



# What can be done to restore Pacific turtle populations?

The Bellagio Blueprint for Action on Pacific Sea Turtles



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## **What can be done to restore Pacific turtle populations? The Bellagio Blueprint for Action on Pacific Sea Turtles**

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# Preface

During 17-21 November 2003, a multi-disciplinary group of 25 experts met in Bellagio, Italy to draft an Action Plan on Pacific Sea Turtles organized jointly by the WorldFish Center and the U.S. NOAA-Fisheries. The group recognized the serious state of sea turtle populations in the Pacific and the escalating nature of human threats to the turtles. However, after examining cases of successful sea turtle conservation programs from around the world and reviewing a broad suite of promising policy and management actions in the Pacific, they concluded that actions to save the threatened and endangered species were possible. Consequently, a Blueprint for Action on Pacific Sea Turtles is presented here for the first time. The Blueprint urges protecting all nesting beaches, reducing turtle take in at-sea and coastal fisheries, stimulating Pan-Pacific policy actions and encouraging the sustainability of the traditional use of sea turtles. In addition to this description of the Blueprint, the experts are developing a full policy brief and other products for wide dissemination.

This publication was drawn together by the following individuals who also acted as the Steering Committee.

- Mahfuzuddin Ahmed, WorldFish Center (co-organizer)
- Peter Dutton, NOAA-Fisheries (co-organizer)
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The Steering Committee would like to acknowledge and thank the support and sponsorship of the Rockefeller Foundation, USA; NOAA-Fisheries; and Western Pacific Fisheries Management Council, USA as main sponsors, and the Convention on Migratory Species, Thailand; Department of Economics University of California, San Diego; Scripps Institution of Oceanography and University of Queensland, Australia as the co-sponsors.

**The Steering Committee**  
Bellagio Conference on Sea Turtles  
July 2004





# Context

The Pacific Ocean is the habitat of five species of widely distributed sea turtles and one restricted to Australian waters that evolved nearly 30 million years ago. All species are long-lived and slow growing. They take from 10 to 30 years to reach maturity and exhibit complex life cycles involving eggs laid in nests on tropical beaches, natal beach homing and extraordinary feeding and breeding migrations that can span the entire Pacific Ocean. Sea turtle populations are slow to increase and replace themselves. The flesh and eggs of these large marine animals have provided food over centuries for many coastal communities throughout the Pacific islands, along the west coast of the Americas and throughout east Asia and eastern Australia. They also provide ornaments such as those made from the distinctive tortoise shell of the hawksbill and are important in the cultural and social identity of many traditional societies.

The long life, wide ranging migrations and value to humans make sea turtles susceptible to many forms of mortality, including direct and incidental takes from coastal and oceanic fishing activities - all of which have increased over the last decades. The persistence of these impacts without correction, particularly in combination with traditional extractive uses, has rendered the species increasingly vulnerable to extinction.

Consequently, all of the five widely distributed species in the Pacific have now been registered as endangered (green turtle – *Chelonia mydas*, olive ridley turtle – *Lepidochelys olivacea*) or, worse, critically endangered (leatherback turtle – *Dermochelys coriacea*, loggerhead turtle – *Caretta caretta*, and the hawksbill turtle – *Eretmochelys imbricata*). The Pacific leatherback is now the most endangered sea turtle in the world, and the loggerhead is also in serious trouble. Some populations are close to extinction, and the Malaysian leatherback population, once one of the most abundant in the world, may have already disappeared. Extirpation of a sea turtle population is generally irreversible because females tend to return to reproduce on the beaches where they were born and, therefore, it is highly unlikely that lost rookeries will be recolonized by turtles born elsewhere.

The restoration of such broad-ranging endangered species will only be accomplished if urgent and coordinated actions across national boundaries are practiced, aimed at critical interventions to mitigate the many threats across the entire Pacific.

To address these issues, a unique group of 25 economists, marine life policy experts, fishing industry and fisheries professionals, conservation, sea turtle and natural resource management specialists and development assistance researchers met during 17-21 November 2003 at the Bellagio Conference Center in Italy to create a blueprint for the conservation of sea turtles in the Pacific Ocean. The Blueprint for Action on Pacific Sea Turtles proposed by the Bellagio meeting includes: (1) the protection of all nesting beaches; (2) reducing turtle take in at-sea and coastal fisheries; (3) stimulating Pan-Pacific policy actions; and (4) encouraging the sustainability of the traditional use of sea turtles (see Appendix 1).



## Point 1: Protect all nesting beaches, starting with those of the Pacific leatherbacks

The Bellagio Blueprint for Action calls for a massive mobilization of effort to protect the 10 remaining leatherback turtle nesting sites around the Pacific from human take, predation and habitat degradation. The 10 beaches are shown on the map. The goal is to protect every nest possible to ensure a maximal hatchling production that can sustain the recovery of depleted populations.

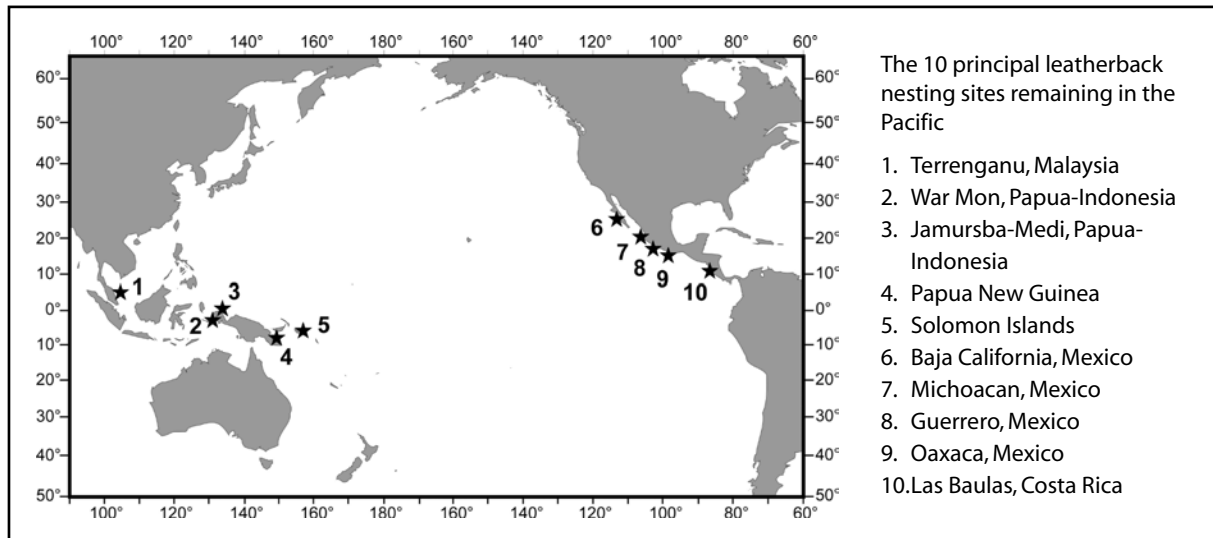


Figure 1. Key leatherback nesting sites remaining in the Pacific

### (i) Protecting nesting beaches has proven to work in restoring sea turtle populations

- a. A good example is that of Kemp's ridley turtle in the Gulf of Mexico. In the Gulf of Mexico, nesting beach protection was effective at halting the extinction of the Kemp's ridley turtle, once the most critically endangered sea turtle in the world. A massive effort was mobilized in the 1970s to protect the last remaining nesting beach by moving all the nests to the safety of a beach hatchery each season. By the late 1980s, the population began to show signs of recovery, which was further enhanced by eliminating trawling in front of the nesting beaches. This recovery accelerated in the 1990s, after a total ban on sea turtle extraction in Mexico and the use of Turtle Excluder Devices (TEDs) in shrimp trawls in Mexico and United States to protect ridley turtles from coastal fishery mortality.
- b. Leatherback turtles nesting in South Africa are also showing signs of recovery. In South Africa, there has been a steady increase in the nesting population of leatherbacks since the 1970s, when beach conservation was begun. An increasing population trend has also occurred throughout the Caribbean due to nesting beach protection.

### (ii) All nesting beaches must be protected, starting with those for leatherbacks and loggerheads

- a. Leatherback extinction in the Pacific is inevitable if nesting beaches are not protected and, in some cases, restored. A necessary though not sufficient condition for reversing the catastrophic decline in leatherback populations is to protect all nesting beaches so as to maximize the production of eggs. This means halting all take of eggs for direct human consumption, and preventing predation by pigs and other animals. In beaches where erosion washes away nests, eggs should be moved to safer sites. At

beaches where the temperature regime has been altered (e.g. through removing shade trees), careful artificial incubation of the eggs or artificial shading of nests can be used to provide the correct incubation conditions for the temperature-sensitive turtle eggs. Good scientific knowledge is now available on appropriate conditions to avoid artificially biasing the sex ratios of the turtles and this needs to be applied widely.

- b. Because of natal homing, each stock tends to be unique. As populations have become depleted and only a few are left, all stocks must be protected and this equates to protecting all nesting beaches. Scientists believe that most nesting beaches have been identified and that these should all be recorded and monitored.

**(iii) Nesting beaches can be protected by engaging local communities, biologists, volunteers, law enforcement officers, and others in conservation and providing the funds to make this possible:**

- a. A promising example of how local people can help protect nesting beaches is at the important but remote leatherback nesting site in Papua Indonesia (Jarmurbsa-Medi). At this site, in the Birdshhead area of Papua Indonesia, the World Wildlife Fund (Indonesia) is working with local people to protect nesting sites from predation and the erosion of natural forces and those of logging in the hinterland.
- b. Community-based efforts in Kamiali, Papua New Guinea to protect nesting beaches are supported by the Western Pacific Fisheries Management Council of the United States of America (WPFMC). A coastal community in Kamiali, working in conjunction with the South Pacific Regional Environmental Programme (SPREP), Kamiali Integrated Conservation Development Group (KICDG) and NOAA Fisheries, is protecting leatherback nesting beaches. This coastal community is protecting eggs from poaching and animal predators, maintaining habitat integrity by preventing the beach from use by commercial logging interests, and participating in research projects aimed to better understand the life history of leatherbacks.
- c. Funds are also needed to support beach protection. Depending on the circumstances, these funds would be used for land purchase (e.g. a suitable leatherback nesting beach could be purchased in Costa Rica), community development/retraining (ecotourism), co-management support costs (Mexico, Papua New Guinea), and purchase of logging and other land use concessions and long-term leases (Papua Indonesia). These costs could be financed in part as mitigation of sea turtle mortality from industry and developed nations (e.g. logging, high seas fisheries), and other mechanisms, e.g. by creating a Global Trust Fund.
- d. Many beach protection plans have not been implemented due to lack of funds. Only 50 per cent of the leatherback nesting beaches in Mexico are currently protected and several proposals remain unfounded for Guatemala, Nicaragua and Papua New Guinea.

## **Point 2: Reduce turtle take in at-sea and coastal fisheries**

The Bellagio Blueprint recognizes that all forms of mortality for Pacific sea turtles will need to be drastically reduced, not just egg mortality on nesting beaches. Turtles suffer significant but poorly quantified mortality from coastal and at-sea fisheries. Pacific sea turtles are migratory, weaving their way across the Pacific Ocean, in and out of Exclusive Economic Zones and the high seas. Their breeding habitat can lie in one nation and their developing and foraging habitat may be in another nation's waters or in the high seas where there is no inherent governance. In their journey, turtles must run a gauntlet of fishing fleets on both the high seas and coastal waters. Sea turtles interact with pelagic longline gear on the high seas, and beach seine, gillnet and shrimp trawl gears in coastal waters. These interactions can lead to death, most frequently through drowning, when the

turtles cannot climb to the surface of the ocean to breathe after becoming hooked or entangled in the fishing gear. New types of gear or ways of fishing can significantly reduce the rate of interactions between turtles and gear or the mortality rate after an interaction has already occurred.

**(i) Fishing mortality can be reduced by new technologies, as demonstrated by the use of turtle excluder devices (TEDS) on trawl nets and circle hooks and bait on long lines**

Technology standards, when combined with reductions in turtle mortality from other sources, such as through nesting site protection, can contribute to the recovery of sea turtle populations. In contrast to many types of regulations, technology standards are comparatively easy to achieve compliance through monitoring and verification, since only a relatively quick inspection is required. New technologies to reduce sea turtle takes from fishing also permit the creativity of fishers to have full play. When consistently applied, they also have the potential to restructure the incentives for nations in such a way that both compliance and participation in this conservation initiative increase. The potential for increased participation (and hence reduction in free riding) in the conservation initiative, along with increased compliance, could even lead to reductions in sea turtle mortality that outweigh other conservation approaches that on paper may appear to be more effective, but in practice are not, due to problems of compliance, participation, and free riding on others' conservation efforts. Adoption of these technology standards does not preclude adoption of other conservation initiatives, and in addition, research and extension programs can continue to refine and implement these technology standards.

- a. In coastal shrimp fisheries, turtle excluder devices or "TEDS" are a grid and trapdoor installed inside a trawling net that, while allowing shrimp to pass to the back of the net, direct sea turtles out and thereby reduce sea turtle bycatch by up to 97 per cent.
- b. In pelagic longline fisheries, exciting new developments in gear and fishing methods in the Atlantic Ocean entailing 18/0 circle hooks and mackerel bait have been found to significantly reduce both the loggerhead and leatherback interactions when compared to the industry standard J hooks and squid bait. In addition, circle hooks significantly reduced the rate of hook ingestion by the loggerheads, thereby reducing the post-hooking mortality associated with interactions. The combination of 18/0 circle hooks and mackerel bait was found to be the most effective mitigation measure for both loggerhead and leatherback sea turtles. Mackerel bait was ascertained to be more efficient for swordfish than squid bait and circle hooks were more efficient for tuna than J hooks. In addition, after hooking by pelagic line gear, line cutters can reduce turtle mortality by allowing the turtle to swim away rather than bring the turtle on board the vessel and increasing the chance of mortality or injury.

**(ii) Better understanding of the links between sea turtles and fisheries**

Better understanding of the links between sea turtles and fisheries allows the design of conservation initiatives that reduce their interactions and thereby sea turtle mortality. Better understanding of these links leads, in part, to designing fishing gear, and adopting management practices and methods of fishing that reduce the takes and mortality of sea turtles.

- a. Longline set depths can be critical to incidental sea turtle mortality. The depth at which longline gear are set and the length of leaders for individual hook lines from the main line affect both the takes and mortality of sea turtles. Shallower sets of longline gear are more likely to result in interactions between the turtles and the gear, since turtles are more likely to swim higher in the water column. Longer leaders can reduce sea turtle mortality once a turtle has been hooked or entangled in a leader, since the turtle can reach the surface to breathe.



- b. Wongara Beach Marine Park (Australia) fisheries closures at the times that coincide with loggerhead nesting are found to be effective. By better understanding the months and locations of loggerhead nesting sites in eastern Australia, Australia was able to establish seasonal fisheries closures for the Wongara Beach Marine Park. This prohibition of fishing in the nesting season and waters off nesting beaches prevented takes and subsequent fisheries-related mortality of loggerhead sea turtles.
- c. Sea turtle protection from coastal fisheries could be much more effective if the current major knowledge gaps regarding turtle take by coastal fishing gear were addressed. Little is known about the extent of sea turtle takes by coastal fishing gear, especially in the waters of developing nations, where most of the sea turtle nesting sites are located. The magnitude and severity of the sea turtle mortality is unknown, although it is believed to be a major factor. Without better knowledge and understanding of the turtle takes by coastal fishing gear, fully effective sea turtle conservation initiatives are difficult to design.

**(iii) Promote a broad set of sea turtle conservation initiatives to mitigate all sources of fisheries-related turtle mortality**

- a. USA Pacific coast fishermen have adopted a beach to protect nesting sites. Pelagic longline fishermen, working with the conservation group ASUPMATOMA (Asociacion Sudcaliforniana de Proteccion al Medio Ambiente y la Tortuga Marina), are in the process of adopting a nesting beach for leatherback sea turtles in Baja California, Mexico. Fishermen are providing funding to allow the conservation group, working in conjunction with Mexican authorities and local communities, to secure the eggs and nesting female leatherbacks from poachers and animal predators and to protect and improve nesting habitat, thereby increasing the success and survivor rate of egg laying and hatchings.

### **Point 3: Establish Pan-Pacific policy actions**

The latest scientific understanding of sea turtle migratory patterns and genetic stock structure shows the extensive geographic scope needed for their development. Sea turtles do not recognize the borders of different nations. Their breeding habitat may lie in one nation while another nation and the high seas may support important foraging habitats for them. These features underline the critical importance of an integrated framework for Pan-Pacific policy actions in addressing sea turtle conservation challenges. The Bellagio Blueprint for Action proposes three critical priorities for establishing Pan-Pacific policy actions.

**(i) Existing regional and international agreements must be strengthened to better respond to the urgent needs for sea turtle conservation**

- a. The Pacific already has a number of existing agreements that possess or have the potential to carry out many of the conservation and management programs and activities that are considered vital to achieving the agreed recovery objectives. Appendix 2 lists relevant instruments and agencies that are related to sea turtles conservation and management while Appendix 3 summarizes various features of the key instruments/agencies dealing with sea turtles issues. The Bellagio Blueprint for Action emphasizes the critical need to further strengthen the Inter American Convention and Indian Ocean and South-East Asian MOU agreements where dedicated sea turtle conservation and protection agreements have been incorporated.

IAC – The Inter-American Convention for the Protection and Conservation of Sea Turtles is in the early stages of development. It currently has an interim secretariat and no source of secure funding. For long-term stability and maximum effectiveness the Parties

to the IAC are encouraged to develop a permanent secretariat and secure consistent funding. The advisory bodies are currently not constituted. The Parties are encouraged to constitute and convene those subsidiary organizations in order for them to begin their work. The IAC currently does not include national participation representing some of the key habitat and fishing countries from the Pacific coast of the Americas, and such countries, including Panama, Chile, and Colombia, should join the Convention as soon as possible. The interim secretariat and the Parties themselves are encouraged to seek the adherence of these priority countries.

**IOSEA MOU** – Indian Ocean and South-East Asian Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats under the Convention on Migratory Species has a developed and comprehensive Conservation and Management Plan (CMP) and an established secretariat financed through voluntary funding. The secretariat and signatories are encouraged to seek secure and long-term sources of funding to assist with the implementation of the CMP, and to consider the strengthening of the administrative capacities of the secretariat. Key countries of the region that are not yet signatories to the MOU, including those with critical sea turtle habitats and populations such as Malaysia, Indonesia and Papua New Guinea, are encouraged to become signatories. The Signatories may consider the advantages and disadvantages of transforming the MOU to a legally-binding instrument, including the prospects for attracting new members, provision of financial security, and enhancing government commitment, among others.

- b. The Bellagio Blueprint for Action on Pacific Sea Turtles emphasizes the valuable potential that exists within Regional Fisheries Management organizations such as the Inter American Tropical Tuna Commission (IATTC) and the new Western and Central Pacific Fisheries Commission (WCPFC) to develop a capacity and facilitate the advancement of effective programs to reduce fisheries-related sea turtle by-catch and mortality.

**IATTC** – The IATTC has fisheries management authority for the eastern tropical Pacific, and has begun to address sea turtle by-catch issues through resolutions and a By-catch Working Group, though there has not been systematic collection of sea turtle interaction data from the longline fisheries under the jurisdiction of the Commission. The IATTC is encouraged to establish comprehensive data collection programs to contribute to the development of a more accurate assessment of the scope of interactions in the eastern Pacific. The IATTC and its members are also encouraged to seek the adherence or cooperation of key coastal countries and distant water fishing fleets such as Colombia, Chile, China, Korea, and Taiwan. Ratification and entry into force of the new IATTC Convention is also encouraged.

**WCPFC** – The WCPFC has not yet entered into force, although when that occurs it will have fisheries conservation and management responsibility for a large portion of the western and south Pacific. Once the Convention enters into force, the Commission is encouraged to take up sea turtle by-catch management and mitigation issues as soon as possible, including data collection on sea turtle/fisheries interactions, and to promote the adherence of the key fishing and coastal countries.

## **(ii) Developing and enhancing new coordination arrangements among the regional instruments**

- a. The western/central/south Pacific Island areas lack the comprehensive geographic and conservation programmatic coverage of the rest of the Pacific. Consideration should be given to adopting such an arrangement for this region, along the lines of the model of the IOSEA MOU/CMP. This can be achieved through the extension and further development of the IOSEA MOU, taking account of identified Pacific needs, with sub-regional coordination provided through the South Pacific Regional

Environment Program (SPREP), or the development of a new arrangement drawing on the Conservation and Management Plan of the IOSEA MOU.

- b. In addition, coordination of regional and sub-regional work programs across the relevant regional organizations is necessary to more effectively utilize available resources, avoid duplication of effort, and promote consistency. The key organizations identified above, through their respective memberships, should consider the establishment of a formal, functional and charter- or MOU-based body that can exchange information, coordinate activities, and discuss priorities based on the model of the Council of Regional Organizations in the Pacific (CROP).

**CROP** – The CROP is a working arrangement among the regional intergovernmental organizations serving the Pacific Islands Forum and the Pacific Community nations and territories. The permanent secretariat of CROP is the Pacific Islands Forum Secretariat, and sectoral working groups are usually chaired in rotation. The CROP Marine Sector Working Group consists of Pacific Islands Forum Secretariat (PIFS), South Pacific Regional Environmental Programme (SPREP), Secretariat for the Pacific Community, Forum Fisheries Agency, University of the South Pacific and the South Pacific Applied Geoscience Commission (SOPAC), and includes various other organizations and non-governmental organizations in its sessions, including the World Wildlife Fund. Within the CROP system SPREP is the lead agency for turtle conservation, but other agencies play significant roles particularly with regard to the management of fisheries, the reduction of by-catch, marine surveys, data collection and research, and the institution of ecosystem-based and socially appropriate management plans. SPREP is encouraged to extend its capacity to act as the regional lead-agency in turtle conservation, with the full involvement of other CROP organizations according to their respective mandates and capacity. The CROP Marine Sector Working Group is encouraged to further define the actions that might be possible by each constituent agency and organization towards the conservation of leatherback sea turtles in the Pacific, and to establish links with other regions critical to the Pacific leatherback population, particularly in the Eastern Pacific and Southeast Asia.

**(iii) Developing new Pacific Island areas conservation and management plans along the lines of the IOSEA MOU**

- a. The Pacific Island countries could consider adopting a new sea turtle conservation and protection arrangement for this region, along the lines of the model of the IOSEA MOU/CMP as the most comprehensive method to accomplish long-term sea turtle conservation and management in the western and south Pacific. The relevant countries are encouraged to explore how this objective might be achieved through the extension and further development of the IOSEA MOU, taking account of identified Pacific needs, with sub-regional coordination provided through SPREP, or the development of a new arrangement drawing on the Conservation and Management Plan of the IOSEA MOU.
- b. The members of the IAC, IATTC, WCPFC, IOSEA MOU and SPREP (and/or any new arrangement in the south Pacific) are encouraged to consider and agree to authorize their respective secretariats or coordinating authorities to develop the envisioned coordinating body, including elaborating its functions, and convening a meeting of the body as soon as possible to begin its work.

#### **Point 4: Encourage sustainability in traditional use**

Sea turtles are part of the traditional diet and culture of coastal and island communities throughout the central and western Pacific. Gathering of turtle eggs and hunting of sea turtles for meat are

an integral part of many local life styles. Hence, regulation or prohibition on sea turtle harvest or substitution of sea turtles with other forms of food must be seen from the perspective of local food security and sustainable use of resources in addition to conserving sea turtles by reducing sea turtle mortality as by-catch from high sea fishing. An important fourth point of the Bellagio Blueprint for Action is to take steps to ensure that traditional uses are sustainable.

**(i) It is essential to develop a better understanding of the traditional uses in the central and western Pacific in order to build a capacity for sustainability**

- a. Social and anthropological information as well as biological and fishing information should be collected from coastal and island communities dependent on sea turtle harvesting to gain a better understanding of the patterns of use.
- b. Link all available knowledge of turtle biology and use, including migration studies, genetics and fisheries, as well as from traditional community-based knowledge.
- c. Document the extent of egg harvesting and sea turtle hunting by local communities in the central and western Pacific and correlate the data collected with the status of stock conservation.

**(ii) Reduce turtle mortality from traditional harvests since indiscriminate harvesting of eggs and nesting females over generations has contributed to a drastic decline in the population of sea turtles**

The current mortality from traditional harvesting far outweighs the levels that sea turtle populations can sustain and therefore recovery is jeopardized.

- a. The cooperation and support of the communities that depend on sea turtle harvests are keys to the conservation and sustainable management of sea turtles. More can be achieved by working with communities that hunt leatherbacks traditionally in the Kei Islands (Indonesia). Community involvement is also essential in reducing egg harvesting. There is demonstrated evidence of management success through community-based initiatives. Although socio-cultural factors and institutional arrangements surrounding the use of common property resources such as sea turtles and their habitats vary from country to country, and region to region, the Jarmurbsa Medi (Papua, Indonesia) case demonstrated that egg poaching can be eliminated by community beach monitoring.

**(iii) Community-based management and co-management arrangements for nesting beach conservation must be cast within the legal and institutional framework governing access and use of resources at sites that are important sea turtle habitats**

- a. Customary and communal use rights of coastal beaches and adjacent land and waters and their resources should be recognized.
- b. Education and awareness programs on sustainable harvest, and assistance to alternative livelihoods are critical to a successful conservation program.
- c. Community-based conservation and management of nesting beaches and sea turtle hunting need to be linked with side payments and compensation programs, including support from developed countries to offset by-catch mortality in the high seas and coastal fisheries.
- d. Beaches need to be protected from commercial interests such as tourism and logging impacts as well as from predators. These will require participation of multiple stakeholders and the integrated management of coastal activities to optimize values and benefits for multiple stakeholders (both for use and non-use values).

## Next steps

In addition to the dissemination of the general report of the Bellagio Conference, the participants, secretariats and national governments are urged to take every opportunity to immediately deliver these messages to the relevant organizations and countries directly and through scheduled meetings of the existing organizations. Such meetings include the meeting of the IATTC Bycatch Working Group in January 2004, the Pacific Island Regional Oceans Forum in February 2004, the International Sea Turtle Symposium in February 2004, the Meeting of the Signatories to the IOSEA MOU in March 2004, the FAO Technical Consultation on Sea Turtle Conservation in March 2004, the Conference of Parties to the IAC in August 2004, and the meeting of the prepcn for WCPFC in 2004.





# Appendices

## Appendix 1. Plan of actions and priorities at various levels and lead agencies/ instruments

ACTION PLANS	Level				Agencies/ Instruments				
	Local	National	Regional	Global	CMS/IOSEA MOU	WCPFC	IATTC including AIDCP	SPREP (CROP)	IAC
<b>1. Nesting Beaches Protection and Management</b>									
<b>Protection of Nests and Nesting Females</b>									X
<b>Eastern Pacific:</b>									
(i) Hiring personnel for enforcement	1	2							
(ii) Land management	1	2							
(iii) Land acquisition by alternative means (Costa Rica)	1	2		3					
(iv) Community-based conservation and co-management (Mexico & Central America)	1	2							
<b>Western Pacific (Papua Indonesia, PNG, Solomon Island)</b>									
(i) Nest protection, predator control	1		2		2			2	
(ii) Land management	1	2							
(iii) Community-based conservation and co-management	1	2							
<b>2. Sustainable Harvesting</b>									
(i) Regulate traditional hunting through community-based harvest management	1	1	2		2	2		2	2
(ii) Undertake education and awareness programs	1	1	1	1	2	2	2	2	2
(iii) Support developing alternative livelihoods and food of people dependent on sea turtle harvesting	1	1	1	2	1	2		2	1
<b>3. Reducing Mortalities from By-catch</b>									
<b>(I) Long line fishing</b>									
(i) Implement gear modification and mitigation measures with the involvement of fishing organizations	1	1	1	1	1	1	1	1	1
(ii) Undertake education and awareness programs for fishers	1	1	1	1	1	1	1	1	1
(iii) Engage fishing sector in:									
(a) Innovation and diffusion of gear modification	1	1	1	1	1	1	1	1	1
(b) Establishment of technology standards to eliminate/reduce by-catch	1	1	1	1	1	1	1	1	1
(iv) Establish an international team to develop and disseminate technology standards (technology transfer)			1	1	1	1	1	1	1
(v) Explore property rights options including tradable quotas, caps and buy-back programs	1	1	1		1	1	1	1	1
(vi) Adopt conservation initiatives to offset fisheries-related turtle mortality	1	1	2		2	1	1	1	2
(iv) Establish an international team to develop and disseminate technology standards (technology transfer)			1	1	1	1	1	1	1
(v) Explore property rights options including tradable quotas, caps and buy-back programs	1	1	1		1	1	1	1	1
(vi) Adopt conservation initiatives to offset fisheries-related turtle mortality	1	1	2		2	1	1	1	2

continued >



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ACTION PLANS	Level				Agencies/ Instruments				
	Local	National	Regional	Global	CMS/IOSEA MOU	WCPFC	IATTC including AIDCP	SPREP (CROP)	IAC
<b>(II) Coastal Fisheries</b>									
(i) Undertake a rapid assessment of coastal fisheries that affect sea turtles	1	1	1		1	3	3	1	1
(ii) Undertake education and awareness programs for coastal fishers	1	1	1		1			1	1
(iii) Improve coastal fisheries statistical system to include both catch and by-catch	1	1	1	1 (FAO)	1	3	3	1	1
(iv) Implement time/area closure of near-shore fisheries that take sea turtles (e.g. gillnets, trawls) off nesting beaches during the nesting season	1	1			2				2
(v) Designate areas above and off nesting beaches as protected areas	1	1			2				2
(vi) Establish programs to reduce fishing capacity and support alternative livelihoods for displaced coastal fishers [1]	1	1	2		2	3	3	3	2
(vii) Adopt conservation initiatives to offset all sources of fisheries-related turtle mortality in shrimp trawling	1	1	2		2				2
<b>4. Other Actions</b>									
(i) Establish a global trust fund or similar mechanism to support international national and local initiatives	1	2	2	1	2	3	3	3	2
(ii) Seek financial assistance from developed countries to developing countries through side payments		2	1	1	2	3	3		2
(iii) Undertake further research to:									
(a) Fill information gaps	1	1	1	1	1	1	1	1	1
(b) Accelerate development and transfer of by-catch reduction technologies	1	1	1	1	1	1	1	1	1
(c) Identify cost-effective solutions to reducing sea turtle mortality and reducing poor peoples dependence on sea turtles and their habitats	1	1	1	1	1	1	1	1	1
(iv) Identify responsible agencies at all levels (international, national and local) for supporting and facilitating various actions including dealing with legal, institutional and socioeconomic issues	1	1	1	1	1	1	1	1	1
<b>5. Institutions – Agreements</b>									
(i) Strengthen existing agreements/institutions		1	1		1	1	1	1	1
(ii) Explore new conservation and coordination arrangements		1	1		1	1	1	1	1

Key: 1 = Primary, 2 = Secondary, 3 = Tertiary

[1] in cash economies most fishers are poor

## Appendix 2. List of instruments/agencies related to sea turtle conservation and management

Geographical Scale	Focus of Instrument/ agency	Instruments/agency
Regional	Turtles	IAC (Inter-American Convention for the Protection and Conservation of Sea Turtles)
		CMS/IOSEA MOU on the Conservation and Management of Marine Turtles and their Habitats
	Fisheries	IATTC (Inter-American Tropical Tuna Commission)
		WCPFC (Western and Central Pacific Fisheries Commission)
		FFA (Forum Fisheries Agency)
		ISC (Interim Scientific Committee)
		CCSBT (Convention for the Conservation of Southern Bluefin Tuna)
		IOTC (Indian Ocean Tuna Commission)
		SPC (Secretariat for the Pacific Community)
	Other	SPREP (South Pacific Regional Environment Programme)
		PICES (Convention for a North Pacific Marine Science Organization)
		PEMSEA- Partnerships in Environmental Management for the Seas of East Asia
		UNEP Regional Seas - South Asia, North Pacific
Global	Turtles	CITES (Convention on International Trade in Endangered Species)
		CMS (Convention on Migratory Species)
		CBD (Convention on Biological Diversity)
	Fisheries	Code of conduct for responsible fisheries (FAO)

### Appendix 3. Key instruments/agencies dealing with various issues related to sea turtles

Geographical Scale	REGIONAL		
Focus of instrument/ agency	Turtles		Fisheries
Instruments/ agency	IAC (Inter-American Convention for the Protection and Conservation of Sea Turtles)	CMS/IOSEA MOU on the Conservation and Management of Marine Turtles and their Habitats)	IATTC (Inter-American Tropical Tuna Commission) including AIDCP (Agreement on International Dolphin Conservation Program)
Thematic coverage	Covers full range of conservation issues	Covers full range of conservation issues	By-catch (by interpretation and resolution) and ecosystem management
Species coverage	All except flatback	All	Unlimited
Geographic scope	Land areas of Americas, waters under national jurisdiction, flag vessels on high seas	Indian Ocean, Southeast Asia and adjacent seas east of Torres Strait	Eastern Tropical Pacific including coastal waters and high seas
Actual membership (Pacific countries only)	CR, EC, GT, MX, PER, US, HO	AU, PH, US, VT, CAM	US, PM, JP, FR, NI, CR, ES, GT, MX, EC, PER, VAN
Funding sources	Voluntary	Voluntary, multiple donors (financial and in-kind)	National assessments obligatory
Existence of secretariat or coordinating and advisory body	No permanent secretariat yet, two advisory bodies not yet constituted	Secretariat and advisory body constituted	Permanent secretariat and scientific staff
Mandate for developing relations with other bodies	Mandate exist (through resolution), no mechanisms yet	Explicit requirement of MOU, mechanisms under development	Mandate exists in the convention
Time frame for adaptation	Amendment and ratification (lengthy)	Relatively expeditious by consensus, no subsequent ratification	Amendment and ratification (lengthy)
Non-members (underlined - priority countries)	ES, NI, <u>PA</u> , <u>CL</u> , <u>CO</u> , CAN	<u>PNG</u> , <u>ID</u> , FR, <u>MAL</u> , TH, SG, CN (priority in terms of habitat)	<u>CL</u> , <u>CN</u> , <u>CO</u> , <u>TW</u> , <u>KOR</u>
Notes	Establish predictable funding and strengthen infrastructure and secretariat, encourage participation of priority countries.	Additional resources (financial and personnel) required. Consider pros/ cons of transforming the MOU to a legally-binding instrument (e.g. In terms of ability to attract new members, provide for financial security, and enhance government commitment).	Widen membership, extend and improve data coverage.

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<b>Geographical Scale</b>	<b>REGIONAL</b>		<b>GLOBAL</b>
<b>Focus of instrument/ agency</b>	Fisheries	Other	Turtles
<b>Instruments/ agency</b>	<b>WCPFC (Western and Central Pacific Fisheries Commission)</b>	<b>SPREP (South Pacific Regional Environment Programme)</b>	<b>CMS (Convention on Migratory Species)</b>
<b>Thematic coverage</b>	By-catch and ecosystem management	Covers full range of conservation issues	Covers full range of conservation issues
<b>Species coverage</b>	All	All except flatback	All
<b>Geographic scope</b>	Western and Central Pacific, waters under national jurisdiction and high seas	Defined by membership (terrestrial and marine areas under national jurisdiction)	Terrestrial and marine areas under national jurisdiction of its members and flag vessels on high seas
<b>Actual membership (Pacific countries only)</b>	Potential members: All coastal states and DWFN	14 island countries, AU, NZ, US and French Territories	CL, PE, PA, PH, AU, NZ, FR
<b>Funding sources</b>	National assessments, voluntary contribution, special funds for developing countries	Assessment and voluntary contribution	National assessments, voluntary contribution, special funds for developing countries
<b>Existence of secretariat or coordinating and advisory body</b>	Permanent secretariat and scientific staff	Permanent secretariat	Permanent secretariat and two advisory bodies
<b>Mandate for developing relations with other bodies</b>	Mandate exist in the convention	Potential capacity	Multiple MOUs in place (CBD, Ramsar and CITES)
<b>Time frame for adaptation</b>	Amendment and ratification (lengthy)	Program flexible, convention requires amendment and ratification	Amendment and ratification (lengthy)
<b>Non-members (underlined - priority countries)</b>	2004	-	JP, CN, US, PNG, ID, MAL, TH, VAN
<b>Notes</b>	Consider all measures to collect data and mitigate by-catch. Take up by-catch measures as soon as possible.	Turtle program is not based on a legal obligation - formalize and extend program to incorporate additional conservation competence. Consider all measures to collect data and mitigate by-catch.	Widen membership, elaborate MOU with SPREP, and enhance involvement of national bodies responsible for fisheries.





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