

Report No. 3.

Zisman, S. 1996. The Directory of Belizean Protected Areas and Sites of Nature Conservation Interest.

## **Annex 1. Detailed Phasing of the NBSAP Process**

### **Phase One: Pre-preparation activities**

1. Establish pro-tem National Biodiversity Committee(NBC)-September, 1996.
2. Letters of interest in accepting NBSAP enabling activity - September-October, 1996.
3. Preparation of 2 drafts of "ProDoc" by local sub-committee of NBC and submission to UNDP for expert advice - December, 1996 -March, 1997.
4. UNDP consultant comes to Belize to finalize ProDoc - April, 1997.
5. ProDoc approved by UNDP-GEF - June, 1997.
6. NBSAP project funded in August & staff recruitment begins.
7. NBSAP initiates implementation in September 1, 1997 with Administrative Assistant only. Training in UNDP accounting procedure and establishes office at Conservation Division, Forest Department, Ministry of Natural Resources.

### **Phase Two: Project Implementation**

1. National Coordinator recruited - October 15, 1997.
2. Stocktaking and Assessment in Preparation of NBSAP - November, 1997.
3. Selection and contracting of six national consultants - October, 1997.
4. Technical Assistance from Biodiversity Planning Consultant on TOR for PPT and Reports Structures.
5. Stocktaking and Assessment (November 1997 to February 1998) by six consultants.
6. Official launching of the program - December 3, 1997.
7. Three meetings of PPT on development goal of strategy -December 1997- January 1998.
8. Three NBC meetings during October - December 1997.
9. GOB, NGOS, CBOs Forum- January 1998 (guidelines to improve consultations).
10. Official nomination of NBC and TABS by Permanent Secretary, Ministry of Natural Resources - December 1997 to January 1998.
11. First TABS meeting - Jan 1998.
12. Six stocktaking reports(draft) by consultants- February 1998. After corrections, the final versions were submitted between April, May and June, 1998.
13. 8 consultations to elicit inputs from stakeholders on development of strategy - February 26 - April 30, 1998.
14. Distributed 800 of consultation results to all participants, private sector, hotels, all high schools/Sixth Forms/UCB, commercial/industrial sector.
15. Public Awareness Program (PAP)- December 1997 to September 1998 including 10 monthly newspaper articles, brochures, TV program, essay competitions, the Convention on Biodiversity on comic book form, posters, flags, bumper stickers, National Agricultural and Trade Show participation ( delivered essay winning prizes at this Show).
16. Various meetings of the PPT- February to August, 1998.
17. Receive comments from Biodiversity Planning consultant on Stocktaking and Assessment.
18. With inputs from 8 consultations, consultants prepare draft strategic objectives and combined by Project Office into " first working draft of Strategy by PPT by June 1, 1998.
19. Discussion of first draft by PPT on June 5-6, 1998 and new inputs developed by PPT.
20. Project office prepares 2<sup>nd</sup> working draft of strategy by June 9, 1998.
21. Second meeting of TABS with inputs from other project collaborators- June 12, 1998.
22. PPT meeting on Sat 13, June, 1998 to incorporate TABS inputs and further prioritize the strategic objectives.
23. With inputs from "22", the Project Office incorporates inputs and produce the third working draft.
24. First Regional Consultation ( North) on Action Plan, June 18-19 in Orange Walk Town, Orange Walk District.
25. With those inputs, Project Office prepares 4<sup>th</sup> draft of StratDoc and 1<sup>st</sup> draft of Action Plan Doc- June 26, 1998.
26. Second Regional Consultation(Central) on Action Plan, July 2-3, 1998 in San Ignacio Town, Cayo District.
27. Arrival of Biodiversity Planning Consultant for second Technical Assistance consultancy- July 12-

- August 1, 1998.
28. With inputs from "26", Project Office prepares 5<sup>th</sup> draft of StratDoc and 2<sup>nd</sup> draft Action Plan Doc- July 10, 1998.
  29. Third Regional Consultation (South) on Action Plan, July 16-17, 1998. Independence Village, Stann Creek District.
  30. Project Office with support of Biodiversity Consultant and Mr. Noel Jacobs, prepare final StratDoc and Action Plan Doc, September 15, 1998.
  31. Third TABS meeting to review final drafts of documents, September 25, Belmopan Hotel.
  32. Final editing of documents by September 26-30, 1998.
  33. Printing of documents (100 samples prior to final print), October 1-7, 1998.
  34. Last stakeholder meeting to approve documents prior to submission to GOB, October 9, 1998.
  35. Submission of documents to Cabinet, October 9, 1998.
  36. Finalization of First Country Report, October- December, 1998.
  37. Project closes November 30, 1998.
  38. GOB develops Policy on Biodiversity, October- December, 1998.
  39. National Biodiversity Office established by GOB, October, 1998.

**Annex 2. List of Medicinal and Higher Plants Reported in Belize (O'Brien, 1998).**

Level of Classification	No. of Higher Plants Reported for Belize	No. of Plants With Medicinal Use	No. of Plants With Local Medicinal Use	No. of Plants With Regional Medicinal Use
Class	6	5	-	-
Families	207	118	-	-
Genus	1219	384	-	-
Species	3409	613	383	369

**Annex 3. List of Medicinal Plants in Belize that are Considered Threatened Internationally and their IUCN Category ( World Conservation Center, 1995 in O'Brien, 1998).**

Family	Scientific name	IUCN Category
Piperaceae	Piper zacatense (C.D.C.)	Rare
Fabaceae	Bauhinia erythrocalyx (Wunderlin)	Rare
Rubiaceae	Psychotria limonensis (krause)	Rare
Dioscoreaceae	Dioscorea bartletti	Rare
Bromeliaceae	Tillandria streptophylla	Vulnerable
Acanthaceae	Justicia bartletti (Standley)	Indeterminate

**Annex 4. Summary of Biological Diversity in Coastal and Marine Areas (Jacobs, 1998).**

TAXON	COASTAL		MARINE	
	Genera	Species	Genera	Species
Fish	37	173*	229	472
Invertebrates	29	45	296**	456**
Reptiles	17	124	5	7
Amphibians	6	7	---	---
Insects	152	240***	---	---
Birds	128	177	34	47
Mammals	37	39	4	5
Plants	188	235	66	315
<b>TOTALS</b>	<b>594</b>	<b>1,040</b>	<b>634</b>	<b>1,302</b>

*Note: \* Includes freshwater species; \*\* Some genera and species inferred from carefully analyzed geographic distribution data; \*\*\* Includes counts from river forests, coastal creeks, beaches and cayes.*

**Annex 5. Species Exploited by Different Categories of Fishing (Jacobs, 1998).**

TAXON	FOR EXPORT	FOR LOCAL CONSUMPTION	SPORT/RECREATIONAL
Lane Snapper ( <i>Lutjanus synagris</i> )	+	+	
Kingfish ( <i>Scomberomorus regalis</i> )		+	+
Crevalle ( <i>Caranx hippos</i> )	+	+	+
Permit ( <i>Trachinotus falcatus</i> )		+	+
Blacktip Shark ( <i>Carcharhinus limbatus</i> )	+	+	
Nurse Shark ( <i>Ginglymostoma cirratum</i> )	+	+	
Lemon Shark ( <i>Negaprion brevirostris</i> )	+	+	
Bull Shark ( <i>Carcharhinus leucas</i> )	+	+	
Reef Shark ( <i>Carcharhinus perezii</i> )	+	+	
Hammerhead Shark ( <i>Sphyrna lewini</i> )	+	+	
Gray Snapper ( <i>Lutjanus griseus</i> )	+	+	
Spanish Mackerel ( <i>Scoberomorus brasiliensis</i> )		+	
Mutton Snapper ( <i>Lutjanus analis</i> )	+	+	
Yellow Jack ( <i>Caranx bartholomaei</i> )	+	+	
Jacks ( <i>Alectis</i> spp. and <i>Caranx</i> spp.)	+	+	
Grunts ( <i>Haemulon</i> spp.)		+	
Common Snook ( <i>Centropomus undecimalis</i> )		+	+
Great Barracuda ( <i>Sphyaena barracuda</i> )	+	+	
Yellowtail Snapper ( <i>Ocyurus chrysurus</i> )	+	+	+
Mulletts ( <i>Mugil</i> spp.)		+	

Porgies ( <i>Sparisoma</i> spp.)				+	
Tiggerfish ( <i>Balistes</i> sp.)				+	
Tarpon ( <i>Megalops atlanticus</i> )				+	+
Spiny Lobster ( <i>Panulirus argus</i> )		+		+	
Queen Conch ( <i>Strombus gigas</i> )		+		+	
Stone Crab ( <i>Minippe</i> sp.)		+		+	
Blue Crab ( <i>Callinectes sapidus</i> )		+		+	
Pink Shrimp ( <i>Penaeus notialis</i> )		+			
White Shrimp ( <i>Penaeus schmitti</i> )				+	
Bonefish ( <i>Albula vulpes</i> )					+
Seaweed ( <i>Eucheuma</i> sp.)		+		+	
Seaweed ( <i>Sargassum</i> sp.)		+		+	
Green Turtle ( <i>Chelonia mydas</i> )				+	
Loggerhead ( <i>Caretta caretta</i> )				+	
Nassau Grouper ( <i>Epinephelus striatus</i> )		+		+	
Rock Hind ( <i>Epinephelus adscensionis</i> )		+		+	
Tiger Grouper ( <i>Mycteroperca tigris</i> )		+		+	
Jewfish ( <i>Epinephelus itajara</i> )		+		+	
Dog Snapper ( <i>Lutjanus jocu</i> )		+		+	
Hogfish ( <i>Lachnolaimus maximus</i> )		+		+	
Baysnook ( <i>Petenia splendida</i> )				+	
Tuba ( <i>Cichlasoma</i> sp.)				+	
Crana ( <i>Cichlasoma</i> sp.)				+	

Mus Mus ( ? )				+	
Hicatee ( <i>Dermatemys mawii</i> )				+	
Longfin Damselfish ( <i>Stegastes diencaeus</i> )		+			
Dusky Damselfish ( <i>Stegastes fuscus</i> )		+			
Threespot Damselfish ( <i>Stegastes planifrons</i> )		+			
Cocoa Damselfish ( <i>Stegastes variabilis</i> )		+			
Beaugregory ( <i>Stegastes leucosticus</i> )		+			
Bicolor Damselfish ( <i>Stegastes partitus</i> )		+			
Yellowtail Damselfish ( <i>Microspathodon chrysurus</i> )		+			
Blue Chromis ( <i>Chromis cyanea</i> )		+			
Baca ( <i>Ictalurus furcatus</i> )				+	
Catfish ( <i>Ictalurus</i> sp.)				+	

**Annex 6. Species Composition of Trawled Shrimp By-catch (Modified from Gardener, 1996 in Jacobs, 1998).**

TAXON IN BY-CATCH	COMMON NAME	COMMERCIAL IMPORTANCE
1. <i>Lutjanus synagris</i>	Lane Snapper	Yes
2. <i>Caranx hippos</i>	Crevalle Jack	Yes
3. <i>Scomberomorus regalis</i>	Kingfish	Yes
4. <i>Harengula jaguana</i>	Brazilian Sardinella	Unknown
5. <i>Balistes capriscus</i>	Grey Triggerfish	Yes
6. <i>Porichthys plectrodon</i>	Atlantic Midshipman	No
7. <i>Bothus lunatus</i>	Peacock Flounder	Unknown
8. <i>Cyclopsetta chittendini</i>	Mexican Flounder	Unknown
9. <i>Selene vomer</i>	Atlantic Lookdown	No
10. <i>Trachinotus falcatus</i>	Permit	Yes
11. <i>Diatra rhombeus</i>	Caitipa Mojarra	Unknown
12. <i>Aluterus Schoepfi</i>	Filefish	No
13. <i>Lactophrys quadricornis</i>	Scrawled Cowfish	No
14. <i>Archirus archirus</i>	Drab Sole	Unknown
15. <i>Spheroides greeleyi</i>	Green Puffer	No
16. <i>Sygnatus sp.</i>	Pipefish	No
17. <i>Archirus lineatus</i>	Lined Sole	Unknown
18. <i>Lepiphodium sp.</i>	Cusk Eel	No
19. <i>Rhizoprionodon porosus</i>	Blacktip Shark	Yes
20. <i>Drodon sp.</i>	Porcupine fish	No
21. <i>Sphyrna sp.</i>	Hammerhead Shark	Yes
22. <i>Lutjanus griseus</i>	Gray Snapper	Yes
23. <i>Scomberomorus brasiliensis</i>	Spanish Mackerel	Yes
24. <i>Chloroscombrus chrysurus</i>	Atlantic Bumber	No
25. <i>Lollinguncula brevis</i>	Thumbstall Squid	Unknown
26. <i>Scorpaena brasiliensis</i>	Barbfish	No
27. <i>Albula vulpes</i>	Bonefish	Yes
28. <i>Equetus acuminatus</i>	High Hat	No
29. <i>Panulirus argus</i>	Spiny Lobster	Yes
30. <i>Sphyrna guachancho</i>	Guanchanche	Yes



31. <i>Hippocampus sp.</i>	Sea horse	Yes
32. <i>Chaetodipterus faber</i>	Atlantic Spadefish	Unknown
33. <i>Opisthonema oglinum</i>	Atlantic Thread Herring	Unknown
34. <i>Citharichthys spilopterus</i>	Bay Whiff	No
35. <i>Menticirrhus americanus</i>	Southern Kingcroaker	Unknown
36. <i>Symphurus sp.</i>	Tonguefish	No
37. <i>Prionotus punctatus</i>	Bluewing Searobin	No
38. <i>Spheroides testudineus</i>	Checkered Puffer Fish	No
39. <i>Ariopsis bonallae</i>	New Grenada Cutfish	No
40. <i>Dasyatis guttata</i>	Long Nose Stingray	No
41. Squillidae	Mantis Shrimp	No
42. <i>Callinectes ornatus</i>	Shellings Crab	No
43. <i>Hepatus pudibundus</i>	Flexed Box Crab	No
44. Crustacea	Purse Crab	No
45. <i>Portunus spinimanus</i>	Blotched Swimming Crab	No
46. Lucinidae	Bivalve	No
47. <i>Lutjanus analis</i>	Mutton snapper	Yes
48. <i>Caranx bartholomaei</i>	Yellow Jack	Yes
49. <i>Rachycentron canadum</i>	Cobia	Yes
50. Gastropoda	Horse Conch	Yes
51. Clupeidae	Shad	Yes
52. <i>Zalieutes maginti</i>	Batfish	No
53. <i>Gymnachurus nudus</i>	Naked Sole	Unknown
54. <i>Pomacanthus arcuatus</i>	Gray Angelfish	Yes
55. <i>Trinectes maculatus</i>	Sole	Unknown
56. <i>Rhinobatus percellens</i>	Fiddlerfish	No
57. <i>Echeneus neuciatoides</i>	Whitefin Sucker	No
58. <i>Priacanthus arenatus</i>	Atlantic Bigeye	No
59. <i>Hoplunus sp.</i>	Pike Conger Eel	No
60. <i>Synodus foetens</i>	Lizardfish	No
61. <i>Selar crumenophthalmus</i>	Bigeye Scad	No
62. <i>Haemulon aurolineatum</i>	Tomtate Grunt	Yes
63. <i>Petrochirus diogenes</i>	Giant Hermit	Unknown

64. <i>Symphurus plagnisa</i>	Dusky Cheek Tonguefish	No
65. <i>Cyclopsetta fimbriata</i>	Spotfin Flounder	Unknown
66. <i>Halichoeres caudalis</i>	Wrasse	Yes
67. <i>Murex donmoorei</i>	Don Moore's Murex	No
68. <i>Fasciolaria tulipa</i>	True Tulip	No
69. <i>Pugilina morio</i>	Giant Hairy Melangena	No
70. <i>Calappa flamea</i>	Flame Box Crab	No
71. <i>Mithrax sp.</i>	Old Man's Face	No
72. <i>Oreaster reticulatus</i>	Cushioned Sea star	No

**Annex 7a: Fisheries Production by Commodity in Pounds for 1992 - 1996**

Product	1992	1993	1994	1995	1996
Whole Finfish	526,912	862,194	199,255	280,762	775,510
Fish Fillet	86,191	58,169	60,499	43,386	53,782
Conch	623,661	441,962	437,866	301,951	325,180
Lobster	462,422	462,491	415,923	836,586	606,248
Pink Shrimp	106,312	62,681	75,368	174,123	83,013
Farm Shrimp	1,083,158	1,071,268	1,311,427	1,692,325	1,243,418**
Crab	7,482	8,432	10,847	15,241	29,330
Grouper Roe*	321	509	650	N/A	N/A
Squid	N/A	N/A	N/A	N/A	N/A
Seaweed	N/A	N/A	N/A	N/A	N/A

\* Resulted in disappearance of Nassau grouper from fishery; \*\* Reduced production due to infection by Taura Syndrome Virus. (Belize Information Service, 1997 in Jacobs, 1998).

**Annex 7b. Gross Production and Export of Fisheries Products for 1992-1996(Jacobs, 1998)**

Year	Tot. Production (lbs)	Exports (lbs)	% of Production	Export Value (BZD)
1992	2,896,459	2,295,733	79.26	\$23,101,179.53
1993	2,469,505	2,394,666	96.98	\$24,630,040.49
1994	2,708,496	2,102,742	77.64	\$26,487,807.77
1995	2,785,616	2,659,766	95.48	\$31,507,623.02
1996	3,116,481	2,476,834	79.47	\$24,337,814.08

(Belize Information Service, 1997 in Jacobs, 1998).

Annex 8. Coastal and Marine Species of Primary Interest (Jacobs, 1998).

TAXON	THREATENED WITH PROTECTIVE STATUS	THREATENED AND UNPROTECTED	PROTECTED BUT ENFORCEMENT LACKING	PROTECTIVE MEASURES NOT ADEQUATE
1. Hawksbill Turtle ( <i>E. imbricata</i> )	+		+	
2. Green Turtle ( <i>C. mydas</i> )	+		+	
3. Loggerhead ( <i>C. carreta</i> )	+		+	
4. American Crocodile ( <i>C. crocodylus</i> )	+		+	+
5. Morelets Crocodile ( <i>C. morelets</i> )	+		+	+
6. Nassau Grouper ( <i>E. striatus</i> )		+	+	+
7. Queen Conch ( <i>S. gigas</i> )	+			
8. Common Snook ( <i>C. undecimalis</i> )		+		
9. Bonefish ( <i>A. vulpes</i> )	+		+	
10. Jewfish ( <i>E. itajara</i> )		+		
11. Tarpon ( <i>M. atlanticus</i> )		+		
12. Permit ( <i>T. falcatus</i> )	+		+	+
13. Manatee ( <i>T. manatus</i> )	+		+	+
14. Hicatee ( <i>D. mawii</i> )		+		
15. Sharks		+		
16. Marine Aquarium Fish				+
17. Brown Noddy ( <i>A. stolidus</i> )	+			+
18. Woodstork ( <i>M. americana</i> )	+			+
19. Bay Breasted Warbler ( <i>D. costanea</i> )	+			
20. Cape May Warbler ( <i>D. t. grina</i> )	+			+
21. Brown Booby ( <i>S. leucogaster</i> )	+			+
22. Roseate Spoonbill ( <i>A. alata</i> )	+			+

Annex 9. Assessment Of Inventory Estimated Number Of Endangered Species In Belize (NBC, 1998).

TAXA	Number of Species	Number of Endangered Species	Endangered Species As % of Total
<b>Vertebrates</b>			
Mammals	163	52	38.2
Birds	571	81	14.1
Reptiles	121	-	-
Amphibians	42	-	-
Inland Fish	117	2	1.7
<b>Invertebrates</b>			
Mollusks	157	-	-
Crustaceans	1	-	-
Insects	10	-	-
Odonate	176	-	-
Butterflies	288	-	-
Other	2	-	-
<b>Plants</b>			
Angiosperms	3409	57	1.6
Gymnosperms	3	-	-

**Annex 10a. TABLE OF EXISTING LEGISLATION AND HOW THEY CAN BE ADAPTED TO MORE EFFECTIVELY SUPPORT BIODIVERSITY CONSERVATION (Elliis, 1998).**

Title of Legislation	Proposed Change	Reason for change
Wildlife Protection Act	Amend the Schedule to the Act to list only those wildlife that can be legally hunted and provide protected status to all other wildlife	The present law does not grant sufficient protection to wildlife species and it is difficult to list species and sub-species in an exhaustive way
Wildlife Protection Act, National Parks Systems Act	Increase the Fines for infractions	To strengthen implementation
National Parks Systems Act	Amend the Act to provide for Management Plans to be prepared before the Protected Area is declared	This will enable more effective management of Protected Areas and have no paper parks
Mangrove Regulations	Increase fines for mangrove cutting, presently at \$1,000 maximum	This fine does not reflect the value of mangroves and results in non-compliance with law
Mangrove Regulations	Amend the Regulations to require Government Departments to comply with permitting requirements	Government agencies can take the lead in ensuring compliance. Large Government sponsored projects have major impact on mangroves
Forest Act	Amendment of the Forest Rules to introduction of new procedures for issuing of timber harvesting Licenses	This would provide for the conservation of forest resources by providing for sustained yield timber licenses ; provision of mapping requirements for areas to be issued and the public advertisement of areas over which licenses will be granted; the establishment of a License Review Committee to provide transparency to the process

Forest Act	Amendment to the Forest Act to provide for greater control of harvesting and extractive use of medicinal plants and other non-timber forest produce	At present there is no legal regulation of bio-prospecting
Forest Act	Amendment to the Forest Act to provide for the inclusion of biodiversity conservation as an integral part of management of the Forest Estate	At present the Forest Act does not specifically reference its role in relation to the protection of watersheds, wildlife, littoral forest and other intrinsic forest values and other environmental services
Lands Utilization Act	There needs to be regulations under the Act to provide for the protection of watersheds, estuaries and wetlands on National and private lands	The Act provides for such regulations to be made and this would close a gap in the protection of marine & coastal resources
Lands Utilization Act	Any proposed Revision should provide for the definition of the Special Development Areas (SDAs), clarify the process of establishing SDAs and the Management thereof	This would allow the SDA's to be effectively utilized in establishing and enforcing use guidelines in ecologically sensitive areas
Fisheries Act	Amend the Act to create the offense of and specific fines for damage to Coral Reefs	This would prohibit destruction or damage to coral, an area where a gap presently exists
Fisheries Act	Amend the Act to create changes in the closed seasons for certain species; revise size limits for others and regulate the use of trawlers	This would contribute to the development of sustainable fisheries
The National Lands Act	Amend the Act to include the requirement to apply such zoning and other recommendations of the Lands Utilization Authority as a part of the leasing process	This would institutionalize the relationship between the two processes and contribute to improved biodiversity conservation

**Annex 101. TABLE OF NEW LEGISLATION THAT WOULD MORE EFFECTIVELY SUPPORT BIODIVERSITY CONSERVATION (Ellis, 1998).**

Existing Situation	Proposed Legislation	Effect
No Regulations have been passed under the National Parks Systems Act	Regulations	The development of Regulations as provided for under the Act could improve the management of protected areas by regulating such issues as co-management Sustainable, use, and the development of management plans Regulation for Inventory in Public Protected Areas.
There is no legislation to monitor and control bio-prospecting	Parent Legislation and Regulations	There is the need to regulate the issues related to bio-prospecting in all its complexity and to address the institutional arrangements for the management and supervision of bio-prospecting in all its forms
Belize's present Intellectual Property Rights legislation is inadequate to cover such areas as access to genetic resources  Biosafety Laws are non-existent	Parent Legislation and Regulations	The development of legislation and regulations which would address the new areas of intellectual property rights defined by the Convention on Biodiversity and resolve whatever conflicts emerge from Belize's accession to other International Agreements
There is a need to develop comprehensive legislation to address the issues related to the conservation and protection of Water resources	Parent Legislation and Regulations	The development of legislation which would address water resources valuation management and provide for the development of institutional arrangements for determining and supervising sustainable use and conservation



<p>There is a need for comprehensive legislation to protect and manage the coral reef system</p>	<p>Parent Legislation and Regulations</p>	<p>The development of legislation which would address the protection of the reef system including the coordination of such activities which impact on the reef</p>
<p>There is the need for regulations to be passed under the Lands Utilization Act to address such issues as watershed management and to strengthen the creation and management of Special Development Areas</p>	<p>Regulations</p>	<p>This would enable the Special Development Areas to become a more effective planning tool</p>

**Annex 10c. TABLE OF POLICIES WHICH NEED TO BE IN PLACE TO EFFECTIVELY SUPPORT BIODIVERSITY CONSERVATION (Ellis, 1998).**

Type of Policy	Institution Responsible	Effect
A national policy on the conservation and sustainable use of biodiversity	Ministry of Natural Resources as Focal Point for the Convention on Biodiversity	To show the links between biodiversity conservation and the different sectors and set out policy directions on the subject for each sector
Cayes Development Policy	Fisheries and Forest Department/Ministry of Natural Resources for Land Planning Issues	To provide guidance for the general development and management of all cayes to protect the cayes for the enjoyment and benefit of future generations
Belize Mineral Resources Policy and Marine Dredging Guidelines	Geology and Petroleum Unit	To provide direction on environmental issues related to mining and dredging
Oil Spill Contingency Plan	Department of the Environment/Port Authority	To address the issue of oil pollution of the coastal zone through ship-based sources
Cruise Ship Policy	Department of the Environment	To provide direction to the management of cruise ships dumping of waste and anchoring in national waters
Forest Policy	Forest Department (MNRE)	This Policy has been in existence for some time and a current draft now addresses biodiversity conservation issues
Wildlife Protection Policy	Forest Department (MNR)	To provide direction to the various agencies which are involved in the monitoring and enforcement of legislation which impact on wildlife in order to ensure the conservation of Biodiversity
Protected Areas Policy	Forest Department	To provide overall policy guidance for statutory protected area development and management as well as the definition of private initiatives within the National Protected Areas System
Fisheries Policy	Fisheries Department	To provide guidance for the development of sustainable fishing practices and management in order to contribute to the in situ conservation of fisheries resources as part of Belize's biodiversity
National Land Policy	Lands and Survey Department	To provide comprehensive direction on land use issues including the conservation of biodiversity and to address such current practices which contribute to loss of biodiversity

Sustainable Agricultural Policy	Agriculture Department	To provide, inter alia, for comprehensive guidance on issues related to the conservation of Biodiversity such as the control of pesticide use, the implementation of sustainable agricultural practices as well as the conservation of genetic material
Water Resources Policy	Hydrology Department/ Ministry of Natural Resources	To provide guidance on the issues related to the conservation, Valuation and sustainable use of water resources in order to maintain the necessary conditions for Belize's biodiversity to be maintained
Policy regulating Access to Genetic Resources and Biotechnology	The Ministry of Natural Resources/Solicitor General's Office	To provide direction with respect to those issues which relate to the accessing of genetic resources, bio-prospecting and the other issues defined by the CBD under Articles 15 & 19
Ex-Situ Conservation	The Ministry of Natural Resources	To provide direction on the management and development of ex-situ conservation in response to Article 9 of the Biodiversity Convention

**Annex 11a. Declared and Proposed Coastal and Marine Protected Areas of Belize at February, 1998. (Also includes Protected Areas which encompasses a river, lagoon, stream, creek or watershed) (Jacobs, 1998).**

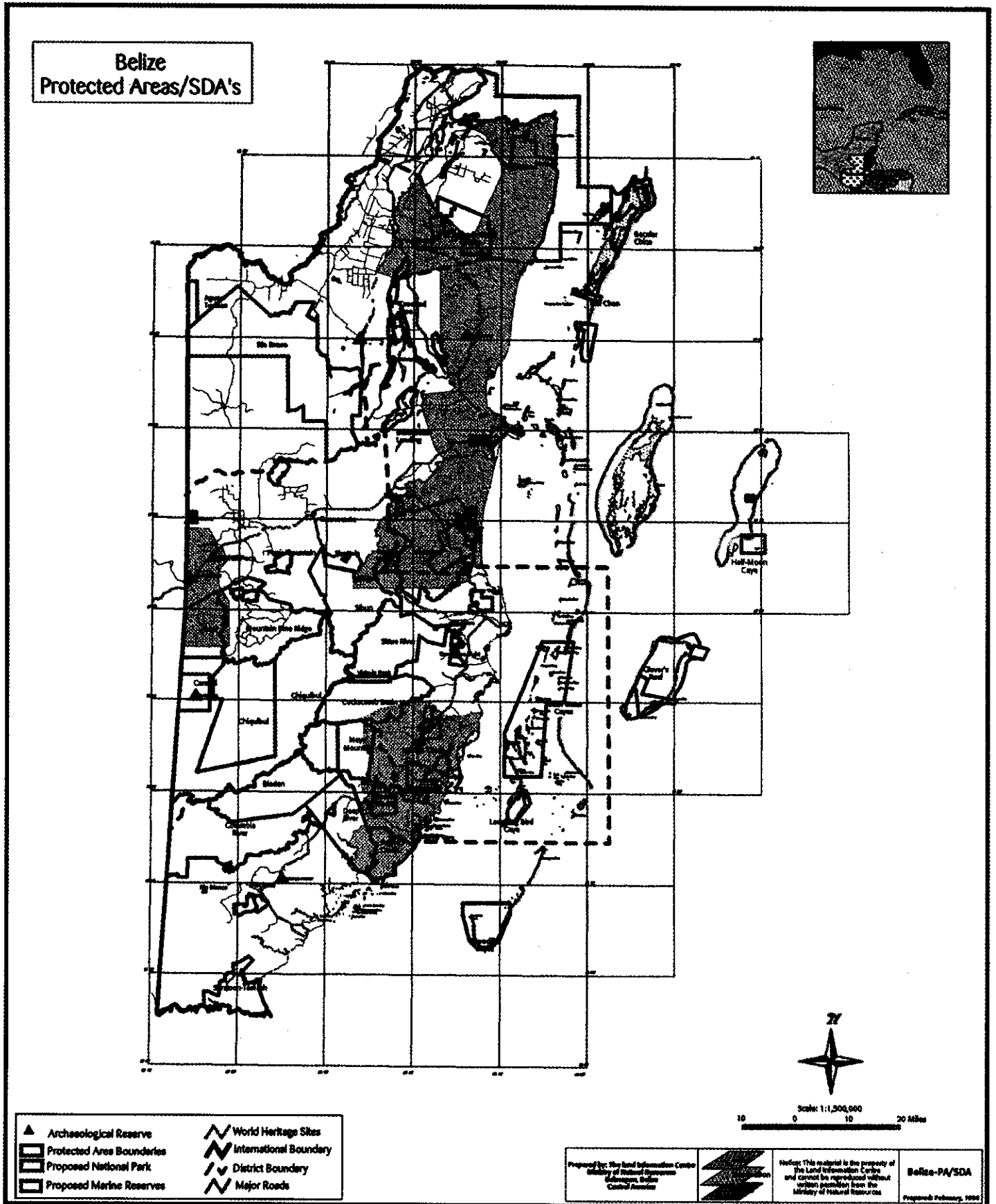
<b>NAME</b>	<b>YEAR ESTABLISHED</b>	<b>AREA IN HECTARES</b>
Burdon Canal Nature Reserve	1990	2,128
Bird Cayes	1977	5
Blue Hole National Park	1986	269
Laughing Bird Caye National Park	1991	4,097
Paynes Creek National Park	1994	12,824
Rio Blanco National Park	1994	40
Sarstoon/Temash National Park	1994	16,963
Bacalar Chico National Park and Marine Reserve	1996	11,396
Half Moon Caye National Monument	1982	3,956
Blue Hole Natural Monument	1996	414
Crooked Tree Wildlife Sanctuary	1984	16,719
Deep River Forest Reserve	1990	31,811
Freshwater Creek Forest Reserve	1960	24,363
Manatee Forest Reserve	1959	42,056
Mango Creek Forest Reserve (1,2,3,4)	1989	14,392
Sibun Forest Reserve	1977	43,074
Sittee River Forest Reserve	1977	38,120
Swasey Bladen Reserve	1989	5,983
Monkey Caye Forest Reserve	1996	591
Sapodilla Caye Marine Reserve	1996	13,523
Southwater Caye Marine Reserve	1996	31,730
Glover's Reef Marine Reserve	1993	32,889

**Annex 11b. Proposed Coastal and Marine Protected Areas at February, 1998 (Jacobs, 1998).**

**PROPOSED PROTECTED AREAS**

1. Mexico Rocks
2. Siwa Ban/Caye Caulker Forest Reserve
3. Shipstern Caye and Lagoon
4. Four Miles Lagoon
5. Belize River Mouth
6. Northern and Southern Lagoon
7. Placencia Peninsula
8. Port Honduras
9. Mussel Creek
10. Beaver Dam
11. Northern River
12. New River Lagoon
13. Rio Hondo
14. Sennis River
15. Aguascaliente Swamp
16. Whitewater
17. Indian Creek
18. Upper Macal river/Privassion Creek
19. Raspaculo Branch Watershed
20. Silk Cayes
21. Turneffe Island
22. Manatee Sanctuary

Annex 12. Map of Protected Areas and Special Development Areas (LIC, 1998)



Belize  
Protected Areas/SDA's



- |                           |                        |
|---------------------------|------------------------|
| Archaeological Reserve    | World Heritage Sites   |
| Protected Area Boundaries | International Boundary |
| Proposed National Park    | District Boundary      |
| Proposed Marine Reserves  | Major Roads            |



Scale: 1:1,500,000  
0 10 20 Miles

Prepared by: The Land Information Centre  
Ministry of Natural Resources  
Belize City, Belize  
Central America



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Belize-PA/SDA  
Prepared February, 1998

**Annex 13. International Conventions and Agreements relating to the Biological and Natural Resources and the Environment to which Belize has become a Party.**

<b>List of Agreements, Protocols, International Conventions Signed by Belize with Respect to Biodiversity Resources and the Environment and Trade</b>	<b>YEAR</b>
1. Convention on Wetlands of International Importance especially as Waterfowl Habitat	1971
2. International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL)	1973
3. Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) Toxins and their destruction	1980
4. Convention on International Trade in Endangered Species of Wild Fauna and Fauna (CITES)	1981
5. United Nations Law of the Sea Convention	1982
6. International Convention for the Regulation of Whaling,	1982
7. Convention for the Protection and Development of the Marine Environment for the Wider Caribbean Region (The Cartagena Convention)	1983
8. Convention concerning the Protection of Workers against Ionizing Radiation	1984
9. Western Central Atlantic Fisheries Commission(WECAFC)	1985
10. Vienna Convention for the Protection of the Ozone Layer - Final Act of the Plenipotentiaries on the Protection of the Ozone Layer	1987
11. International Plant Protection Convention	1987
12. Montreal Protocol on Substances that Deplete the Ozone Layer - Final Act and Amendments	1990
13. The UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage.	1990
14. Bilateral Agreement between Belize and Mexico on Cooperation for the protection and improvement of the Environment and conservation of Natural Resources in the Border Zone	1991
15. Convention concerning Indigenous and Tribal Peoples in Independent Countries	1992
16. Central American Biodiversity and Protection of Priority Areas Convention	1992
17. Convention on Biological Diversity	1992
18. Climate Change Convention	1992
19. Agreement establishing the Inter-American Institute for Global Change Research	1992
20. Agreement establishing the Fund for the Development of Indigenous Peoples of Latin America and the Caribbean	1994
21. Alliance for the Sustainable Development of Central America(ALIDES)	1995
22. Statement of Intent for Sustainable Development Cooperation and Joint Implementation of Measures to Reduce Emissions of Greenhouse Gases by the Government of the USA, Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama	1994
23. Marrakesh Declaration of 1994 - Final Act embodying the Results of the Uruguay Round of Multilateral Trade Negotiations re GATT.	1995

<b>List of Agreements, Protocols, International Conventions Signed by Belize with Respect to Biodiversity Resources and the Environment and Trade</b>	<b>YEAR</b>
24. Agreement for the implementation of the Provision of the United Nations Convention on the Law of the Sea of 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks	1997
25. Latin American Organization for Fisheries Development (OLDEPESCA)	1997
26. Ratification of RAMSAR Convention	1998

Source: Ministry of Foreign Affairs *in* Ellis, 1998.



**Annex 14a. Institutions and their Capacity in Relation to the Management of Medicinal Plants (O'Brien, 1998).**

Capacity	Government	Non-Government	Private
Education/Scientific/Research	<ol style="list-style-type: none"> <li>1. Belize College of Agriculture</li> </ol>	<ol style="list-style-type: none"> <li>1. Belize Association of Traditional Healers (BATH)</li> <li>2. Belize Audubon Society (BAS)</li> <li>3. Ixchel Research Foundation</li> <li>4. Programme for Belize (PFB)</li> <li>5. Traditional Healers Foundation (THF)</li> <li>6. New York Botanical Gardens (Institute of Economic Botany)</li> </ol>	
Conservation/Management	<ol style="list-style-type: none"> <li>1. Conservation Division (Forestry Department)</li> </ol>	<ol style="list-style-type: none"> <li>1. Belize Audubon Society</li> <li>2. Belize Enterprise for Sustainable Technology (BEST)</li> <li>3. Programme for Belize (PFB)</li> </ol>	<ol style="list-style-type: none"> <li>1. Rainforest Medicine Trail</li> <li>2. Original Panti Trail</li> <li>3. Private and Community Protected Areas.</li> </ol>
Industrial/Commercial			<ol style="list-style-type: none"> <li>1. Traditional Healers</li> <li>2. Arum Co. Ltd.</li> <li>3. Rainforest Remedies</li> <li>4. Rainforest Rescue</li> <li>5. Traditional Healers Foundation</li> <li>6. Agape</li> </ol>

Annex 14b. Institutional Profile of Various Organizations Involved in the Management and Conservation of Medicinal Plants (O'Brien, 1998).

Name of Institution	Date Founded	Status	Personnel		Main Foci in Relation to Medicinal Plants
			Management Technical Support	Manual/ Unskilled	
Agape and Di Bush Medicin Kongsl of Belize	1994	Uncertain but the company is believed to have closed down its operations	Uncertain	Uncertain	Promote and protect the use of herbs, Teach traditional healing (through newsletter and public awareness), Export botanical products from Belize, Networking and information sharing, Promote September 12 <sup>th</sup> as the National day of herbs.
Belize Association of Traditional Healers (BATH)	1992	Officially dissolved in June 1994 due to polarization. One faction continued as BATH and the other faction formed a Council of Elders which was replaced by the Traditional Healers Foundation (THF) in 1997.	BATH had approximately 70 members	None	Promote the use of herbs, Document and share knowledge, Education (through teaching in schools, newsletters, public forums and displays), Management of medicinal plant (MP) resources, Networking and database management, Promote research, Promote apprenticeship and foster cottage industries, Offer consulting services, Promote equitable sharing of benefits.
Belize College of Agriculture (BCA)	1977	Operational but only 2 technical person involved partially with management of MP.	13	7	Educate students on ethnobotany of MP, Promote the cultivation of MP, Maintain herbarium collection of MP, Guide the development of the MP subsector.

**Annex 14c. Institutional Profile of Various Organizations Involved in the Management and Conservation of Medicinal Plants.**

Name of Institution	Date Founded	Status	Personnel		Main Foci in Relation to Medicinal Plants
			Management Technical	Manual/ Unskilled	
Belize Enterprise for Sustainable Technology (BEST)	1985	BEST is now a more active participant and is spearheading the revival of the Terranova initiative.	10	None	Support sustainable development of natural resources, Promote enterprise development, Promote efficient use of resources.
Belize Rural Women's Association (BRWA)	-	BRWA remains a registered NGO but has been without financial support and staff for a few years now.	None	None	Public awareness of traditional healing, Research and documentation, Legitimize traditional healing practices and incorporate into the national health care, Promote MP production and processing, Develop confidence and promote awareness on traditional healing amongst rural women, Networking and organization of healers.
Ixchel Research Foundation	1990	Active	8	3	Establish living collection of MP, Prepare herbarium specimens and maintain a collection of MP, Conduct scientific research, Document information on traditional healing, Conduct outreach through field trips, displays, youth camps and other educational programmes for youths, Promote natural healing and herbalism.
Rainforest Remedies	1992	Operational	1	1	Prepare dried herbs, extracts, salves and tinctures for commercial sale.
Rainforest Rescue	Uncertain	Uncertain	Uncertain	Uncertain	Process medicinal plants for sale.

Annex 14d. Institutional Profile of Various Organizations Involved in the Management and Conservation of Medicinal Plants (O'Brien, 1998).

Name of Institution	Date Founded	Status	Personnel		Main Foci in Relation to Medicinal Plants
			Management Technical	Manual Unskilled	
Conservation Division (Forestry Dept.)	-	Active	9	2	Establishment of protected areas, Management and co-management of protected areas, Regulation, monitoring and control of natural resources, Issuing permits for plant collection and export, Facilitates meetings, seminars and workshops, Management of the national herbarium.
New York Botanical Gardens Institute of Economic Botany (NYBG - IEB)	1981 (In Belize since 1988)	NYBG (IEB) collaborated with ixchel and other local institutions in Belize on the Belize Ethnobotany Project (BEP) since 1988. This project ended in 1996 but NYBG's work in Belize continues through smaller projects and collaboration.	20	None	Collection and identification of useful plants, Documentation and database management (of plant specimens and their uses), Natural resource management, Basic and applied research on useful plants, Dissemination of results, Teaching and training, Networking and capacity building, Determination of active principles and initial screening of plants for the National Cancer Institute (NCI).
Traditional Healers Foundation (THF)	1997	Recently formed	App. 15 members	None	Same as for BATH (the faction of BATH that had resigned during the controversy reorganized to form the THF).
Traditional Healers	-	Traditional healers continue to operate in Belize.	Exact no. uncertain	Exact no. uncertain	Use medicinal plants for common and other ailments.

N. B. BCA, BEST, The Conservation Division and the Institute of Economic Botany of the New York Botanical Gardens have at least one (1) staff member with interest/responsibility for medicinal plants but the institution is not devoted solely to medicinal plants.

**Annex 15. Assessment of Investment In Biodiversity Conservation (Rosado, 1998)**

	<u>1997/98 BZ\$</u>
Ministry of Tourism and the Environment (total budget)	
General Administration	286,071
Archaeological Operations	581,324
Dept. of the Environment	<u>237,955</u>
Total	1,105,350
Ministry of Natural Resources	
General Administration	478,660
Lands Administration	987,361
Surveys and Mapping	642,123
Property Tax Valuation	140,616
Forestry Department	<u>2,313,404</u>
Total	4,597,164
<b>GRAND TOTAL</b>	<b>5,702,514</b>

Annex 10a. Estimated Management Costs For Protected Areas (Rosado, 1998)  
(Annual Operating Costs in US \$).

CLASSIFICATION OF PROTECTED AREA	AREA (ha)	ANNUAL OPERATING COSTS (US\$)	ANNUAL COSTS PER ha (US\$)
National Parks			
Aguas Turbias	3546	70,605	19.9
Blue Hole	269	71,026	264.0
Chiquibut	115906	158,474	1.4
Five Blues Lake	1644	52,977	32.2
Guanacaste	23	69,482	3021.0
Laughing Bird Caye	4096	26,786	6.5
Monkey Bay	728	25,281	34.7
Paynes Creek	12824	55,568	4.3
Rio Blanco	40	22,201	555.0
Sarstoon/Temash	16962	121,759	7.2
Nature Reserves			
Bladen	40355	135,986	3.4
Burdon Creek	2127	52,154	24.5
Tapir Mountain	2730	83,837	30.7
Wildlife Sanctuaries			
Cockscomb Basin	35194	128,901	3.6
Crooked Tree	16719	65,287	3.9
National Monuments			
Half Moon Caye	3955	64,588	16.3

<b>Forest Reserves</b>			
Chiquibul	59874	76,657	1.3
Columbia	41676	78,297	1.9
Commerce Bight	2207	7,313	3.3
Deep River	31811	63,805	2.0
Freshwater Creek	24363	61,078	2.5
Grants Works	3200	17,814	5.6
Machaca	1520	13,836	9.1
Manatee	42055	67,398	1.6
Mango Creek	14392	85,089	5.9
Maya Mountain	51866	61,531	1.1
Mountain Pine Ridge	51346	92,403	1.8
Sibun	43073	64,433	1.5
Silkgrass	1945	5,697	2.9
Sittee River	38119	57,334	1.6
Swasey Bladen	5983	47,609	7.9
Terra Nova	2745	47,202	17.1
Vaca	21195	56,458	2.6
<b>Private</b>			
Rio Bravo	98282	235,419	2.4
Shipstern	7627	109,883	14.4
Community Baboon	5255	39,284	7.5
<b>GRAND TOTAL</b>		<b>2,281,452</b>	

Annex 16b. Investment Needs For Protected Areas in US\$ (Rosado, 1998)

CLASSIFICATION OF PROTECTED AREA	AREA (ha)	INVESTMENT NEEDS	PER ha
----------------------------------	-----------	------------------	--------

National Parks					
Aguas Turbias	3546	264,490	74.5		
Blue Hole	269	114,000	423.7		
Chiquibul	115906	1,112,251	9.6		
Five Blues Lake	1644	107,925	65.6		
Guanacaste	23	49,000	2130.4		
Laughing Bird Caye	4096	47,000	11.5		
Monkey Bay	728	147,048	201.9		
Paynes Creek	12824	328,215	25.6		
Rio Blanco	40	101,170	2529.2		
Sarstoon/Temash	16962	520,561	30.7		
Nature Reserves					
Bladen	40355	636,249	15.7		
Burdon Creek	2127	178,704	89.0		
Tapir Mountain	2730	278,542	102.0		
Wildlife Sanctuaries					
Cockscomb Basin	35194	128,000	3.6		
Crooked Tree	16719	284,000	16.9		
National Monuments					
Half Moon Caye	3955	151,000	38.1		
Forest Reserves					
Chiquibul	59874	525,002	8.7		
Columbia	41676	130,000	3.1		
Commerce Eight	2207	158,938	224.6		
Deep River	31811	500,372	15.7		
Freshwater Creek	24363	158,000	6.5		
Grants Works	3200	134,286	41.9		
Machaca	1520	65,981	43.4		
Manatee	42055	477,482	11.3		
Mango Creek	14392	418,656	29.0		
Maya Mountain	51866	431,542	8.3		
Mountain Pine Ridge	51346	65,000	1.3		
Sibun	43073	501,372	11.6		
Silkgrass	1945	84,864	43.6		
Sittee River	38119	382,808	10.0		
Swasey Bladen	5983	243,804	40.7		
Terra Nova	2745	130,632	47.5		
Vaca	21195	425,639	20.0		
Private					
Rio Bravo	98282	365,000	3.6		
Shipstern	7627	78,500	10.2		
Community Baboon	5255	40,000	7.6		
<b>GRAND TOTAL</b>		<b>9,757,033</b>			



Annex 17a. Important or Existing Programmes in Place to Manage Medicinal Plant Resources (O'Brien, 1998).

Programme	Programme Duration	Programme Expenditure (in \$ Bz.)	No. of Participants	Expenditure for 1996 (in \$ Bz.)	Coordinator (s)	Source of Funds/Sponsors
Belize Ethnobotany Project	1988-96	800,000.00	n/a	undetermined but included in total project expenditure	Institute of Economic Botany (NYBG) and Ixchel	Richard Dickie, USAID
Ixchel Research Foundation Some important programmes	1990-	-	n/a	662,232.00		Sale of herbal remedies, research fees, consulting fee, sale of books, grants and seminars
	1992-	-	n/a	218,501.00	Ixchel	Business enterprise
	1983-	-	n/a	12,916.00	Ixchel	Ixchel
3. Royalties, donations & scholarship	1995-	-	n/a	40,759.00	Ixchel	Ixchel
Two (2) National Traditional Healers Conferences	1989-91	18,900.00	355	0.00	Ixchel, BCES & BRWA	New Orleans Fertility Clinic
Three (3) Regional Traditional Healers Conferences	1991-92	45,291.84	223	0.00	Ixchel & BCES	USAID

Annex 17b. Important or Existing Programmes in Place to Manage Medicinal Plant Resources (O'Brien, 1998).

Programme	Programme Duration	Programme Expenditure (\$ Bz.)	No. of Participants	Expenditure for 1996 (\$ Bz.)	Coordinator (s)	Source of Funds/Sponsors
BCA training	1992-	-	22-24 students	2,250.00	BCA/Ixchel	Ixchel
Herbarium upgrading	1996-97	96,033.00	n/a	96,033.00	FPMP and Conservation Division	UK Government
National ecology study	1996-97	188,490.00	n/a	188,490.00	FPMP and Conservation Division	UK Government
Terranova	1993-94	39,701.53	n/a	0.00	BATH	9 sponsors > \$ 1,000.00 and 59 sponsors < \$ 1,000.00
BATH	1993-94	10,328.04	70	0.00	BATH	contributed the project funds for both Terranova and BATH
Conservation Division	-	-	n/a	157,316.00	Ministry of Natural Resources and the Environment	Government of Belize

**Annex 18a. Status of Shrimp Mariculture at December, 1997 (Modified from Huntington and Dixon, 1997 in Jacobs, 1998).**

Farm Name	Location	Total Land Area (Ha.)	Production Area (Ha.)
Aqua-mar	Big Creek	486 (1,215)	130 (405)
Belize Aquaculture	Blair Atoll	3,240 (3,240)	6 (122)
Cherax	Indian Hill	3,645 (4,050)	100 (100)
Laguna Madre	Independence	1,296 (1,296)	19 (100)
Nova Companies	Ladyville	770 (1,418)	230 (608)
Paradise	Mullins River	876 (1,484)	81 (486)
Toledo Fish Farms	Monkey River	506 (2,026)	30 (203)

*Note: Quantities in brackets are estimations of expansion and production for the next 5 years; Caribbean Shrimp, located at Ladyville, does not appear in the table due to inconsistencies in its operations.*

**Annex 18b. Status of Shrimp Mariculture at December, 1997 (Modified from Huntington and Dixon, 1997 in Jacobs, 1998).**

Farm Name	Production (MT/Yr)	Water Exchange (%/Day)	Seawater Use Source Volume (M <sup>3</sup> /Day)	Effluent Treatment
Aqua-mar	218 (679)	5 (5)	Estuary 9,601 (29,910)	No (No)
Belize Aquaculture	? (1,215)	0 (0)	Sea 3,888 (79,056)	Yes (Yes)
Cherax*	100 (200)	8 (8)	Estuary 9,837 (9,837)	No (Yes)
Laguna Madre	233 (537)	15 (5)	Lagoon 6,546 (12,820)	No (Yes)
Nova Companies**	500 (1,321)	2 (4)	Sea 73,645 (194,678)	No (Yes)
Paradise	101 (506)	5 (5)	Sea 4,046 (24,321)	No (Yes)
Toledo Fish Farm	49 (304)	3 (1)	Sea 10,474 (N/A)	No (No)

*Key: ( ) = quantities estimated for the next 5 years; ? = first harvest due February, 1998; \* = Cherax has an effluent monitoring program in place; \*\* = Nova has sedimentation ponds that receive waste from processing facility; N/A = data not available*

Annex 19. Major Threats to Coastal and Marine Biodiversity (Jacobs, 1998).

THREATS	PRINCIPAL EFFECTS
1. Inadequate use of Coastal Lands	Habitat destruction; soil erosion; increased environmental vulnerability.
2. Inadequate Municipal Waste Disposal	Eutrophication and its associated algal blooms; alteration to the ecological structure of coastal communities; toxicity from excess ammonium compounds; coral destruction.
3. Industrial Waste	Pollution with pesticide residues; organic overload resulting in low levels of dissolved oxygen; critical habitat destruction; toxicity by heavy metals; offshore transport of nutrients.
4. Dredging and Sand Mining	Suspended solids in water column that block pores of respiratory units of living corals.
5. Mangrove Clearance	Critical habitat destruction for hundreds of species that use mangrove root system as nursery; birds and many other inhabitants of the mangrove arboreal, subtidal and intertidal communities represent a major part of Belize's coastal biodiversity.
6. Oil Spills and Bilge Disposal	Catastrophic effects on both benthic and nektonic communities; mass mortalities of species.
7. Unsustainable Fishing Practices	Species extinction; ecological imbalance; hunger; reduction in genetic diversity.
8. Indiscriminate Killings and Hunting	Species extinction; reduction of genetic diversity; ecological imbalance.
9. Poaching	Species extinction; reduction of genetic diversity.
10. Tourism, Residential and Industrial Developments	Mangrove destruction; alteration of beaches and destruction of turtle nesting sites; shoreline instability and destruction of habitats for benthic beach communities.
11. Introduction of Exotic Species	Species competition; alteration of community structure; species displacement and extinction.
12. Natural Disasters	Coral reef destruction; destruction of critical habitats on coastline and cayes.

13. Tourism	Damage to corals by boat anchors, bilge and other wastes from cruise ships; physical contacts with corals by divers; interruption of nesting of birds by tourist visitation.
14. Human Population Growth	Clearance of coastal vegetation; increase solid waste; insanitary conditions for human beings; nutrient overload on coastal communities.

Annex 20. Identified Gaps and Suggested Actions for the Sustainable Use of Coastal and Marine Biodiversity (Jacobs, 1998).

IDENTIFIED GAPS	SUGGESTIONS FOR ACTION
1. Inappropriate Fishing Regulations	Complete revision of Fisheries Act as quick as possible. Must include specific regulations for addressing by-catch in trawl shrimp fishery, protection of Nassau grouper, revision of boat and fishing licences as 'disincentives' to arbitrary expansion of the industry; revisit regulations on nets and marine aquarium fish.
2. Unavailability of basic biological data	Assess current biological status of each resource; evaluate the effects of present fishing practices; formulate a National Fisheries Development Policy.
3. No formal Aquaculture Policy	Formal policy to be completed no later than May 1998.
4. No knowledge of biological resources in Exclusive Economic Zone	Conscious efforts must be made to determine the state of exploitation of resources within EEZ. Joint ventures with foreign companies is a quick option. Consider deep sea research with Cuba and Mexico.

<p>5. Lack of species specific regulations under the Fisheries Act, Wildlife Protection Act and Forest Act</p>	<p>Acts should be revised and amended to address those species considered to be threatened or vulnerable to overexploitation. Revise those species specific regulations that have not been efficient and make necessary changes.</p>
<p>6. Lack of legislation on maritime transport of toxic substances in Belizean waters.</p>	<p>This should be given top priority and the development and implementation should be between the Port Authority and IMMARBE. Regulations should include an Environmental Compliance Plan for all ships that traffic in Belizean waters.</p>
<p>7. Formal policies for coastal development</p>	<p>Multi-sectoral and multi-agency responsibility that needs immediate action. In the absence of formal legislation, the proposed Belize City Cayes Development Guidelines, the Turneffe Islands Development Guidelines, and the Cayes Development Policy should be considered for immediate adoption. Policies for sustainable agriculture, tourism, and for the leasing and granting of land must be developed immediately.</p>
<p>8. Legislative overlaps and 'turf protection' between agencies</p>	<p>Careful consideration must be given to need to revise and reassign mandates to individual Government agencies.</p>
<p>9. Serious lack of human and institutional capacity</p>	<p>This should be given top priority by all institutions involved in the monitoring and management of coastal and marine biodiversity. Training and public awareness campaign.</p>
<p>10. Lack of enforcement</p>	<p>Evident in all sectors and at all levels. Urgent need to develop mechanisms for enforcement. The development of new legislation should include enforcement mechanisms and financing.</p>
<p>11. No incentives for Public Sector participation in biodiversity conservation</p>	<p>Rewards (e.g. exemption or reduced taxation) should be given to investors for ecologically sound development and exemplary fines should be imposed as 'disincentives' for delinquencies.</p>
<p>12. Lack of proper waste control</p>	<p>It is necessary for Government to allocate the necessary resources for the Solid Waste Management Authority to become functional. It is also necessary to formulate a comprehensive pollution monitoring system and the introduction of effluent charges.</p>
<p>13. Inappropriate management framework for Marine Reserves and other Protected Areas</p>	<p>Ensure the production of management plans for all existing and proposed protected areas; develop adequate enforcement and monitoring programmes; conduct frequent reviews of management plans and determine new management needs accordingly.</p>

<p>14. No specific legislation for littoral forests</p>	<p>Revise Forest Act to include regulations specific to littoral forests.</p>
<p>15. Lack of policies on bioprospecting, intellectual property rights, and equitable distribution of genetic resources.</p>	<p>Multi-sectoral and multi-agency issue. Conscious efforts must be made to develop appropriate guideline and policies.</p>
<p>16. Lack of knowledge on the Freshwater Fishery.</p>	<p>Conduct an urgent assessment of the Freshwater Fishery with focus on gears used, areas of fishing, species exploited, fishing effort, catch, socio-economic structure, and trends.</p>