managers need to consider four questions:

1) Who are the users?
2) Which areas do they use?
3) What is the overlap among uses?
4) How could policy/management change the overlap among uses?

Scientific analyses can be used to quantify the overlap among users and estimate changes in overlap arising from new policies or management actions.

Dr. Redfern concluded by presenting preliminary results of a risk assessment for four whale species in the ETP. She explicitly addressed the risk of ship strikes and entanglement using a global database developed and described by Halpern et al. (2008). The global shipping and fishing data have several issues that currently preclude finalizing the risk assessment and Dr. Redfern requested help from the workshop participants to improve the data. In particular, she requested better shipping data from automated identification system data and better information on both commercial and artisanal fishing effort, including the number of boats using different types of gear and the areas fished. Obtaining improved data is imperative because the preliminary analyses suggest high ship-strike risk for many species off Baja California, Mexico, and in the Costa Rica Dome. They also suggest high ship strike and entanglement risk off South American.

XVI. BREAK-OUT GROUPS. Day 2

Group 1 (Colombia, Panamá, Costa Rica and NOAA)

The group addressed the following questions:

<table>
<thead>
<tr>
<th>How can you collect data, particularly spatial data, about these threats?</th>
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<tbody>
<tr>
<td><strong>A. Data collection</strong></td>
</tr>
<tr>
<td>• To collect data for oceanic cetaceans, observers can be placed on fishing, research and Navy vessels. Smaller commercial vessels traveling between national ports can be used to collect data for coastal species.</td>
</tr>
<tr>
<td>• Research collaborations could be established with international partners, including obtaining funds from international sources.</td>
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<tr>
<td>• More support from governmental institutions (e.g. Panama - CENACYT).</td>
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<tr>
<td>• Colombia could request access to marine mammal data collected by the Yubarta Foundation.</td>
</tr>
<tr>
<td>• Panama and other countries that are members of the IATTC may request observer data.</td>
</tr>
<tr>
<td>• Panama could request that research vessels working in Panamanian waters carry an observer</td>
</tr>
<tr>
<td><strong>B. Information management</strong></td>
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</tbody>
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Turnover in the government results in the loss of institutional information, databases and publications. Consequently, a proposal could be made to change the way that information is stored by governmental institutions.

### What type of support is needed to build national databases on large whales in your country?

- **Panama:**
  - Information related to fishing vessels is held by ARAP (Aquatic Resources Authority of Panama)
  - Automatic identification systems data from vessels in Panama may be available through the ACP (Panama Canal Authority).
- **Colombia:**
  - Information related to fishing vessels is held by AUNAP (National Authority for Aquaculture and Fisheries)
  - Information from ships is managed by the Ministry of Defense and access is restricted

### What type of support is needed to conduct the spatial analyses needed for marine spatial planning?

- More coordination between governmental institutions, research centers, NGO’s
- Data must be made available.

### What are the institutional opportunities and barriers for resource protections in your country?

Because of the transboundary nature of these species, it would be desirable to have regional binding initiatives.

### What laws exist to protect marine mammals in your country?

**Colombia:**

- **Decree 2811 of 1974:** National Code for the protection of the environment and renewable natural resources. This code establishes the responsibility of the state and citizens to promote the conservation of the aquatic environment and its resources, rational development and to ensure long-term availability and rational use (Article 266). Articles 4 and 5 of this decree define the term fauna as cetaceans, sirenians, pinnipeds, birds, sea turtles, fresh or brackish water crocodiles and frogs, and other species that do not fulfill their total life cycle within waterways, but depend on water for their livelihood. Furthermore, the Decree 1681 of 1978 (Part X Book II) regulates the conservation and use of aquatic resources.

- **Law 99 of 1993,** created the Ministry of Environment and Sustainable Development and reorganized the National Environmental System (SINA). The Ministry of Environment is responsible for national environmental policies and guidelines which are implemented locally by regional environmental authorities (12 of 33 are coastal and marine based).

- **Law 165 of 1994,** Colombia ratified the Convention on Biological Diversity and provides a national framework for the conservation of all species through three fundamental principles: learning, conservation and use of biodiversity.

June 11, 2002.

e. **Act 557 of 2000.** Colombia signed the agreement on the international program for the conservation of dolphins - AIDCP, aiming to progressively reduce incidental dolphin mortality in the tuna fishery.

f. **Directive 001 of 2001** in which the Maritime General (DIMAR) established whaling procedures. The provisions of this Regulation will be adjusted with the help of key stakeholders such as the local coastal community (Buenaventura and Bahía Málaga operators) and the Yubarta Foundation to ensure effective implementation.

g. **Act 1348 of 2009:** Colombia adopted the International Convention for the Regulation of Whaling (ICRW) and its Protocol. In 2011, the country formally joined IWC. Colombia's position in this Commission is related to the conservation and nonlethal use of marine mammals (such as whale watching).

Panama:

- **Law No. 13 of 2005.** Biological Corridor for the Protection of Marine Mammals.
- **Resolution 1 of January 29, 2007** set whaling regulations in waters off Panama.
- **Law No. 44 of 2006** authorizes AMP to manage, conserve, and restore marine and coastal resources and ensure compliance with the provisions of the United Nations Convention

**How can you help move large whale conservation forward during the coming year?**

**Colombia:**

Strengthening regional institutions in charge of Aquatic Mammals Management Plan (Autonomous Coastal Corporations).

**Panama:**

Creating political will and civil society empowerment, activation of the Panama marine corridor committee and diffusion through all media about existing regulations

**How can you contribute to marine spatial planning efforts for the eastern Pacific?**

**Colombia:**

- Strengthening CMAR and programs in progress.
- Strengthening coastal environment units (UAC’s).

**Panama:**

- By providing information; specifically, supporting analysis with existing data

**Group 2 (Chile, Ecuador, and NOAA):**

The group addressed the following questions:

**How can we improve species distribution data?**

- Establish national/regional observer networks (researchers, fisheries observers, other staff trained).
- Placing marine mammal observers on coastal, cruise and military ships.
- Placing marine mammal observers on oil platforms, lighthouses, coastal research stations, and other platforms of opportunity.
- Develop whale species identification manuals that contain real images of each species (e.g., images that show what an observer might see on the water).
- Include marine mammal observers on oceanographic vessels in the joint annual regional oceanographic program coordinated by CPPS in the framework of the ERFEN Protocol.

**How is priority habitat defined?**

- The approach has been to identify sites of frequent occurrence and concentration of whales in feeding and breeding areas. These concentrations may be related to particular oceanographic conditions. Water quality is also an important component of whale habitat.
- Management in these areas is more important than in other areas. The identification and management of migration routes is also important.

**What type of support is needed to conduct the spatial analyses needed for marine spatial planning?**

- Specialized training for researchers and decision makers at local, national and regional levels.
- Continue the standardization of geo-referenced databases for whale distributions and human activities (e.g., fishing, tourism, shipping traffic, etc.).
- Collecting information on effort, as much as possible, when collecting data about whale distributions.
- Institutionalize the coordination, generation, management and dissemination of cetacean data.
- Develop National Marine Mammal Action Plans for each country that is a member of CPPS.

**What type of support is needed to build national databases on large whales in your country?**

- Provide standardized training to marine mammal observers (theoretical and practical courses, standardized field forms and sighting protocols).
- Establish a regional protocol for fisheries observers. Chile has produced a cetacean identification manual.

**How can we improve the data used in the risk assessment?**

- Identify relevant information on fishing gear, fleet size and type, and fishing areas.
  - Obtain Fleet Operational Plans (operations description).
- Get and/or generate the necessary information. In Chile, the information is available but not standardized. Research is also needed to determine which fisheries are most relevant. There is some public information, but it might take some time and effort to incorporate it in databases. In Ecuador, the information is scattered and not standardized. The Technical Secretariat of the Sea is developing a geoportal that could incorporate fisheries information, once it has been coordinated internally.
- Send a formal letter requesting observer data from the IATTC (Inter-American Tropical Tuna Commission).
- Obtain and archive AIS data to assess the risk of ships striking whales. Specific challenges include involving national authorities and developing a system to archive the data.

**What further analyses are needed?**

- An assessment of the impact of noise on whales.
How can we obtain the data needed for area-specific management?

- Request information from appropriate authorities.
- A future workshop on data quality and standards is needed.
Appendix1

LIST OF PARTICIPANTS

INTERNATIONAL WORKSHOP TO DEVELOP TRANSBOUNDARY APPROACHES FOR REDUCING RISKS TO LARGE WHALES IN THE EASTERN PACIFIC BASIN

Salinas, Ecuador, 15 - 16 August 2013

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# Appendix 2

## AGENDA

**INTERNATIONAL WORKSHOP TO DEVELOP TRANSBOUNDARY APPROACHES FOR REDUCING RISKS TO LARGE鲸类 IN THE EASTERN PACIFIC BASIN**

**Salinas, Ecuador, 15 - 16 August 2013**

<table>
<thead>
<tr>
<th>Thursday 15 August 2013</th>
<th>Lecturer</th>
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</thead>
<tbody>
<tr>
<td>08.30-09.00</td>
<td>Registration</td>
</tr>
<tr>
<td>09.00-9.15</td>
<td><strong>I. Introduction</strong></td>
</tr>
<tr>
<td>1. Welcome to participants</td>
<td>CPPS/NOAA</td>
</tr>
<tr>
<td>2. Objectives and scope</td>
<td>F Félix</td>
</tr>
<tr>
<td>9.15-11.00</td>
<td><strong>II. Marine Spatial Planning</strong></td>
</tr>
<tr>
<td>1. Introduction to marine spatial planning</td>
<td>J. Jiménez</td>
</tr>
<tr>
<td>2. Southeast Pacific Marine Mammal Action Plan: Regional conservation priorities</td>
<td>H. Huerta</td>
</tr>
<tr>
<td>3. NOAA Fisheries International Science Strategy</td>
<td>K. Chanon</td>
</tr>
<tr>
<td>4. NOAA Fisheries Office of International Affairs</td>
<td>N. Young/N. Daves</td>
</tr>
<tr>
<td>5. Eastern Pacific whale ecology. Breeding and feeding grounds, migration routes. Transboundary focus</td>
<td>F. Félix</td>
</tr>
<tr>
<td>6. Regional Case studies</td>
<td>R. Hucke-Gaete</td>
</tr>
<tr>
<td>6. Blue whale critical areas in Southern Chile</td>
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<tr>
<td>11.00-11.30</td>
<td>COFFEE BREAK</td>
</tr>
<tr>
<td>11:30-13:00</td>
<td><strong>II. Marine Spatial Planning (cont.)</strong></td>
</tr>
<tr>
<td>• An oceanic MPA for Blue whales, the Costa Rica Dome</td>
<td>J. Jiménez</td>
</tr>
<tr>
<td>• Assessing the risk of collisions between ships and humpback whales off Panama</td>
<td>H. Guzmán</td>
</tr>
<tr>
<td>• Assessing the risk of ships striking large whales in marine spatial planning</td>
<td>J. Redfern</td>
</tr>
<tr>
<td>13.00-14.30</td>
<td>LUNCH</td>
</tr>
<tr>
<td>14.30-16.00</td>
<td>What are the greatest threats to large whales in your country? Can those threats be addressed using a marine spatial planning approach? Why or why not? Are ongoing MSP processes addressing marine biodiversity issues in your country?</td>
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<tr>
<td></td>
<td>Break outgroups</td>
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<tr>
<td>16.00</td>
<td>End first day</td>
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<tr>
<td>16:00-18:00</td>
<td>WELCOME by CPPS</td>
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### Friday 16 August 2013

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>09.00-11.00</td>
<td><strong>III. Data and analyses needed to support marine spatial planning</strong></td>
<td>F. Félix</td>
</tr>
<tr>
<td></td>
<td>1. Importance of a regional database for large whale management (eg. SIBIMAP/GEOPORTAL/ EBSAs). Information gaps on marine mammal migration corridors, threats, population structure, etc. Results from the UNEP/CPPS project on habitat modeling (MaxEnt).</td>
<td>J. Redfern</td>
</tr>
<tr>
<td></td>
<td>2. Species distribution models: MaxEnt versus GAMs. Large whale risk assessment for the eastern tropical Pacific</td>
<td></td>
</tr>
<tr>
<td>11.00-11.30</td>
<td><strong>COFFEE BREAK</strong></td>
<td></td>
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<tr>
<td>11.30-13.00</td>
<td><strong>How can you collect data, particularly spatial data, about these threats?</strong></td>
<td>Break out groups</td>
</tr>
<tr>
<td></td>
<td>What type of support is needed to build national databases of large whale distributions in your country? What type of support is needed to conduct the spatial analyses needed for marine spatial planning?</td>
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</tr>
<tr>
<td>13.00</td>
<td><strong>LUNCH</strong></td>
<td></td>
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<tr>
<td>14.30-16.00</td>
<td><strong>IV. Commitments for moving forward</strong></td>
<td>Break out groups</td>
</tr>
<tr>
<td></td>
<td>What are the institutional opportunities and barriers for resource protection in your country? What laws exist to protect marine mammals in your country? How can you help move large whale conservation forward during the coming year? How can you contribute to marine spatial planning efforts for the eastern Pacific?</td>
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</tr>
<tr>
<td>16.00-16.30</td>
<td><strong>COFFEE BREAK</strong></td>
<td></td>
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<tr>
<td>16.30-17.30</td>
<td><strong>Commitments for moving forward (cont.)</strong></td>
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<tr>
<td>17.30</td>
<td><strong>Closure.</strong></td>
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</tbody>
</table>

### Lecturers

- **Keith Chanon**  
  International Science Coordinator. National Oceanic and Atmospheric Agency NOAA, USA
- **Nancy Daves**  
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- **Fernando Félix**  
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- **Héctor Guzmán**  
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- **Rodrigo Hucke-Gaete**  
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- **Héctor Huerta**  
  Regional Technical Coordinator. Plan de Acción para la Protección del Medio Marino y Áreas Costeras del Pacífico
<table>
<thead>
<tr>
<th>Name</th>
<th>Position/Location</th>
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</thead>
<tbody>
<tr>
<td>Jorge Jiménez</td>
<td>President MarViva, Costa Rica.</td>
</tr>
<tr>
<td>Jessica Redfern</td>
<td>Marine Mammal Spatial Habitat and Risk Program Leader. Southwest Fisheries Science Center. NOAA Fisheries USA.</td>
</tr>
<tr>
<td>Nina Young</td>
<td>Office of International Affairs. National Oceanic and Atmospheric Agency NOAA. USA</td>
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</tbody>
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