

Darwin Initiative for the Survival of Species

Annual Report

1. Darwin Project Information

Project title	Development of a biodiversity strategy and action plan for Bermuda
Country	Bermuda
Contractor	Bermuda Zoological Society
Project reference No.	162/09/009
Grant Value	98,000
Start/Finishing dates	April 2000 – March 2003
Reporting period	April 2000- March 2001

2. Project Background

The need for a clearly defined strategy for biodiversity conservation in Bermuda has been widely recognised by local conservationists and resource managers. With a resident population of 60,000 inhabiting a total land mass of 50km², and entertaining 500,000 tourists a year, the UK Overseas Territory of Bermuda is one of the most densely populated islands in the world. Fuelled by strong economic growth, the pressure for further development poses an escalating threat to the Island's fragile ecology, and to its underlying economy, which, like many island communities is intrinsically dependent on the health of its natural habitats. It is this rapid pace of development, and the inevitable conflict, which arises between community needs and the natural environment, which dictates the need for a well-defined framework for conservation action, with prioritised goals for addressing the most pressing issues.

Over 8,000 species have been recorded from this small island archipelago. In the last few decades, approximately 5% of Bermuda's recorded endemic species have become extinct, and development and invasive species threaten at least 30%. Despite an impressive history of conservation initiatives and the existence of a number of very active local conservation bodies, the absence of a co-ordinated strategy for conservation has resulted in a very fragmented approach and inefficient allocation of resources.

The current project, to develop a BSAP for Bermuda is considered instrumental in establishing the conservation priorities for Bermuda, as well as defining a strategy for implementation to meet these objectives. It is recognised that community-wide participation in developing the Plan is integral to its successful implementation.

3. Project Objectives

The overall objective of the project is to promote the conservation and sustainable use of Bermuda's biological diversity and to contribute to the conservation of global biodiversity. The production and subsequent implementation of a Biodiversity Strategy & Action Plan (BSAP) for Bermuda is seen as a vehicle for accomplishing this. The specific objectives of the project continue to be those defined in the original proposal:

- To synthesise the existing biodiversity information and develop a series of prioritised species/habitat profiles clarifying their current status;
- To establish measurable targets for conservation of prioritised species/habitats through stakeholder consensus;
- To develop a series of prioritised practical options for achieving these targets, identify appropriate delivery mechanisms and produce and distribute the BSAP to the community;
- To build the capacity for implementation of the BSAP by forging partnerships utilising existing community resources;
- To raise awareness throughout the community on the issues threatening local and global biodiversity;
- To provide British expertise to Bermuda in; 1) developing skills in the process of consensus building and biodiversity strategy action planning; and in 2) promoting the effective management of threatening invasive species.

4. Progress

This project is being facilitated jointly through the Bermuda Zoological Society and the Bermuda Aquarium, Museum and Zoo, with support from Fauna and Flora International. A core management team was established in June 2000, comprising eight staff from the two local organisations as well as Dr. Abigail Entwistle from Fauna and Flora International. Dr. Anne Glasspool (Project Leader of the Bermuda Biodiversity Project) serves as Project Leader, whilst Mr. Jack Ward (Principal Curator of the Bermuda Aquarium, Museum and Zoo) is the Project Director. The other team members comprise the Curator of the Natural History Museum, three members of the Bermuda Biodiversity Project team, (one of these has since left) and two staff from the development, public relations and marketing team of the Bermuda Zoological Society. On a daily basis, most of the work for this project is being undertaken by the Bermuda Biodiversity Project team (British scientists Dr. Anne Glasspool, and Bermudians Heather De Silva and Joseph Furbert). Three Bermudian graduate/postgraduate interns (Mark Outerbridge, Chrystal Anderson and Lisa Rodrigues) in residence between three and six months have assisted them. A further 6 Bermudian and 3 overseas students (2 high school, and 7 undergraduate) also assisted in the data collection for periods of up to two months.

Significant progress has been made throughout the year towards the overall objectives of this project. Three objectives were scheduled to be targeted during the first year, and the following account summarises the progress for each.

Objective 1. Synthesise existing biodiversity information and contextual factors: develop a series of prioritised species/habitat profiles clarifying their current status.

Synthesis of the existing biodiversity information will provide the benchmark for the establishment of measurable conservation targets in subsequent phases of the project, and has therefore been the focus of much of the year's activities. Several approaches have been adopted. The need for a baseline framework onto which biodiversity data could be incorporated was immediately recognised and has been met by the development of terrestrial habitat maps integrated with the Bermuda Government GIS. Using data collected by the Bermuda Biodiversity Project team over the last three years, in combination with a geographically accurate digitised aerial photomosaic of Bermuda, the Island's open spaces have been delineated into 12 habitat types. The resulting habitat map not only serves as an important baseline, but also allows species-

specific data to be superimposed onto it. In conjunction with the Department of Planning's digitised conservation zonings, it also provides a valuable management tool for determining which habitats are currently afforded protection, and highlights critical habitats in need of protection. A similar approach is intended for the habitat mapping of the Bermuda's 1000 km² shallow-water marine platform. During the year, a U.K. firm was awarded the contract to create a digital photomosaic from a set of marine orthophotographs commissioned by the Bermuda Biodiversity Project in 1997. The completed digital photomosaic was delivered in March 2001.

In addition to the habitat mapping, project staff have focussed attention on collating information about Bermuda's endemic and threatened native species, as well as critical invasive species. The extensive Bermuda Natural History database developed as part of the ongoing activities of the Bermuda Biodiversity Project has proven to be an invaluable resource for securing information about Bermuda's flora and fauna. A concerted effort was also made to focus the summer intern research projects in 2000 towards gathering more field data on some of these species, and integration of species-distribution data into the GIS has commenced for selected species. A FileMaker Pro database now supports entries on 5,053 species found locally.

In an effort to assess what different sectors of the community were doing to support biodiversity conservation, a questionnaire was mailed to 230 organisations. This included local NGO's, churches, clubs and societies, schools, and businesses. 63 responses were received, detailing projects, initiatives and activities being supported or undertaken by the organisations.

The end of the year saw the completion of the draft Country study. Drawing on all the information collected through the above means, as well as contributions from 56 experts in various fields, this colourful 103 page document provides an overview of the status of Bermuda's biota, identifies the most critical issues facing the conservation of the Island's biodiversity and attempts to place these in the context of the social and economic needs of the community. The draft document was presented to Cabinet where it was received with much enthusiasm, and was distributed to the participants of the first planning workshop. Feedback has been solicited and aside from the very positive comments received about both the content and easy reading style, errors noted have been corrected and the document is undergoing final editing. Many requests for the Study have been received, and the Ministry of Education has asked that all local schools secure copies. 500 copies will be printed initially.

In March the first strategic planning workshop was held at the Fairmont Hamilton Princess Hotel in Hamilton Bermuda. Attended by 51 people representing Government ministries, local NGO's, schools and a few local businesses, this two day workshop focussed on prioritising the issues facing the Island's biodiversity, and developing the overall aim and objectives of the BSAP. The workshop was hailed as a tremendous success by all the participants, representing the first time that so many of the Island's conservationists had met together. Those present also acknowledged an address by the Minister of the Environment, Development and Opportunity as confirmation of the Ministry's commitment to the BSAP process.

Lack of awareness has long been acknowledged as one of the principle threats to Bermuda's biodiversity. One of the activities outlined under the objective to synthesise existing information, was to assess the real and perceived value of Bermuda's biodiversity at the community level. To address this, a local consultancy firm was tasked in March 2001 with conducting a public survey. This will take the form of a phone survey of about 600 residents, as well as several focus group sessions. The information should provide an important baseline of current attitudes towards biodiversity, as well as shedding some light as to the best approaches for raising the level of awareness.

Objective 2. Raise community awareness on the issues threatening local and global biodiversity.

Working with staff from Fauna and Flora International, the BSAP management team conducted an initial stakeholder analysis from which they developed a public involvement and awareness plan.

It was acknowledged that the BSAP will only ultimately be successful if accepted by those responsible for policy development, so a series of meetings with members of the cabinet was scheduled. The Project Director met with, and secured the support of: the Minister of the Environment, the Minister of Tourism, the Minister of Health and Social Services, the Minister of Finance, the Minister of Labour and Home Affairs, the Minister of Youth, Sport and Recreation and the Permanent Secretary of the Ministry of Transport. In November 2000 a new Minister of the Environment, Development and Opportunity was appointed; he has demonstrated his commitment to the BSAP, declaring 2001 the Year of Biodiversity Awareness in Bermuda. Moreover, the commitment of the Bermuda Government was reinforced by its inclusion in the Throne Speech in November 2000.

News that the Bermuda Government was establishing a Central Policy Unit prompted an encouraging meeting with Darren Welch who has been seconded from the Foreign and Commonwealth Office to assist the Bermuda Government in the establishment of the CPU. He proposed that as the BSAP develops, the project team works more closely with his team to ensure integration of biodiversity conservation throughout government.

The need to establish a Steering Committee to provide transparency and accountability to the process and to gain cross-sectoral high level buy-in was agreed by the management team. As a result 11 individuals, including 3 government officials, 3 environmental NGO representatives and 5 members of the local business community as well as the Project Director formed a committee in October 2000 and met 6 times over the following 6 months. They have provided valuable ideas about strategies for raising public awareness and engaging the business community.

The local print media have been engaged and four articles about the project have appeared in the local daily newspapers. Project staff have also conducted three interviews on local radio stations. Two articles have been written for local newsletters and one appeared in the Fauna and Flora International newsletter. 13 oral presentations have been given to various groups such as the Rotary and Lions Clubs, the Bermuda Zoological Society AGM, the Bermuda Biodiversity Project summer 'Open House' and the Bermuda Natural History Course. A meeting of representatives of all of the local environmental NGO's was also held to explain the process and explore ways in which the organisations could work together. Project staff have worked closely with the Bermuda Zoological Society education team to develop a package to present to local teachers and presentations have been made to the staff at 9 local schools to date. The Project Leader also made a presentation at the "Linking the Fragments of Paradise" conference for the U.K.O.T.'s in Gibraltar in 2000.

Objective 3. Provide British expertise to Bermuda to develop skills in the process of consensus building and biodiversity strategy action planning.

Dr. Abigail Entwistle from Fauna and Flora International visited Bermuda twice during the course of the year. During an initial planning visit, she helped establish the core BSAP management team comprising staff at the Bermuda Zoological Society and Bermuda Aquarium,

Museum and Zoo. During a series of meetings Dr. Entwistle ensured that local counterparts were thoroughly grounded in the BSAP process. These meetings extended to key staff at the Ministry of the Environment as well as staff at the Department of Agriculture and Fisheries, and members of the Bermuda Zoological Society, in recognition of the need for wide community buy-in to ensure the success of the initiative. The role of FFI in providing technical assistance and facilitation was clearly explained and welcomed.

During a second visit to Bermuda in March 2001, Dr. Entwistle was joined by Dr. Nigel Coulson, her FFI colleague. Their combined experience as biodiversity planning specialists was demonstrated in the first planning workshop held that month with key stakeholders. Their outstanding role as facilitators ensured objectivity in the process and inspired a high level of confidence amongst all the participants. The Bermuda BSAP management team took a largely participatory approach, but were nevertheless able to gain insight and confidence in the skills required to develop consensus. Working closely with this team before and after the workshop, the FFI staff shared ideas as to how best to involve the wider community in the process whilst at the same time ensuring continued forward momentum for the project and this provided an important guideline. Follow-up correspondence with the FFI staff has ensured continued support at all stages of the project to date.

In concluding this section on progress, it should be noted that all of the activities proposed under each objective have been undertaken, although some are still ongoing. Progress has been positive and the objectives are being met, although the production of the Country Study was three months behind schedule, and the initial strategic planning workshop was held two months later than scheduled. The Country Study evolved into a more detailed document than initially intended, however the positive feedback regarding the document suggests that this extra time was well spent. The workshop was re-scheduled so as not to coincide with other activities in the local calendar, thereby ensuring the availability of as many key stakeholders as possible. It is not felt that these delays will affect the future project schedule significantly.

Perhaps the one area where there needs to be more focus is that of raising public awareness, and it is intended that much greater emphasis be placed on this during the second year of the project. There have been no significant difficulties encountered during the year; indeed support for the initiative has exceeded expectations. As a result, it is not felt that there needs to be any change to the original project design. The objectives and activities for the next year remain as outlined in the appendix.

5. Partnerships

The success of the project to date is a reflection of the strong collaborative partnerships that have been developed over the course of the last year, both with UK partners and local partners.

The Bermuda Zoological Society (BZS) has been fortunate to be able to draw on the expertise of biodiversity planning specialists from Fauna and Flora International to provide guidance and oversight in the overall planning of this initiative. Visits from Drs. Abigail Entwistle and Nigel Coulson have ensured that local counterparts have a clear understanding of the BSAP planning process and have demonstrated first hand, the skills required to help develop consensus. Follow-up consultation via e-mail has ensured continued support as and when needed.

The very nature of this project has, within Bermuda, served to forge strong local partnerships. The close partnership that already exists between the Bermuda Zoological Society and the

Ministry of the Environment, Development and Opportunity has been a keystone in engaging not only the continued support of that Ministry, but that of other government departments. For example, the willingness of the Bermuda Government to allow the BZS access to their GIS data (and expertise) in return for digitised habitat and species maps and associated databases has been instrumental to the production of critical biodiversity information.

Amongst the NGO community responsible for biodiversity conservation, there has also developed a much greater awareness of the benefits of collaborating. The opportunities for discussion triggered by various meetings organised by the BSAP team to bring these key stakeholders together has no doubt facilitated much of this. The inclusion of the Ministry of the Environment, Development and Opportunity in these meetings has also ensured a greater spirit of collaboration between the wider NGO community and the Bermuda Government.

The local and international business community continue to be supportive of local biodiversity conservation, although not enough effort has been made to date to actively engage them in conservation activities aside from funding. This needs to be addressed during year 2.

6. Impact and Sustainability

The main impact of this initiative will not become apparent until the strategy and action plan is actually developed and implemented. However, it is evident that among those organisations involved in conservation in Bermuda (both governmental and NGO), the BSAP project has a very high profile. It is now widely accepted as the co-ordinating body for biodiversity conservation; a fact reinforced during the recent planning workshop in March 2001. Commitment by the Bermuda Government towards the BSAP was highlighted by its mention in the Government Throne Speech at the opening of Parliament in October 2000, as well as by subsequent support from the Ministry of the Environment, Development and Opportunity. There are encouraging signs of a five year financial commitment towards the work of the Bermuda Biodiversity Project. In an effort to help profile biodiversity conservation, the Minister of the Environment, Development and Opportunity declared 2001 the “Year of Biodiversity Awareness”. Meetings by the BSAP management team with other members of the cabinet have also secured support.

The production of the Bermuda “Country Study”, which draws on expertise from across the community, has had a much greater impact than anticipated. The document, which is still only in a draft format, is already being viewed as a valuable reference document and requests for copies from many elements of the community have been encouraging. For example, the Study is being used by the Bermuda Government as a reference document to determine what legislation and policies need to be in place for ratification of the Convention on Biodiversity to be extended to Bermuda. This is being done in consultation with the Environmental Policy Department at the Foreign and Commonwealth Office.

Amongst the wider community, the concept of biodiversity does still not appear to be widely understood. In an effort to raise the profile of the project, various newspaper and newsletter articles, radio talk show airings and presentations to specific community and school groups have been undertaken, and efforts for a more concentrated publicity campaign are underway.

7. Outputs, Outcomes and Dissemination

Table 1. Project Outputs (According to Standard Output Measures)

Code No.	Quantity	Description
4A	7	5 Bermudian and 2 American undergraduates worked with the BSAP team helping synthesise existing biodiversity information, as well as assisting in the collection of species-specific field data
4B	56	The above students averaged 8 week internships
4C	1	Bermudian postgraduate Lisa Rodrigues was employed with the project
4D	13	Ms. Rodrigues was employed for 13 weeks during the year
5	1	Bermudian Joseph Furbert is receiving on the job, year-round training
6A	2	2 Bermudian graduate, Mark Outerbridge and Chrystal Anderson were employed to gain work experience
6B	27	Mr. Outerbridge and Ms. Anderson were employed for approximately 3 months each during the course of the year
7	1	Draft Bermuda Biodiversity Country Study produced
8	3	Dr. Abigail Entwistle spent two weeks in Bermuda and Dr. Nigel Coulson spent one week on the Island.
12B	1	Production of the digitised terrestrial habitat maps will support GIS applications of species distributions when linked with the species database, which has also been enhanced through the addition of species-specific information
13B		Specimens collected during various field expeditions were accessioned into the Natural History Museum collection at the Bermuda Aquarium, Museum and Zoo
14A	1 (+22)	Two day strategic planning workshop held for 51 local participants in March 2001. Additionally, 13 oral presentations (seminars, luncheon speeches etc.) were given during the course of the year to local groups and 9 presentations were made at local schools to the entire staff.
14B	1	Project Leader presented project work at "Linking the Fragments of Paradise" conference in Gibraltar in September 2000
15A	4	Three press releases were published in Bermuda's daily newspaper, the Royal Gazette in March 2000, October 2000, January 2001 and March 2001. A 'letter to the editor' from a member of the public also appeared in February in the Royal Gazette praising the project.
15B	2	Article in Bermuda Department of Agriculture and Fisheries Bulletin April 2001 issue and an article in the Bermuda Zoological Society newsletter Critter Talk fall 2000 issue
15D	1	Article in Fauna and Flora International newsletter in 2000
19A	3	Three members of the project team gave two, half hour radio interviews on the local radio show Bai'Hai Live. The Project Leader also gave a radio interview during the first strategic planning workshop.
23	£92,465	Other funding sources include: Bermuda Government – £67,729; Ernest E. Stempel Foundation – £15,920; Bay Foundation – £2,857; Bermuda Zoological Society – £3,500

The principle output not met during the year was the establishment of a web site for the project. Discussions with local internet providers have taken place and a web site will be developed in year 2. Year round on the job training was also proposed for Bermudian Mr. Keanya Francis, however he left at the beginning of the year to work in the Department of Planning, so this training has not been met.

Table 2. Publications

Type	Detail	Publishers	Available from	Cost
Conference Paper	Biodiversity Recording and Planning. Glasspool, A.F., W. Sterrer, J. Ward, H. De Silva and J. Furbert. 2000	Conservation Forum	www.ukotcf.org	
Report	Bermuda Biodiversity Country Study. Anderson, A., H. De Silva, J. Furbert, A. Glasspool, L. Rodrigues, W. Sterrer, and J. Ward. 2001.	Bermuda Zoological Society	Bermuda Zoological Society (in press)	Approx £15

8. Project Expenditure

Table 3: Project expenditure during the reporting period

Item	Budget	Expenditure
Total	109,360	126,825

The actual expenses are higher than proposed largely due to the environmental awareness survey that was commissioned, as well as to the employment of three Bermudian graduates for internships with the project. Costs incurred for the planning workshop were also higher than anticipated. These additional costs were covered by funds raised from private funding agencies, including the Ernest E. Stempel Foundation, the Bay Foundation, and the Bermuda Zoological Society membership as well as the Bermuda Government.

NB. The unfavourable exchange rate has also resulted in the Bermuda Zoological Society absorbing higher costs than originally proposed.

9. Monitoring, Evaluation and Lessons

The production of a draft Country Study has served as the primary means for evaluating the extent to which existing biodiversity information has been synthesised during the course of the year. The long list of contributors to this document and the widespread circulation of the draft document for review should ensure that the material is comprehensive and accurate. The degree to which this document is now used will be the strongest indication of a successful product.

The establishment of a Steering Committee to oversee the project activities was the primary step taken to ensure that the project team remain objective in their approach and focussed on engaging the wider community. The public awareness survey that was commissioned will serve as an important baseline indicator from which future changes in awareness can be monitored.

The success of the first strategic planning workshop from the perspective of the participants was assessed through a questionnaire, which was distributed on the last day of the workshop. This will prove a useful guideline in running subsequent workshops.

10. Author(s)/Date

Anne F. Glasspool/30th September 2001

Appendix

<i>Objective/Activity</i>	<i>Year 1</i>	<i>Year 2</i>	<i>Year 3</i>	Outputs	<i>Quantity</i>
1. Synthesise existing information relating to biodiversity and contextual factors; develop a series of prioritised species/habitat profiles clarifying their current status					
a). Recruit local specialists and brief them on the process	X			8	1
b) Information gathering including collation of biodiversity data, contextual and institutional reviews literature and Museum collections and analysis of habitat mapping data to extract biodiversity information	X	X		4A 4D	8 Bermudian 16
c) Assess the real, and perceived value of Bermuda's biodiversity at the community level through information gathering process	X			17B	4
d) Organise strategic planning workshop with stakeholders to review information and establish priority issues	X			8	1
e) Input data into Biodiversity database and map species distributions on Government GIS	X			12B	2
f) Produce "Biodiversity Country Study" (incorporated as a chapter in planned State of the Environment report) and disseminate	X	X		10	500
2. Establish measurable conservation targets and actions for prioritised species/habitats through stakeholder consensus					
a) Organise planning workshop with key stakeholders to establish consensus on prioritised conservation targets		X		14A 6A 8	1 100 1
b) Establish working groups to identify specific details		X			
c) Conduct training workshops provide specific implementation skills (e.g. habitat restoration, invasive species)		X		6A 6B 8	15 1 1
3. Develop series of prioritised practical options for achieving these targets, identify appropriate delivery mechanisms, and produce and distribute the BSAP to the community					
a) Organise action planning workshop with key stakeholders to review options for actions		X		14A 6A 8	1 100 1
b) Establish working groups to identify specific details		X			
c) Produce draft strategy action plan, followed by final review workshop			X	14A	1
d) Edit, produce and distribute hard copies of BSAP and release electronic copy			X	9	500
e) Bermuda team to produce evaluation report of effectiveness of the consensus building process and develop plan to monitor effectiveness of the BSAP implementation			X X	9 11	100 2
4. Build the capacity for implementation of the plan by forging partnerships utilising existing community resources					
a) Establish a working group to assess areas of interest and levels of commitment within stakeholder groups and forge partnerships		X			
b) Report to the steering committee so that resources can be effectively allocated in the practical options being identified		X			
5. Raise community awareness on the issues threatening local and global biodiversity					
a) Hold series of workshops with stakeholders	X	X		6A 14A	100 3
b) Publicise the project through local print media	X	X	X	15A	9

				15C	3
c) Conduct radio and T.V. interviews and make presentations on local shows	X	X	X	19A 18A	3 6
d) Produce regular updates in local newsletters (BZS, Audubon, National Trust, Agriculture and Fisheries, Bermuda Electric Light Company) and in the U.K. (FFI)	X	X	X	16A 16B 16C	6 >40,000 +web 5,000
e) Establish classes at BAMZ for primary and secondary schools to consider the options facing Bermuda; develop interpretative material for exhibit; and produce information leaflet		X	X	7 10	3 2
6. Provide British expertise to Bermuda to develop skills in the process of consensus building and biodiversity strategy action planning, and in promoting the effective management of threatening invasive species					
a) Ensure maximal sharing of skills in biodiversity planning by close co-operation at all stages between Bermudian staff and UK collaborators, both through workshop facilitation and side-by-side working within a team environment.	X	X	X	8 6A 6B	4 15 4