



**Inter-American Convention for the
Protection and Conservation of Sea Turtles
[Ecuador]
2006 Annual Report**

Second Annual Report Form [Translation]

Directory

Country	Ecuador
Agency or institution responsible for preparing this	Fundación Charles Darwin
Name of the person in charge of this form	Patricia Zárate
Address	Puerto Ayora, Isla Santa Cruz, Islas Galápagos
P.O. Box	
Telephone(s)	593-5-2526146
Fax	593-5-2526146
E-mail	pzarate@fcdarwin.org.ec
Website	www.darwinfoundation.org

Others who participated in the preparation of this form

Name	Affiliation	Contribution/ Topic	Telephone	E-mail
Italo Bravo	Charles Darwin Foundation	General Info.	593593154391	ibravo@fcdarwin.org.ec

Focal Point

Institution: Ministerio de Relaciones Exteriores

Name: Juan Leoro Almeida

Signature:

Date: May 1st, 2006



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1. Biological Information

1.1. Species present

Species	Pacific Ocean Galápagos Is./ Ecuadorian Continent Phase(s)	Atlantic Ocean	Caribbean Sea
		Phase(s)	Phase(s)
<i>Lepidochelys olivacea</i>	F/F		
<i>Lepidochelys kempii</i>			
<i>Dermochelys coriacea</i>	M/M,R		
<i>Eretmochelys imbricata</i>	F/R		
<i>Chelonia mydas</i>	R, F/R, F		
<i>Caretta caretta</i>			

Phases: R = Reproduction; F = Foraging; M = Migration; D = Phase Unknown

1.2. Important sites for sea turtle conservation



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	Name of Site	Species (s)	Season	Geographic Location (Lat/Long)	Area (km or hectares, if applicable)	Protection Category	Observations*
Nesting Site / Continental Ecuador	*Playa dorada	Cm	December-April	517607/9821125	0.15 Km	Restricted	Unknown
	*La playita de Salango	Cm, Ei and Dc	December-April	518473/9827317	0.57	Restricted	Unknown
	*Los Frailes	Cm, Ei	December-April	523258/9835171	1.41	Public	Unknown
	*Salaite	Cm	December-April	527332/9845830	1.8	Public	Unknown
	*Salango	Nd	December-April	517696/9824493	2.5	Nd	Unknown
	Playa Cerro Viejo	Ei	December-April	Nd	Nd	Restricted	Unknown
	La Corota	Cm	December-April	Nd	0.5	Nd	Unknown
	Las Playitas de los Frailes	Dc, Ei	December-April	Nd	0.5	Nd	Unknown
	Machalilla	Ei	December-April	Nd	Nd	Public	Unknown
Nesting Site/ Galapagos Is.	Quinta Playa/Galápagos	Cm	Dec - may	S01°00'25.77"W091°05'07.9"	2.05 km	Protected/zone 2.3	1001-5000 nests/ 50001-100000 hatchlings
	Bahía Barahona/Galápagos	Cm	Dec - may	S00°59'25.87"W091°04'10.2"	1.16 km	Protected/zone 2.3	501-1000 nests/10001-50000 hatchlings
	Las Bachas	Cm	Jan - apr	S00°29'33.07"W090°20'15.6"	0.96 km	Site visit/2.3	101-500 nests/10001-50000 hatchlings
	Las Salinas	Cm	Jan - apr	S00°28'05.67"W090°17'39.9"	0.84 km	Not protected/zone 2.3	101-500/1001-10000
	Espumilla	Cm.	Dec - may	S00°12'03.27"W090°49'43.2"	1.20 km	Site visit/zone 2.3	101- 500 nests/ hatchlings and
Foraging Site	Bahía Elizabeth	Cm	All year	S00°35'41.17"W091°04'10.2"	Nd	Zone 2.2	
	Punta Espinosa	Cm	All year	S00°16'20.97"W091°26'16.6"	Nd	Zone 2.2	
	Caleta Derek	Cm	All year	S00°38'35.97"W091°05'33.4"	Nd	Zone 2.3	
	Punta Núñez	Cm,Ei	Cm. All year, Ei june - agu	S00°44'40.77"W090°15'18.3"	Nd	Zone 2.4	
Migratory Routes	Eastern Pacific Ocean	Cm.	Nesting turtles migrate from Galápagos towards Central and South America				
	Eastern Pacific Ocean	Dc	Leatherbacks nesting in America use the Cocos- Galápagos migratory corridor				
	Eastern Pacific Ocean	Ei	Migrate from nesting beaches in Central America to feed in the waters of the Galapagos Marine Reserve				
	Eastern Pacific Ocean	Lo	Migrate from nesting beaches in Central America to feed in the waters of the Galapagos Marine Reserve				



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Nesting Sites - Continental Ecuador

It is believed that along the Continent of Ecuador, various [nesting] beaches within the 4 coastal provinces exist. Over the last couple of decades, Esmeraldas, Manabí, Guayas and El Oro, were reported as nesting sites for different species of sea turtles (Green & Ortiz – Crespo 1981). At present, research activities are mainly concentrated on several beaches within the province of Manabí (Barragán 2003), because they are found within the boundaries of, or very close to, Machalilla National Park.

Studies carried out over several years have reported the nesting of three species of sea turtles, the Dc, Ei and Cm (Hurtado 1992). In the majority of these cases, the number of nests or the species found on each one of these beaches has not been established. The number of nesting beaches with activity inside the Machalilla Nacional Park has varied over time. In 1992 and in 2001 the presence of nesting females was reported along 8 beaches (Hurtado 1992). On the contrary, in 2001 and 2003 activity was found at four beaches (Barragán 2003). Changes in monitoring efforts between study years as well as in the number of hours or climatic conditions may explain the differences; however, it is possible that the year in which each one of these studies was carried out did not coincide with the arrival of a large number of nesting females.

Between the years 1996 and 2002, the Center for Conservation Data (CDC- Ecuador 2000) monitored nesting sea turtles at MNP beaches and in its area of influence. By interpreting the results obtained between the years of 1996-2002, it can be noted that the presence of turtles on the beaches studied is not very high (0.18 nests /day /Km. of beach and 0.68 tracks/ day/Km. of beach). During this period, the beaches that presented the highest nesting activity for the different species of sea turtles (Cm, Ei) were La playita (0.18 nests/day /Km. of beach and 1.87 tracks/day/Km. of beach) and Frailes (0.15 nests/day/Km. of beach and 1.26 tracks/day/ Km. of beach). It is important to take into consideration that no data exists prior to the year 1996, allowing for a comparison or to establish the conservation status for the different species reported in Continental Ecuador.

Green Turtle Nesting Sites/Galapagos Islands

The green turtle *Chelonia mydas* is the only species of sea turtle nesting in the Galapagos Islands and is found on nearly all of the islands, except Rábida, Genovesa, Pinzón and Fernandina. At least 107 beaches are potential nesting sites for this species; however, the densest nesting areas are found on Santa Cruz, Baltra and Isabela Islands (Green 1983). Based on the high number of nesting females from 1975-1982 (N=1500 females), the Galapagos green turtle colony was considered to be the most important colony in the Eastern Pacific Ocean.



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The Charles Darwin Foundation has monitored green turtle nesting activity for four consecutive years, from the 2000/1 to the 2004/5 nesting season, on beaches with no prior information for previous years (1984 – 2000) in order to establish the status of the current nesting population in the Galapagos. Four index beaches, for which historic information did exist (Green & Ortiz – Crespo 1981, Hurtado 1981), were selected for the purpose of obtaining information on trends of relative abundance and inter-nesting periods. The nesting beaches selected for the Galapagos green turtle, were defined as importance conservation sites for this species based on their abundance of nesting females (Zárate 2002, 2004; Zárate & Dutton 2002, Zárate et al. 2003).

The number of nesting females recorded during the study period varied at the different beaches and between seasons (Fig. 1). In general, the highest numbers of nesting females were recorded in Quinta Playa and Bahía Barahona and the lowest numbers in Las Salinas and Las Bachas. Factors such as the physical characteristics of the beaches and its level of conservation may influence the nesting process over the years. Of the four sites studied, Quinta Playa and Bahía Barahona are both isolated sites, protected within the Terrestrial Park. On the other hand, Las Bachas is a site that receives between 50 – 200 daily visits and Las Salinas does not have any type of protection and is very difficult to access.

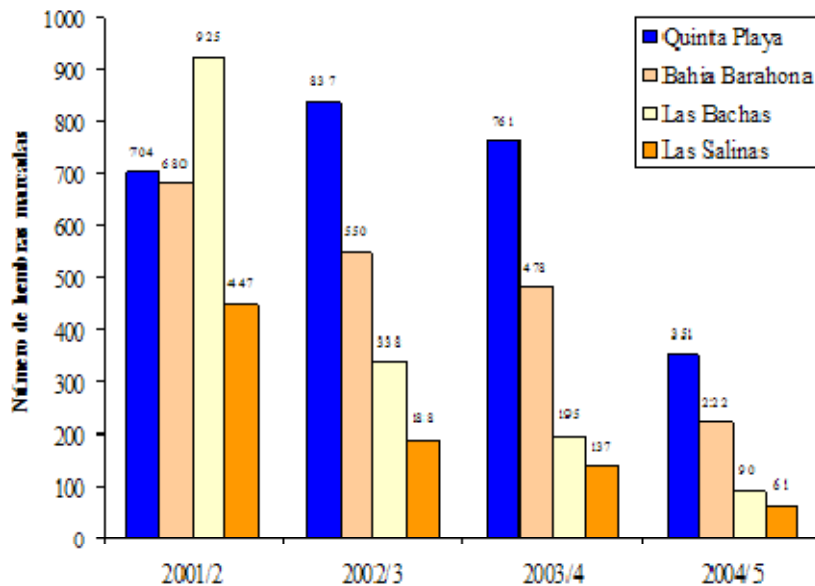


Figure 1. Distribution of the number of green turtle nesting females tagged by site and year in the Galapagos Islands from 2001 – 2005.

The high number of nests laid may be a result of the relatively few threats faced by female green turtles in their nesting habitat (Fig.2).



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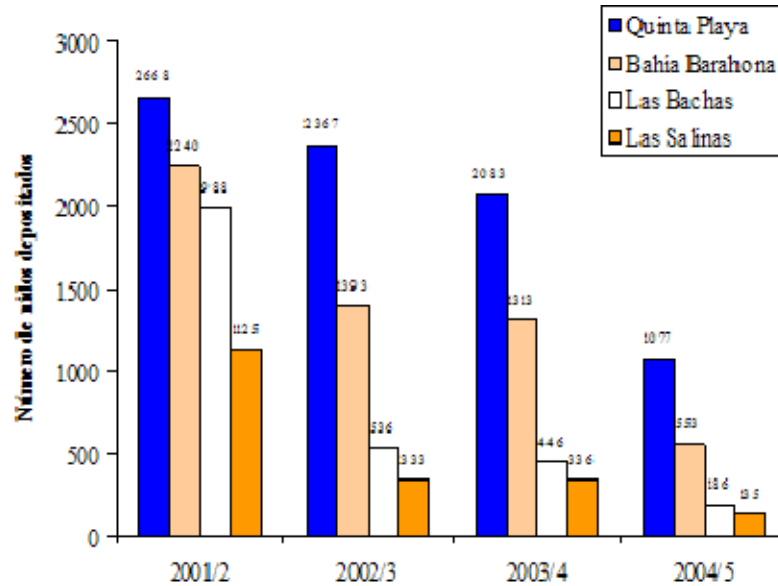


Figure 2. Number of green turtle nests laid at each site and nesting season in the Galapagos Islands, 2001 – 2005.

Even though high numbers of nesting females are reported, a decrease in the number of nesting females has been observed over the years, contrary to historical records at the same sites which showed increasing trends with the exception of the year 1983 when the “El Niño” phenomena occurred in the region (Fig. 3).

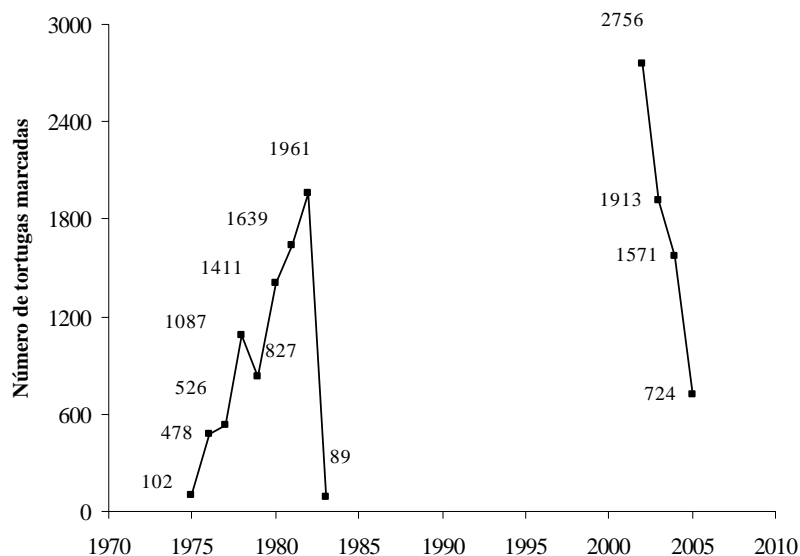


Figure 3. Historical register of female nesting green turtles tagged on Galápagos nesting beaches.



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However, caution must be used when concluding that the number of nesting females is decreasing given that there is no evidence that the entire population is declining since a long time is needed to determine populations.

Up to now, determining the population is limited due to the fact that only a small portion of the nesting colony has completed their nesting cycle and updated information is needed on their sex ratio and size structure. The population census of nesting females only reflects the number of reproductively active females. Females and males that are not actively reproducing may not reflect the same trend. Without knowing the male:female ratio and the age range, it is impossible to extrapolate data from nesting females for the entire population. Therefore, nesting information should be established in conjunction with data from studies on foraging sites in the region.

Galápagos sea turtle foraging sites

Many oceanic sites in the archipelago exist with frequent observation of sea turtles, especially the green turtle *Chelonia mydas* and the hawksbill *Eretmochelys imbricata*. However, the latter is an occasional visitor that does not nest on beaches in the Galápagos Islands; it is observed on the islands north of the Archipelago (Darwin and Wolf) and on the Island of Santa Cruz during the cold season months (May to August). In the study on feeding grounds done by the FCD, only 4 individuals were recorded (years 2003 and 2004) and in the longline fishing Pilot Plan only 1 was incidentally captured (Murillo et al. 2004). Only 1 % of the sea turtles observed in the feeding grounds being studied are hawksbills (P.Zárate pers. obs.).

The other two species recorded for Galápagos, the olive ridley *Lepidochelys olivacea* and leatherback turtle *Dermochelys coriacea*, are occasional visitors that do not nest on beaches in the Galápagos Islands. Very few are recorded in the islands, olive ridleys have never been observed in the feeding grounds being studied, but four individuals were incidentally captured in longlines within the waters of the Galápagos Marine Reserve (RMG), one in 2001 and three during the longline fishing Pilot Plan in the RMG in 2002 (Murillo et al. 2004). The leatherback turtles have also had very few sightings, only three in the past (Green and Ortiz – Crespo 1981) and only one current record as incidental capture in the artisanal longline fishing Pilot Plan being carried out in the waters of the RMG (Murillo et al. 2004).

Those sites identified as priority foraging sites were selected because of their abundance and for having historic data that allows for a comparison across time.



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Migratory routes

Chelonia mydas

Thirteen satellite transmitters were installed on female nesting green turtles, 4 during the 2002 – 2003 nesting season and 9 during the 2004 – 2005 season. According to mark and recapture studies during the 80s, it was said that the nesting turtle colony was in part residential and in part migratory since some females stayed in the Galapagos feeding grounds after finishing their nesting season and others left the Islands; some were recaptured in Central and South America (Green 1984). Our objective was, therefore, to confirm that this is presently happening and to have knowledge on the migratory routes used by females. The results from the first year of installing transmitters were incomplete, three of the four females with satellite transmitters left the Galapagos, but the devices quit transmitting before the females arrived to their final destination (Fig.4).

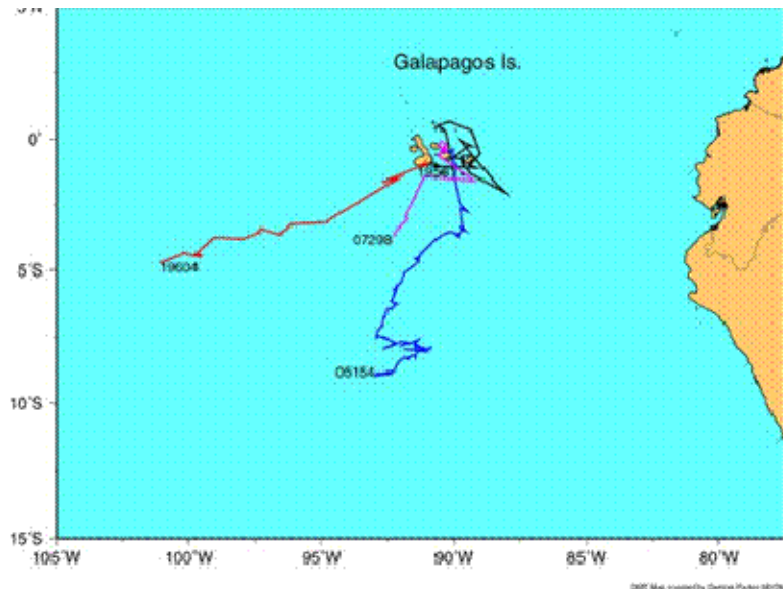


Figure 4. Routes of female nesting green turtles equipped with satellite transmitters during the 2002 – 2003 nesting season in the Galapagos Islands.

Of the 9 transmitters installed in nesting females during the 2004 – 2005 season, 4 followed the same route as in 2002 – 2003 heading southwest, two stayed within the waters of the reserve and three migrated towards the foraging areas in Central America (Fig. 5).



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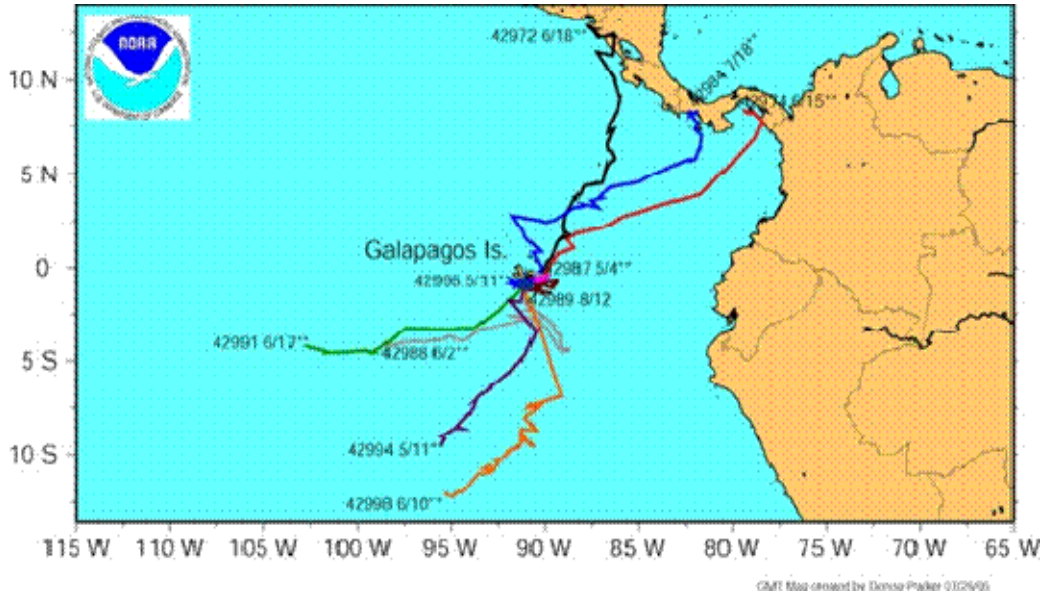


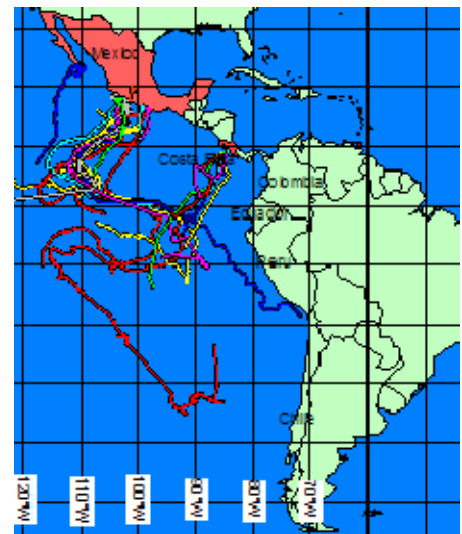
Figure 5. Migratory routes of female nesting green turtles outfitted with satellite transmitters in 2004 – 2005 on Galapagos Islands nesting beaches.

Dermochelys coriacea

The leatherback turtle, with nesting beaches located in Central America (Costa Rica and Mexico), later migrate towards the feeding grounds of Peru and Chile by using the Cocos – Galapagos migratory corridor (Fig. 6, Dutton, Eckert & Benson, unpublished data).

Data from the IATTC observers (Fig.7) also presented reports in waters outside of the Galapagos Marine Reserve (RMG) and Continental Ecuador.

Figure 6. Migratory routes of female leatherbacks after leaving their nesting beaches.





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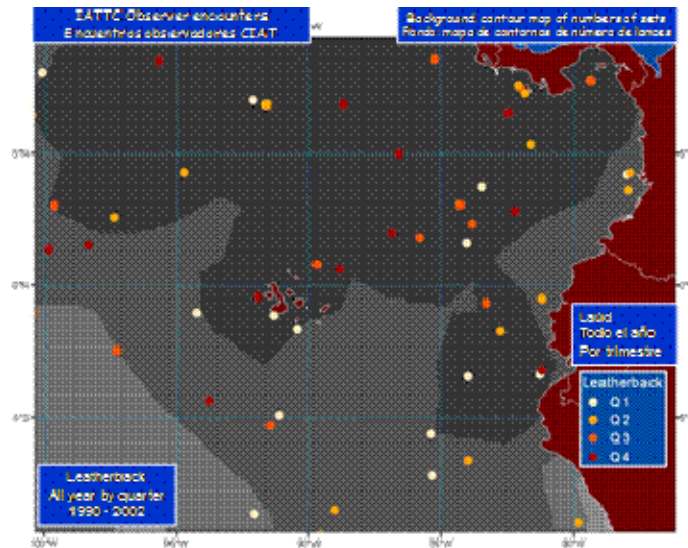


Figure 7. Leatherbacks observed in the Galapagos region and Continental Ecuador.

Lepidochelys olivacea

Information on the presence of the olive ridley in the area of the Eastern Pacific Ocean is based on observations on nesting beaches and on board fishing vessels. The majority of the information is a result of the activities of observers from the Inter-American Tropical Tuna Commission (IATTC; unpublished reports).

Evidence suggests that unlike other species, this species population does not carry out long range migrations, but rather frequently move about in large groups in a limited area (Ambios Ltd. 2004; Fig. 8), including the area surrounding the Galapagos (Fig. 9).



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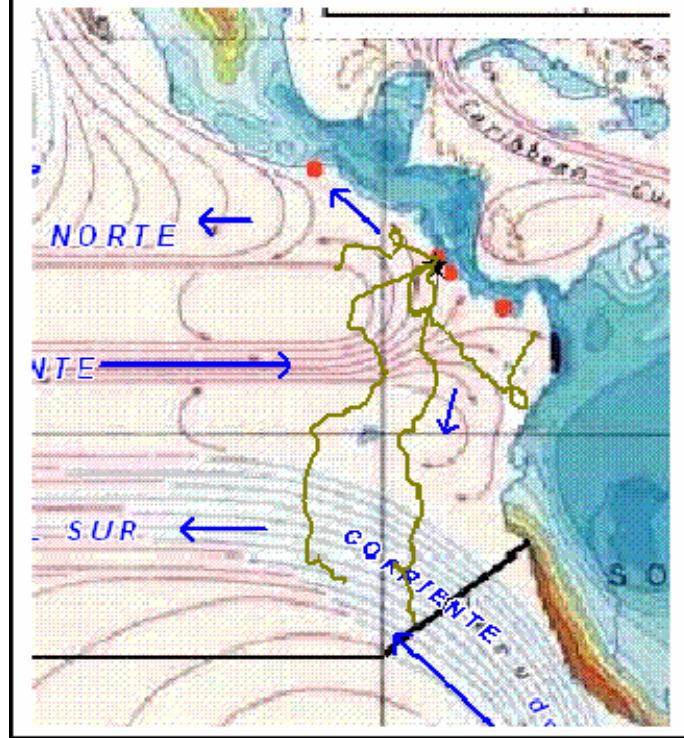


Figure 8. Routes of female olive ridleys (Plotkin et al., 1995).

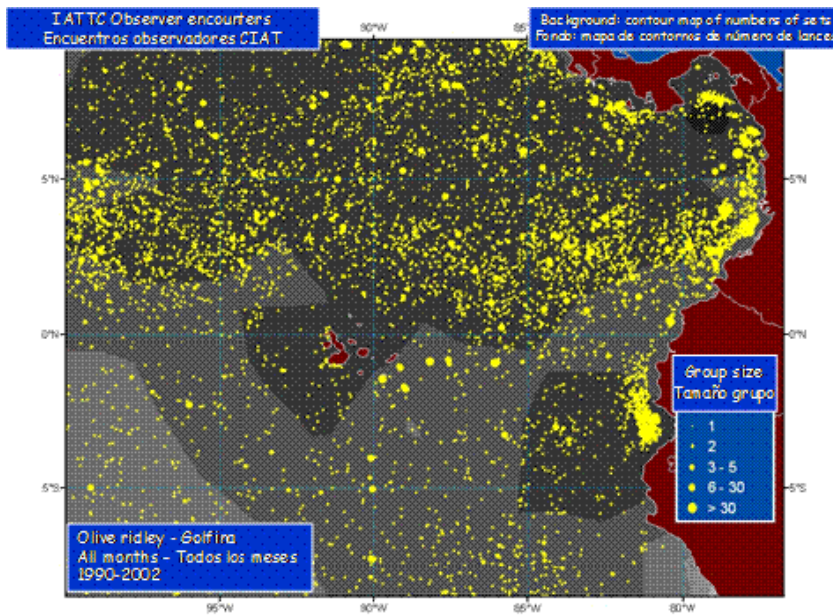


Figure 9. Observations of olive ridleys by IATTC observers in the Eastern Pacific.



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Eretmochelys imbricata

The presence of hawksbills in the Eastern Pacific of Ecuador is provided by observations on nesting beaches and on board fishing vessels. The majority of the information is a result of the activities of observers from the Inter-American Tropical Tuna Commission (IATTC; unpublished reports; Fig 10).

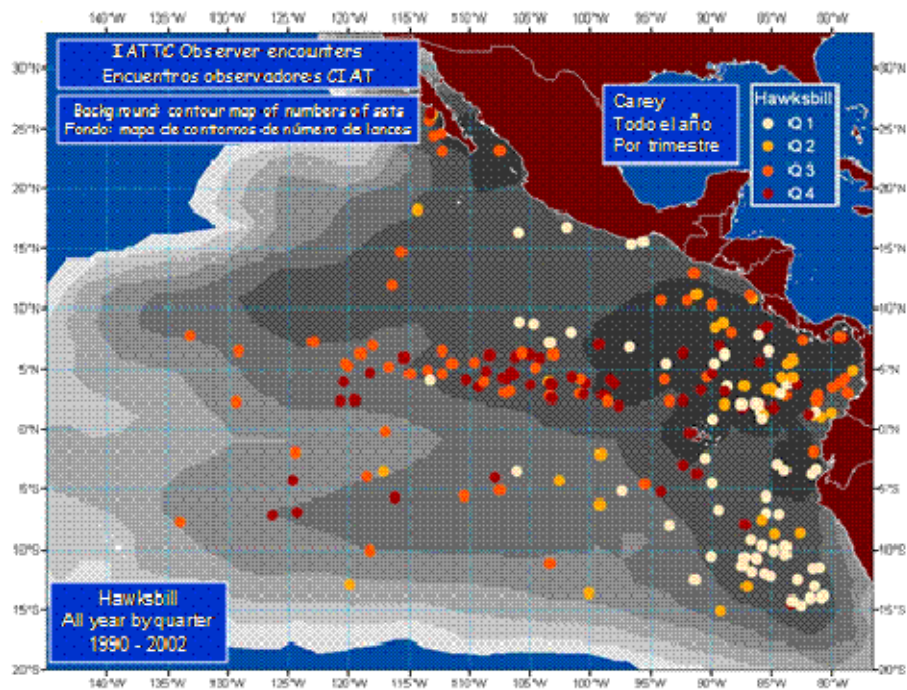


Figure 10. Observations of hawksbill turtles by IATTC observers in the Eastern Pacific.



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2. Information regarding the use derived from sea turtles

There is no extractive use of sea turtles in the Galapagos Archipelago.

	Types of use	Specie	Products	Ocean Basin	Origin*		Estimated annual quantity	Information source	Actions
					L	I			
Consumptive Use	Commercial, cultural, medicinal	Cm, Ei, Lo	Meat (entire individuals)	Eastern Pacific/ Continental Ecuador		X	10.656	Hurtado 1991	
	Domestic, commercial, cultural	Cm, Ei, Lo	Eggs	Eastern Pacific/ Continental Ecuador		X	Nd	Hurtado 1992	
	Commercial, tourism	Cm, Ei, Lo	Carapaces	Eastern Pacific/ Continental Ecuador		X	Nd	Barragan 2003	
Non-consumptive	Education	Cm.,Ei, Dc, Lo		Eastern Pacific/ Continental Ecuador / Galapagos Is.	if the project requires it, a permit is needed from the Galapagos National Park		Numerous local individuals participate in the green turtle project on nesting beaches	FCD Final Reports	Student Groups
	Scientific	Cm.,Ei, Dc, Lo		Eastern Pacific/ Continental Ecuador / Galapagos Is.	A permit is required from Galapagos National Park for collecting samples			FCD Final Reports	tagging, migration, genetics, reproduction

* L = legal, I = illegal



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3. Main threats

3.1 Habitat and other threats

Threats	Specie(s) Affected	Size of Impact	Geographic Region(s) Affected	Information Source	Actions
Sand extraction on nesting beaches	Cm,Ei,Lo,Dc	Nd	Machalilla National Park and surrounding beaches /Continental Ecuador	Barragan 2003	
Tourism Infrastructure	Cm,Ei,Lo,Dc	Nd	Machalilla National Park and surrounding beaches /Continental Ecuador	Barragan 2003	
Traffic and Commercialization	Cm,Ei,Lo,Dc	Nd	Continental Ecuador	Alava et al.2005	
Contamination by liquids and solids	Cm,Ei,Lo,Dc	Nd	Continental Ecuador	Barragan 2003	
Inadequate management of tourism (Carrying capacity of visits to nesting sites)	Cm.	Moderate	Las Bachas, Santa Cruz Island/ Galápagos Is.	FCD Annual Reports	It has been recommended to the Galapagos National Park to build a trail for walking, install signs and even close the site during nesting
Habitat Alteration	Cm.	Nd	Puerto Villamil, Isabela Island /Galápagos Islands	Internal	
Depredation of eggs and hatchlings by wild and domestic animals	Cm.	Moderate	Quinta Playa and Bahía Barahona, Isabela Island / Galápagos Is.	FCD Annual Reports	Eradication programs for introduced animals



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3.2 Capture (Intentional/incidental)

Threats	Specie(s) Affected	Size of Impact	Geographic Region(s) Affected	Information Source	Actions
Artisanal Incidental Fishing	Cm, Ei, Lo, Dc	Nd. It is estimated that in 1990 in Puerto de San Mateo 10,656 turtles were disembarked, possibly reaching rates of 1,000 turtles per day	PNM Beaches and others on the Ecuadorian Continent	Hurtado,1991	None applied
Industrial Incidental Fishing	Cm, Ei, Lo, Dc	Nd	PNM Beaches and others on the Ecuadorian Continent	Hurtado,1991	
Gillnet Fisheries	Cm.	Nd	The fishing zone is the coast of the majority of the nesting sites in Galapagos Islands	Internal registers from denouncements	
Shrimp nets	Cm., Lo, Dc, Ei.	Nd	In migratory routes	Frazier & Salas 1982	Regulations for use of Turtle Excluder Devices (TED).
Longlines and trawl nets	Cm., Lo, Dc, Ei.	Not determined	After female green turtles nest on beaches in the Galapagos, they migrate towards feeding grounds located in Central and South America where they come across numerous fishing boats.		Longlines have been declared as prohibited in Galápagos.



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4. Legal Framework

4.1. International instruments

Treaty, Convention, Agreements, Memorandum of Understanding	Year signed and/or ratification
Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)	1975
Wetlands Convention (RAMSAR)	1971
Inter-American Convention for the Protection and Conservation of Sea Turtles	1998
Convention on the Conservation of Migratory Species of Wild Animals	2004
Resolution No. 050. Official Red Book of threatened species of Ecuador. Elaboration of the Red List of Reptiles of Ecuador	2005
United Nations Convention on Biological Diversity CBD	1993

4.2. National legislation

Type and name of legal instrument (No.)	Description (Range of application)	Sanction(s) Imposed
Law of Special Regime that regulates conservation and Sustainable Development in the Galapagos Province	Unauthorized collection, movement or transport, hunting, commercialization, industrialization, destroying of native, endemic, vulnerable or endangered organisms extinction (CITES)	Prison for 15 to 120 days and fine of 80 general minimum wage.

4.3. Indicate any legal instruments that are currently in the process of being approved.

There are currently no legal instruments in process of being approved.



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4.4. Public and private institutions involved in sea turtle conservation

Institution/ Entity	Responsibilities
Charles Darwin Foundation	Monitor the most important nesting and foraging grounds in Galapagos Islands and realize environmental education activities for local populations
Galápagos National Park	Protect and conserve terrestrial and marine ecosystems inhabited by marine turtles within the Galapagos Archipelago
Machalilla National Park	Protect and conserve terrestrial and marine ecosystems inhabited by marine turtles
General Direction of Maritime Interests of the Navy (DIGEIM) and the National Fisheries Institute	Verify the use of TEDs

5. Exceptions

In Ecuador, the use or possession of sea turtles is prohibited and therefore, no programs exist that regulate their extractive use.

6. Conservation Efforts

6.1 General description of the sea turtle protection and conservation program

The main objective of the Charles Darwin Foundation’s sea turtle project is to provide updated information and management tools to the Galapagos National Park.

Monitoring of green turtle nesting activities started in the year 2000 with the sporadic tagging of several individuals in different areas of the Archipelago. The 2000 – 2001 nesting season was the first year of systematic monitoring at the most important nesting sites for this species in the Archipelago. At present, the fifth year of systematic monitoring has been completed for this species. Studies in feeding grounds involve very specific aspects such as the collection of reproductive parameters to genetic characteristics, movement and impacts on the nesting colony. Around 7000 female green turtles have been tagged to date.



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In 2003, studies began in the foraging areas of Isabela, Santa Cruz and Fernandina Islands where historically the greatest abundance of sea turtles was registered. Approximately 700 individuals have been tagged up to date.

The FCD sea turtle Project has had important participation from the local community since their first years with a total of 225 people. In addition, 50 young university students coming from Ecuadorian universities have been trained in specific techniques.

6.2 Relevant Projects and Activities

Project/Activities	General objective	Results obtained	Duration	
			From	Until
Training and involvement of biology students from Ecuadorian Continental Universities in the Galapagos project.	Train volunteers in techniques and specific methodologies for monitoring nesting and foraging sites.	More than 50 students trained on specific techniques	2001	present
Evaluation of green turtle nesting areas in the Galapagos	Knowledge on the number of reproductive females and nesting success for two beaches during the dos 2006 nesting season.	7000 turtles tagged and obtained reproductive success per year and by site	2001	present
Evaluation of sea turtle feeding grounds in the Galapagos	Knowledge on the population structure of sea turtles in foraging areas.	Sites are dominated by juveniles and/or adults	2003	present
Study of the green turtle diet in Galápagos	Information on the diet and trophic ecology of sea turtles.	Identification of at least 12 species of algae that make up their diet	2003	present
Migration and movements of Galapagos green turtles	Identify migratory routes and foraging zones	Migrate towards Central America	2003	present
Genetic study of populations	Identify the genetics of sea turtles present in Galápagos.	Green turtle of Galapagos presents a unique halotype	2001	present
Awareness of local student community of sea turtle project in Galápagos.	Involve Galapagos high school students in data collection and environmental education activities	More than 200 students involved in data collection	2001	present
Preliminary results of the first large scale experiment with hooks especially designed for fishing operations in the Continental Ecuador/Manta	Decrease the impact and mortality of sea turtles from incidental fishing	Decreased sea turtle mortality by 90%	2005	present



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There is no knowledge of other projects that are currently being carried out in Continental Ecuador.

7. International Cooperation

The sea turtle project carried out at the Charles Darwin Foundation is possible thanks to financial support provide by the National Marine Fisheries Service (La Jolla, USA).

8. National Directory

Name	Institutional affiliation	Line of work / Specialty	Telephone	Fax	E-mail	Website

9. Sources of Information

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