GIS and Data Coordination for the MPAH: Scoping Report for Phase 1

June 2011 – May 2012

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List of Acronyms

ACT	–	African Conservation Trust
ARC	–	Alliance of Rural Communities
CEPF	–	Critical Ecosystem Partnership Fund
CFR	–	Cape Floristic Region
CI	–	Conservation International
CSA		Conservation South Africa
EWT	–	Endangered Wildlife Trust
ESRI	–	Environmental Systems Research Institute
GBIF	–	Global Biodiversity Information Facility
GIS	–	Geographic Information System
GPS	–	Global Positioning System
KBA	–	Key Biodiversity Area
LOI	–	Letter of Interest
MPAH	–	Maputaland-Pondoland-Albany Hotspot
SANBI	–	South African National Biodiversity Institute
SD	–	Strategic Direction
SK	–	Succulent Karoo
SWC	–	Sustaining the Wild coast
WESSA	–	Wildlife and Environment Society of Southern Africa

General information

Project full name:	GIS and Data Coordination for the Maputaland-Pondoland-Albany Hotspot (MPAH)(Phase 1)
Period number:	2
Period covered - start date:	1 June 2011
Period covered - end date:	31 May 2012
Project start date:	1 June 2011
Project duration [months]:	12
Principal Investigator name:	Kirsten Oliver
Host Institution name:	The Endangered Wildlife Trust (EWT)
Date of submission:	31 May 2012

Duration and action plan

Project Proposal Submission:	7 February 2011
Project Start Date:	1 June 2011
Project Agreement:	26 August 2011
Mid-term Progress Report:	30 November 2011
Final Project Report:	31 May 2012
Project End Date:	31 May 2012

Executive summary

In June 2011, the Endangered Wildlife Trust (EWT) was awarded a small funding grant from the Critical Ecosystem partnership Fund (CEPF) to conduct a scoping investigation into the current status and requirements of Geographic Information Systems (GIS) and biodiversity data infrastructure among the projects of the Maputaland-Pondoland-Albany Hotspot (MPAH). The initial intention was that the scoping exercise set the ground work for a more substantial project in Phase 2, in which the actual infrastructure and training in GIS and biodiversity data management would be implemented, and for which further funding would be requested. The scoping assessment has developed an overview of the requirements of the MPAH and uses these to inform priorities, recommendations and actions for Phase 2.

Why GIS and data management for the MPAH Project?

GIS has become increasingly recognised as a valuable tool in conservation, providing not only a valuable means of analysing data to better inform conservation decision making, but as an instrument for interpreting scientific outputs to the general public through the use of maps. Trustworthy results from data analysis rely on access to sound biodiversity data, which makes the collection and management of such data of paramount importance. Key reasons for including GIS and data management facilities within biodiversity hotspot initiatives include:

- Visualisation of spatial information helps us interpret and understand the data, and creates valuable tools for social media and awareness;
- Spatial analysis results and mapping products are valuable contributions to changes in policy and legislation;
- Through GIS we implement an information paradigm shift in which GIS allows us to integrate information from a range of different landscapes and situations; and
- A GIS enables storage and dissemination of information during and beyond the time limits of the project, ensuring continuity and that no data are lost when the project ends.

The CEPF Strategic Direction (SD) Four calls for the *creation of an enabling environment to improve conservation and management of Maputaland-Pondoland-Albany priority sites*. The provision of GIS training and support, as well as data management services directed at all projects within the MPAH speaks directly to this objective.

Specific reasons why GIS and data management are particularly valuable to the MPAH include:

- Integration of valuable existing data and new data being collected by the various projects. The creation of a central GIS and data management service will ensure the safekeeping of, and access of all parties to valuable data collected through MPAH projects. This will in turn ensure greater and more effective use of data resources now and beyond the scope of the CEPF funding cycle;
- The GIS and biodiversity data therein can be used for many applications required of the projects within the MPAH, including;
    - Social mapping applications for community development projects
    - Endangered species/community interaction analysis
    - Species distribution modelling
    - Scenario based trend analysis

- Mapping – the creation of maps to visualise projects, scenarios and project outputs – is a powerful aid in decision making, public awareness and strategic assessments, all of which are vital to the deliverables of the MPAH projects.

GIS and data needs assessment

A GIS and data requirements assessment was a key objective of Phase 1. The assessment comprised an online survey of the spatial data needs and GIS skills and requirements of all of the projects working within the MPAH. The purpose of the assessment was to better understand the needs of the individual projects and the MPAH as a whole to inform the development of Phase 2 of the project to implement GIS and data training and support for the CEPF investment in the MPAH.

During August through September 2011, and again in January through February 2012 an online survey was conducted. The objectives of this survey were to:

1. Understand the GIS and biodiversity data requirements of each project within the MPAH;
2. Determine the current format for project data and the required format for optimum MPAH project management;
3. Assess the level of data sharing amongst the projects and various data partners; and
4. Assess the current GIS and data collection and management skills of the project teams.

A total of 20 organisations were requested to complete the assessment, two of which declined on the basis that their projects would not be including any components of GIS or biodiversity data. As a result the total number of respondents included in the assessment was 18. The assessment was divided into ten core themes and revealed a number of common elements between projects. The majority of the organisations (89%) implementing projects across the MPAH are non-governmental and concerned with biodiversity and natural resource management. Primary biodiversity data, which is obtained mostly through field data collection activities, is most commonly used for conservation planning and environmental management.

In terms of data quantities already available within the projects, the majority (61%) have occurrence records (presence only).Most respondents (61%) indicated wetland and grassland data would be the most beneficial data sets in terms of ecosystems, while vegetation and protected area data (83%) would be the most useful spatial layers. A description of the species' habitat, and accurate dereferencing were described as the most important data characteristics by the group.

Many projects within the MPAH are focussed more on general biodiversity conservation, as opposed to specific species protection, and their requests for data are subsequently more general. This is also reflected in the number of projects that are focussed on biodiversity stewardship or community development.

The majority of projects included in this assessment do not have a formal relational database facility for their data. Data are stored in either an Excel or similar digital spreadsheet format or in hardcopy. In the interests of effective conservation, these storage formats are inefficient as they will need to be converted to digital, in the case of hardcopy, to be analysed. Formal databases have also proven to be a more secure means of storing data.

Global Positioning Systems (GPS's) and GIS are used by the majority of the projects, and despite the availability of sophisticated Free and Open Source (FOSS) software, the proprietary ESRI software still comes out as the preferred choice in GIS tools. Some projects collect data using GPS's, but do not have access to GIS facilities. This needs to be addressed to ensure the data collected are effectively utilised to inform the projects.

Information sharing is important in a project such as this, where there are numerous stakeholders and a wide geographic spread of projects. There are concerns among stakeholders over the sharing of data as an infringement on proprietary rights, and some have limiting factors such as inadequate computer skills or technological capacity.

In terms of training in GIS, the majority of projects (72%) indicated they have an interest in sending members of their teams on GIS training. The most important aspect that would be required from GIS training would be in how to effectively create a map for use in reports and other documentations and presentations.

Through this scoping assessment, it has be shown that there is a need for both the provision of GIS training and support services, and for the development of biodiversity data infrastructure to effectively manage data produced through the various MPAH projects. These two elements will ensure the long-term retention of data, ensuring it is not lost, and will teach essential skills to staff, that will extend far beyond the scope of the MPAH. It is felt that that both GIS and biodiversity data management will contribute to a lasting legacy of the MPAH

Introduction

Phase 1 of the GIS and Data Coordination Project for the MPAH was a scoping exercise, aimed at assessing the current use of and on-going needs of GIS and data infrastructure within the various projects being implemented under the CEPF investment in the Hotspot.

Phase 1 culminated in the development of this Scoping Report, which covers the following aspects as identified at the outset of the project:

a) The identification of data partners working on the MPAH project;
b) An assessment of the biodiversity data needs of stakeholders, including base spatial layers, gaps in biodiversity knowledge and required species inventories associated with each project;
c) A list of existing datasets and potential historic datasets;
d) Recommendations of available data facilities which the various projects can make use of, e.g. the Global Biodiversity Information Facility (GBIF);
e) Identification of GIS and database training needs of the MPAH stakeholders (numbers of participants, level of difficulty, software etc.); and
f) Development of a comprehensive project proposal and implementation plan including budget and project life-cycle for Phase 2 of the GIS project.

Purpose of this scoping report

The aim of the GIS and Data Coordination for the MPAH was to provide GIS facilities and capacity building in fundamental GIS skills for the greater MPAH. This scoping report was compiled in fulfilment of Phase 1 of the project, which focused on setting up the system and working with project partners and other role players to identify the GIS, data and training needs of the various projects within the study area, as well as the MPAH as a whole. The report considers those aspects of biodiversity data and GIS use within the MPAH that need attention, and interprets them into recommendations on how additional services in both GIS training and support and biodiversity data management can be of benefit to the individual projects and to the MPAH and Wild lands Conservation Trust (WCT), who are the implementing agency responsible for coordinating the distribution of CEPF funds and overseeing of the projects within the Hotspot.

Partners

There are a number of partners with which the EWT has worked in Phase 1 of this project.

Wildlands Conservation Trust (WCT)

As the implementing agency for the CEPF investment in the MPAH, Wildlands has proven to be instrumental in the role-out of this GIS and Data Coordination project. Wildlands provided information on the various grantees implementing projects within the Hotspot, their objectives and study areas, as well as contact details of project leaders who were asked to complete the online assessment.

It was envisaged that Phase 2 of the project would involve working closely with Wildlands in the development of strategies to address the needs of the final MPAH reporting and impact assessment of the CEPF investment. To this end, meetings were held with Wildlands to discuss their requirements for GIS and for data discovery, analysis and management. A major outcome of this was

the need to assess the hectarage impact of the CEPF investment across the MPAH, including all projects and their influence on the ground and in policy making for conservation in South Africa.

CEPF GIS staff

At the outset of this project it was deemed necessary to communicate with the CEPF's GIS unit, in order to ensure standards are adhered to and any requirements of the unit are addressed. Information about the correct person to communicate with was requested from Wildlands, and the person referred to as the collaborator on this component of the project was Kellee Koenig from Conservation International (CI).Communications with Kellee revealed that there is no specific standard or requirement for GIS and data management as prescribed by the CEPF. Some guidelines were provided and support for the work we have conducted. In addition, advice was given on examples of similar mapping projects. Unfortunately many of the ideas presented by these examples would have been pursued in Phase 2 of this project, but was beyond the scope of the Phase 1 assessment.

Shapefiles on the MPAH Key Biodiversity Areas (KBA's) and corridors were provided by CI for use in the project. These shapefiles were used in the generation of the project map as discussed below.

Global Biodiversity Information Facility (GBIF)

In 2010, the EWT became a Biodiversity Data Hosting Centre based on the GBIF Global Standards. This infrastructure supports data publishers who do not have access to the technical and infrastructural capacity required to directly discover and publish datasets through the GBIF network. Integral to this process is the secure storage of datasets, and the importance of recognising data ownership, while facilitating collaborations among multiple stakeholders. The EWT is currently working with the GBIF Secretariat to develop the *Best Practice Guidelines for Data Hosting Centres*. This process is of significant benefit to data management for the MPAH, as it provides standards and definitions and can be used to guide the development of field data collection forms and database structures.

Working with GBIF also provided for the development of the questions for the online assessment that has been an integral part of this Phase 1 of the project.

MPAH CEPF grantees

All CEPF funding grantees within the MPHA have become project partners and stakeholders, as their work and activities have contributed to the objectives of this project and helped shape the outcomes of the scoping assessment. The 20 organisations that took part in the assessment, and were included in activities contributing to this scoping report were:

- Alliance of Rural Communities (ARC)
- African Conservation Trust (ACT)
- Birdlife South Africa
- Botanical Society of South Africa (BotSoc)
- Cedarville conservancy
- Conservation South Africa (CSA)
- Dargle Conservancies
- Endangered Wildlife Trust (EWT) x 2 projects
- Game Rangers Association of Africa (GRAA)
- Landmark Foundation
- Peace Parks Foundation (PPF)
- South African National Spatial Biodiversity Institute (SANBI)
- Sustaining the Wild Coast (SWC)

- The Wild Bird Trust
- Wildlife and Environment Society of South Africa (WESSA)
- Wilderness Action Group (WAG)
- Wilderness Foundation
- Wildlife Act Fund
- WildREACH
- Zinkwazi Blythedale Conservancy (ZBC)

GIS and Data Assessment – online survey

In order to assess the requirements of all projects within the MPAH, in terms of GIS and biodiversity data, an online survey was created that asked questions relating to project methods, data use and GIS use.

The objectives of the survey were to:

1. Understand the GIS and biodiversity data requirements of each project within the MPAH;
2. Determine the current format for project data and the required format for optimum MPAH project management;
3. Assess the level of data sharing amongst the projects and various data partners; and
4. Assess the current GIS and data collection and management skills and training requirements of the project teams.

Method

The biodiversity data survey questions were primarily based on those developed by the GBIF as part of their *Best Practice Guide for Data Discovery and Publishing Strategy and Action Plans (GBIF, 2010)*.In addition, a number of questions aimed at assessing the GIS use within each project and the GIS training requirements were included.

The online assessment facility, Survey Monkey (Survey Monkey, 2011), was used to make the questions available to the project leaders, who were emailed a link directing them to the online questionnaire and requesting that they complete all the questions. Project leader information was obtained directly from Wildlands, who provided a list of projects, contact details and some detail about each of the projects. In total 20 project leaders were identified. Two of these declined to take part in the survey on the grounds that their projects had no GIS or biodiversity data needs.
The survey was conducted in two parts, the first (August to September 2011) covered the first set of 10 implementing projects, while the second (January-February 2012) included those projects, also 10, that only commenced operations after September 2011.A preliminary report was compiled after the first round of respondents had completed the survey, and a final report was compiled after the second round of the survey, which consolidated the results of both surveys. In addition to the online survey results, selected project leaders were contacted telephonically to fill in any gaps and obtain additional information.

The survey results were extracted directly from the online facility to Excel spread sheets, where the data were then analysed and graphs produced. The full report for the online assessment is included in Appendix 3: GIS and Data Requirements Survey Report of this report. The information below is a summary of that report.

Assessment results

Twenty organisations, which are currently engaged in conservation projects as a direct result of the CEPF investment within the MPAH, took park in the survey. While there may be additional projects that have started during the process of this survey, only those actually in operation at the time of the two surveys were included.

The questionnaire was composed of questions divided into the following ten themes:

- User Profiles – To develop an understanding of the types of organisations and individuals operating within the MPAH;
- Uses of Primary Biodiversity data – An assessment of the main areas where biodiversity data is used
- Access to Primary Biodiversity data – How do the various organisations obtain their primary biodiversity data?
- Quality and Quantity requirements – how much of each type of data is required for each of the projects?
- GIS data requirements – Is additional Geographic/spatial data required?
- Species data requirements – what specific species data was required of the different projects?
- Format of the data – To determine the need for a formal data housing and management facility for all the data within the MPAH project;
- Current GIS data – What GIS data is being utilised by the projects
- Information Sharing – To determine the willingness of MPAH projects to share their data with other stakeholders and projects;
- GIS training requirements – To gauge the need for GIS training across the MPAH, and the nature of required training.

The results of the survey are discussed below

User profiles

The results of the first component of the survey reveal that 89% (18) of the project leaders are responsible for the management and maintenance of the data for their projects. This served to confirm that the GIS project survey was targeted at the correct audience Any GIS coordination efforts would therefore be best engaged with these members of the project teams, as they will be the individuals managing how data will be used and where GIS will be needed.

Eighty-nine percent of the organisations engaged in the MPAH at the time of this report are NGO's, and the majority are concerned with biodiversity activities, with only a slightly smaller number involved in natural resource management. This result reflects the focus of the CEPF on both biodiversity conservation and civil society – where the two meet is often an engagement of natural resource management.

Uses of primary biodiversity data

This section was aimed at determining the purpose for which the various projects utilise biodiversity data. The results indicate that the majority of projects (94%, n=17) within the MPAH are involved in conservation planning and activities related to environmental management – bringing the social and biodiversity elements together. Only Six (n=1) percent were involved in more specific industries such as bio prospecting or healthcare.

Access to primary biodiversity data

Data for the MPAH projects are currently obtained primarily through project staff's own data collection activities (94%, n=17). While more than half of the projects make use of online datasets and data repositories, 83% (n=15) either use free data, available offline or paper publications and hardcopy. Only a small proportion (28%, n=5) of the respondents indicated that they pay for data. This result speaks to the nature of many of the organisations being non-governmental and non-profit and therefore not having adequate funds to purchase required data, and highlights the need for relevant data to be made available and shared between projects to alleviate the pressure of

trying to buy data, which is sometime more reliable and thorough than data that is made freely available.

While some projects are guided by strict data protocols, many others are considering data from a purely anecdotal perspective. For example, while the Cedarville Conservancy do observe biodiversity information in the field during field visits, and will use what they pick up in the field to inform their projects, there is no structured method for data collection or management. On the other end of the scale, however, organisations like the South African National Biodiversity Institute (SANBI) and WildlifeACT have highly developed, scientifically rigorous protocols for primary data collections. The challenge here will be to identify where it is necessary, in the interests of scientific credibility, to assist with the development of more rigid protocols for those projects that do not already have them, and where it is acceptable, more appropriate even, to rely on less scientifically structured use of information, data and knowledge.

A recommended technique for including GIS in social or community projects, is that of participatory mapping, where communities, students and other stakeholders may be involved in the creation of data through mapping. This method is becoming popular around the world in bringing society into the structured realm of conservation science through a participatory process. The process pulls in the skills and local knowledge of the communities that may otherwise be side-lined in the process. It ensures acceptance and adoption of many of the biodiversity conservation processes as it gives the communities a sense of ownership and contribution. In addition, participatory mapping teaches an awareness of space and the relationships of environmental factors, which is often a link that is missing in understanding the needs and methods of conservation of natural resources.

Quality and quantity requirements

This section of the survey was designed to determine how much of which types of data each project requires, as well as how temporally relevant the data are required to be, i.e., does the data need to be collected over a specific season, or on a long or short term basis. Furthermore, this section assessed how organisations view data quality. Sixty-seven percent (n=12) of the organisations have biodiversity data for their MPAH project. Two organisations (11%) indicated that they do not have any need for primary biodiversity data to fulfil the requirements of their projects. Keeping this in mind, the majority of data held by the rest of the projects consist of occurrence records (presence only).The next highest quantities of data are species information or descriptive data. These types of data, while vital, are often less useable for quantitative analysis and may first need to be extracted and stored in a more structured data system if they are to be used for any specific analysis or GIS.

In terms of specific data requirements, the majority of respondents (61%, n=11) indicated that they require data for wetland and grassland environments as well as other terrestrial environments. Two respondents (11%) indicated that they required data on marine estuaries, but no other types (deep seas or islands) of marine data were highlighted. Data needs for specific ecosystems indicated that many projects(require information for protected areas (83%, n=15) and climatic data (temperature, 50%, n=9 and rainfall, 61%, n=11).

Habitat descriptions and **georeferencing** that is accurate and precise were cited as the two most important characteristics determining the quality of the data (61%, n=11 each).

GIS data requirements

Respondents were asked which spatial data would be required for them to fulfil their project objectives, alongside biodiversity and species data. Spatial data includes any data that has locality information attached to it, i.e. coordinates or geometry information referencing a pocket of

information to a precise location on the surface of the Earth. Typically this relates to the location of entities, e.g. wetlands, as opposed to their condition of other factors, or locality of good quality versus bad quality wetlands.

Twenty-eight percent (n=5) of the organisations indicated that they did not require any GIS data for their projects. Of the remaining organisations, the majority (83%, n=15) indicated they require vegetation and/or protected areas data as the most important spatial data.

Species data requirements

Twenty-eight percent (n=5) of the survey respondents indicated that they did not require any data on species for their projects. This is a reflection of the nature of the projects that are working with biodiversity stewardship, community development and environmental education. Those looking at some form of species/habitat interaction are more likely to require specific species data. The majority of these indicated that they require animal species data (78%, n=14) or plant species data (72%, n=13).Only 17% (n=3) require data on fungi, viruses or microbial species.

The majority of requirements were for data on a regional or local scale, indicating that most projects are concerned with their local ecosystems as opposed to comparisons with other, similar ecosystems around the world. In addition, very few organisations listed specific species, but are rather more focused on biodiversity than individual species.

Format of the data

Understanding how data is currently stored and how data is required to be stored will guide planning for the data management needs of the MPAH. While most organisations currently store their data in Excel spreadsheets (67%, n=12), half (n=9) still store theirs as hardcopy or within reports and documents. If these data are to be used in analysis, they will need to be digitised. Twenty-eight per cent (n=6) of organisations stated that they make use of database software to store their biodiversity data.

Some (11%, n=2) of the organisations stated that they do not understand enough about the different data storage facilities, and require additional information to be able to effectively answer the question. This issue should be addressed by adding explanations to the survey form for subsequent organisations coming into the MPAH.

Respondents were asked if they would be interested in obtaining their data in formats other than what they already use, to which 72% (n=13) indicated they would not be interested.

Spatial data is stored as ESRI shapefiles by 39% (n=7) of respondents, with 28% (n=5) making use of Google Earth for their spatial data storage. A number of organisations (39%, n=7) also utilise hardcopy, printed maps of their spatial data.

Current GIS use

The GIS use section aimed to determine the extent to which the MPAH projects are currently utilising GIS and how GIS may be used to support their projects through the remainder of the CEPF investment. Sixty-one per cent of projects (n=11) indicated that they have access to and make use of GPS units for data collection, and 67% (n=12) of projects are currently making use of GIS to view and analyse their data. Some projects indicated that they are collecting spatial data using a GPS, but do not make use of any GIS software. The collected data needs to be effectively managed and facilities made available, including training, for helping these projects use their data within a GIS to meet

their project objectives, including simple map making to view the data without any sophisticated analysis. Such maps will add value to their reporting deliverables, media and presentations.
Two organisations (11%) are not currently viewing any spatial data.

ESRI software, including both ArcView 3.x and ArcGIS 9.x and above, made up 59% (n=7) of the remaining respondents primary GIS software choices. Twenty-five per cent (n=3) make use of the FOSS software Quantum GIS. The roll-out of FOSS GIS software options has only become comparable to the more familiar proprietary software in terms of functionality and ease-of-use in the past few years and many organisations may not be aware of these options. A software package such as Quantum GIS is freely available and requires only a basic level of training to make use of the essential data viewing and map making tools. This makes GIS far more accessible to organisations and individual that would have struggled previously without specialised training and expensive software. It would be extremely beneficial for the MPAH to take advantage of this and ensure the roll-out of GIS use across all the projects.

Information sharing

As with any large scale project involving data, there are issues around data sharing and accessibility. This section sought to ascertain the extent to which organisations are currently sharing their data, and any limitations or reasons why they may not be in a position to share their data with others. Part of the MPAH GIS and Data project is providing the service of information sharing – both making data available for MPAH project teams, and making data developed through the projects available to a wider audience.

Currently, only 22% of organisations (n=4) are making use of online data repositories such as the South African Earth Observation Network (SAEON) and the South African Biodiversity Information Facility (SABIF).It is hoped that through the longer term Phase two of this project, this will be remedied as more organisations are informed of the facilities available to them for obtaining data.

Just over a third of the organisations (43%, n=7) indicated they have no limitations to sharing data, while the highest limiting factor among the remaining two thirds preventing sharing of biodiversity data was cited as proprietary rights. Many organisations would prefer to keep their data in house so that any papers or publications that arise from the data might be properly credited within the organisation. The GIS and Data project proposes to address this through making metadata available as opposed to actual data.

When asked about limitations on accessing published biodiversity data, the highest cited cause was computer skills (25%, n=4) and poor access through a slow internet connection (25%, n=4).

GIS and training requirements

The GIS and training section of this assessment was designed to ascertain the need for both GIS use within the projects and for training in GIS tools and applications that might assist the projects in achieving their objectives within the CEPF framework. Twenty-two per cent (n=4) will not be making use of GIS within their projects.

Through this assessment, it can be shown that GIS will be utilised in many of the projects, and the majority of those that have not already included an element of GIS would like guidance in understanding how it might be used to enhance their projects.

The results of the assessment also indicate that there is a strong need for GIS training, both very simple, and more complex. Twenty-two percent (n=4) of respondents indicated that their project

leaders have no understanding of GIS. It is also noted, however, that little significant spatial data analysis is currently planned for most of the projects (39%, n=7), the majority of planned GIS use being for the creation of maps to inform decision making (72%, n=13).With this in mind, it is recommended that training courses focus on basic GIS skills and understanding the concepts of spatial relationships, coupled with the development of maps that show project locations and highlight project issues. Where more substantial GIS application is required, it is likely that project teams will already have GIS professionals on board. In these instances support can be offered when needed, but specific training need not be planned.

The survey assessed the need for structured training courses and offered various possible locations for a 5-day basic GIS course. Seventy-two percent (n=13) indicated they would be interested in attending a course, and the majority indicated that either Pietermaritzburg (44%, n=8) (Pietermaritzburg and Johannesburg were listed) or an alternative location (28%, n=5) would be preferable for the course. Note that some indicated that they could make Pietermaritzburg, but would prefer an alternative location as indicated. Alternative locations suggested by the respondents are: Port Edward (2), Port St Johns (1), Port Elizabeth (1), Zululand (1) and Cape Town (1).

Respondents were also asked if they would be interested in joining an online forum (email list or similar mode of communication), through which GIS and data ideas, progress and tips could be discussed, and experiences shared. The majority (79%, n=14) indicated they would be interested in joining such a group. In response to this, and to a recommendation given at the SANBI held MPAH workshop at the Wildlife and Environment Society of South Africa's (WESSA) offices in Howick in October 2011, such a forum was created using the GBIF Community Site, this is further discussed below.

Additional comments on the GIS and data needs assessments

Unfortunately at the time of the survey, there were no projects being implemented in either Swaziland or Mozambique. As a result it is difficult to assess the requirements of upcoming projects that will be implemented within those two countries, and where the majority of GIS support and training would be rolled out, as per the requirements of SD 4b of the Ecosystem Profile.

Maps and mapping projects

Map of the projects

A map of the projects was created in order to visualise the spatial layout of the projects being implemented. The map is included in Figure 1 below.

The map of project areas was developed using a combination of existing polygons of project areas sourced from various layers including the National Cadastre (developed by AfriGIS, www.**afrigis**.co.za/*)*, polygons of known entities - e.g. formal and informal protected areas (Biodiversity GIS, www.**bgis**.sanbi.org/) that make up part of the project areas, and digitised polygons informed by descriptions of the project areas received as part of the project proposals. The intention was to create a visual representation of the MPAH and all associated projects for use internally in understanding the layout of the projects and identifying gaps and high density areas. It was also intended for external use in promoting the MPAH, its projects and partners and to give a visual explanation of the project for use in reports, presentations and other media.

As well as the projects themselves, the KBA's and corridors, identified as part of the Ecosystem Profile, were included in the map. The KBA's are divided into two categories: (i) those that are of high priority for CEPF, and (ii) other KBA's. Corridors are defined as areas that have potential for inclusion as KBA's through some rehabilitation or conservation, or provide essential support for KBA's to function effectively.

In addition to this map, a working map of proposed projects and pending projects was developed during a SANBI workshop held at the WESSA offices in Howick in October 2011.The map is included in Figure 2. Each proposed project or identified gap/opportunity was numbered and corresponds with a list of notes about each location, written up during the workshop.

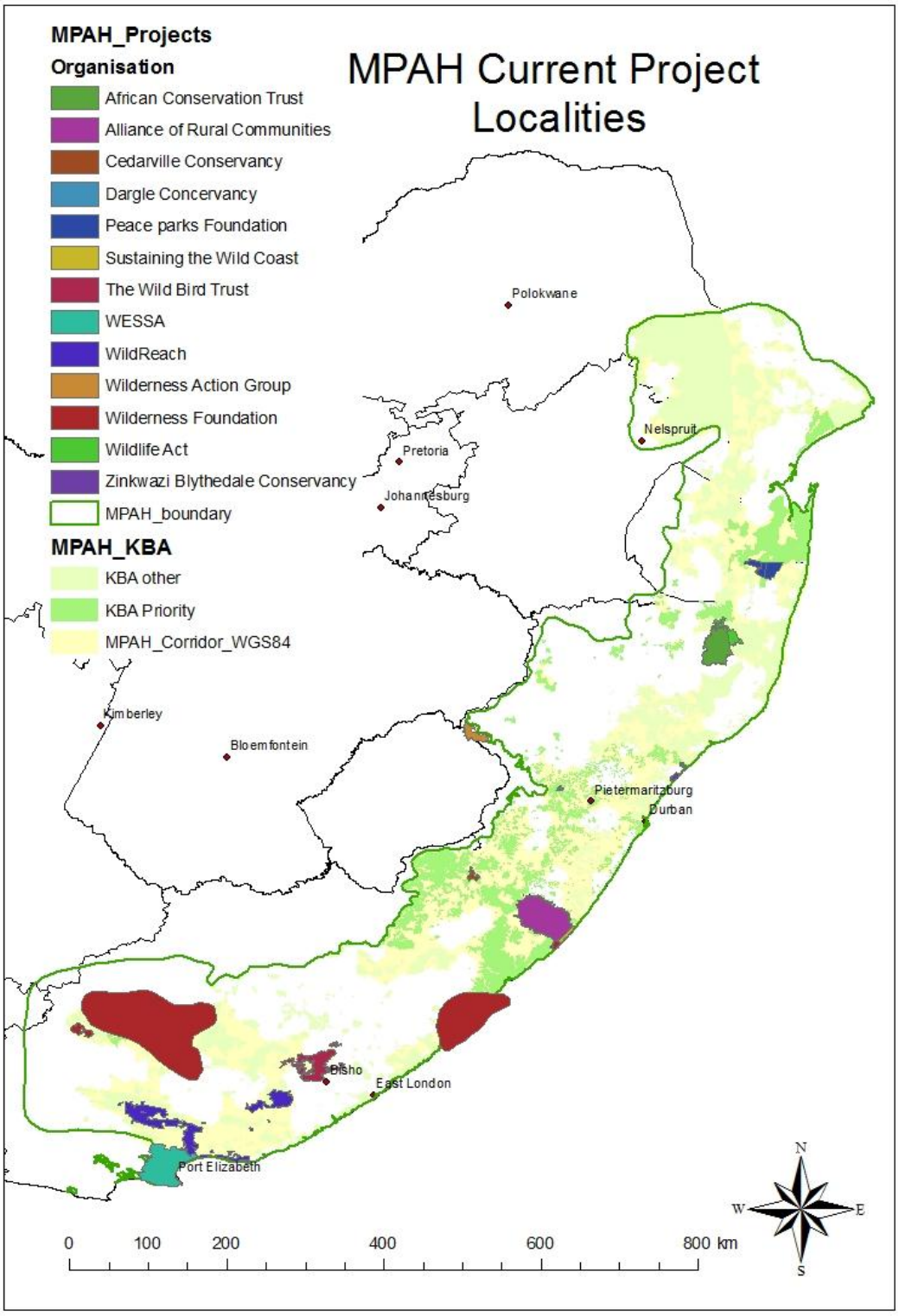


Figure 1. MPAH Project Localities

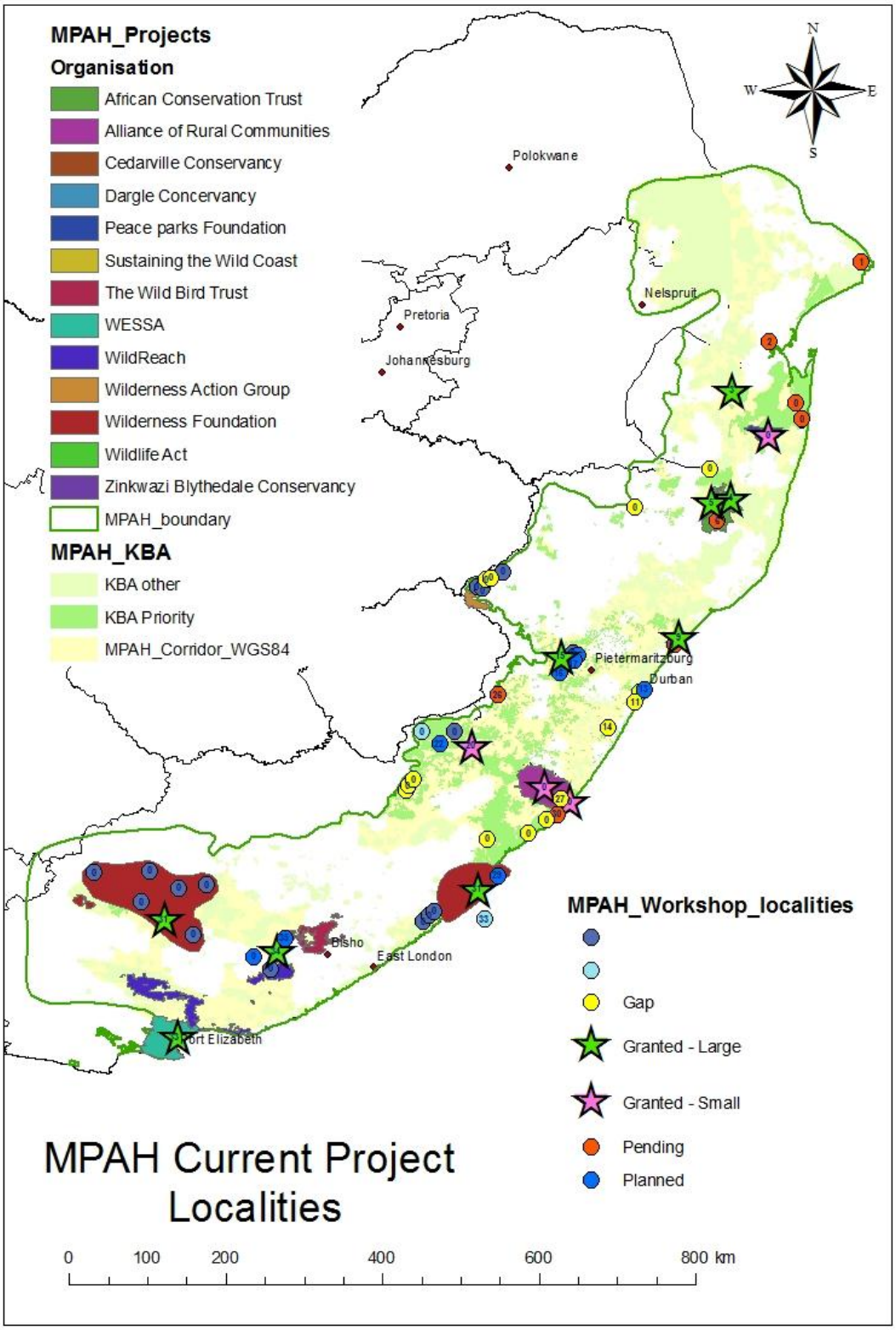
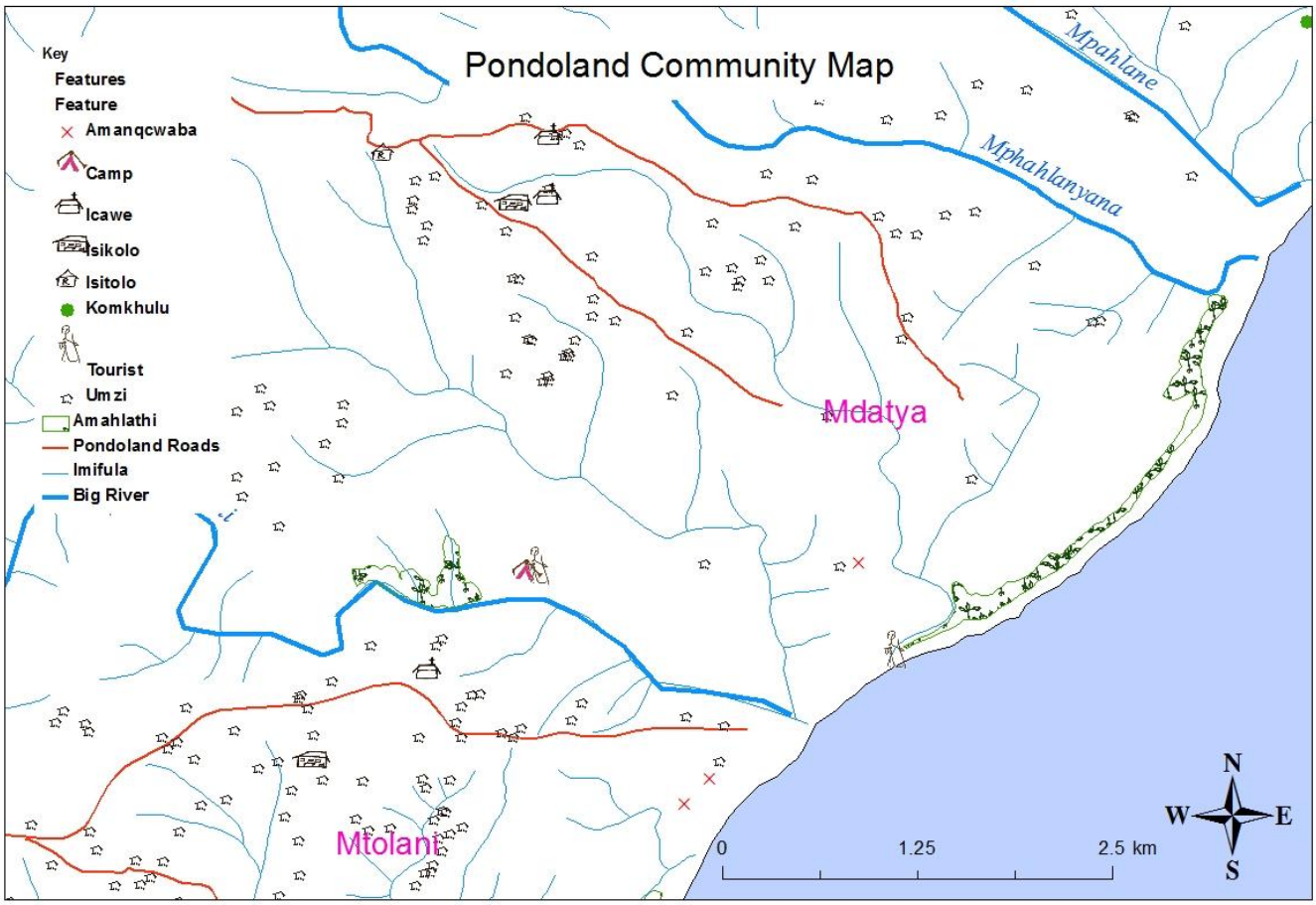


Figure 2. MPAH Map of potential projects and identification of opportunities

Community mapping

The EWT was approached by Sustaining the Wild Coast (SWC) to assist with the development of a community map as part of a Participatory GIS process. The participatory process, conducted as part of the SWC MPAH project, engaged with members of communities in the Pondoland region to create maps of their villages, surrounding landscape and features that are of significance or cultural importance to the local peoples. The maps were drawn on large sheets of paper and then traced to make copies. The original maps were then left within the communities to be further developed, and the copies brought to the EWT to discuss how they could be developed into more 'scientifically sound' maps.

However, this project was not within the scope of the EWT GIS and Data project Phase 1, so could not be completed therein. As part of a separate exercise, a rough map was drawn up for display at an EWT staff function.



Hand-drawn maps with no element of scale are difficult to georeference, and it was therefore decided that the most effective way to create such a map would be to utilize existing spatial data on the area, including rivers, villages and individual dwellings. Additional information was digitized from satellite imagery and the community sites of significance were added (approximate localities, as no GPS units had been used to record them). Of significance, and unique to the participatory mapping process were the keys or legends drawn up by the community. It was decided that these hand drawn depictions of houses, churches, graves, plants etc., would be used as the symbology for the new maps, thereby hopefully tying the more spatially accurate maps back to their community origins. A section of the resulting map is included below in **Error! Reference source not found.**.

Figure 3. Pondoland Community Map

Community Mapping is a valuable method of engaging with communities and communicating various issues across what is often a cultural divide. The exercise involves communities in projects that might otherwise be completed without their input and is seen globally as a beneficial method for biodiversity projects where people are an important factor in the system. This example of the Pondoland map is an example of how the maps can be created to scale and of relevance to more scientific modelling, but include the community information and create ownership for them through use of their symbols. It is recommended that this type of resource be developed across the MPAH where possible. Apart from making a significant contribution to the development of the project, the maps are a unique resource for media and reporting.

Workshops and Meetings

Workplan meeting held on 27 May at Wildlands offices, Hilton

Kirsten attended a meeting to discuss and obtain feedback on the MPAH GIS project workplan for Phase 1. Attending the meeting from Wildlands were DumileTshingana and RoelieKloppers. Kirsten presented the workplan, which had been circulated prior to the meeting, and answered any questions that arose. The proposed workplan was agreed upon in its entirety, and no changes were made.

Projects meeting held on 14 June 2011 at Wildlands offices, Hilton

Kirsten attended a meeting with DumileTshingana to discuss the various projects involved in the MPAH. Dumile gave an overview of the small grant awardees and large grant awardees already implementing their projects and provided projects summaries of each.

MPAH Strategic Direction Four workshop – 24-26 October 2011

On 24-26 October 2011, Kirsten Oliver attended a Strategic Direction Four workshop at WESSA in Howick. The event was organised by SANBI as part of their small grant project titled *Developing civil society capacity to improve conservation and management of Maputuland-Pondoland-Albany Hotspot*. The workshop was aimed at bringing together team leaders and staff from projects (Figure 4) that address the MPAH Strategic Direction Four in a collaborative, networking environment to discuss a variety of themes. It also presented an opportunity for many of the other projects, and some that are still in the proposal phase to meet and discuss needs and gaps for project work. Three main activities were covered during the workshop:

1. Mapping of current activities in the MPAH and identification of gaps;
2. Conceptualising interventions for Strategic Direction Four, and
3. Project Development Methodology.

Figure 4. Delegates at the MPAH Strategic Direction Four Workshop

The workshop provided an invaluable opportunity for the EWT to meet with the project leaders and other staff from the various organisations involved in the MPAH. This opportunity was crucial in the development of working relationships for the MPAH GIS project as it provided not only insight into individual project objectives, that will assist in understanding the projects' requirements for GIS and data, but also where there are still obvious gaps. The projects map, which is a direct deliverable of this period of Phase 1, was further corrected and informed through this workshop, and project leaders themselves were, to some extent, made more aware of how the GIS project can be of use in their projects.

Figure 5. Jim Taylor (WESSA) giving an explanation of SADC focus areas for project development

Progress meeting held in January 2012 at Wildlands offices, Hilton

A progress meeting was held in early January at Wildlands Conservation Trust offices between DumileTshingana, Kirsten Oliver and RoelieKloppers. The mid-term report and progress on the project was discussed. In general discussion, Kirsten gave an overview of the GBIF Community Group and it was approved, and an overview of the Sustaining the Wild Coast Community Mapping Project, which was well received. Minutes of this meeting are included in Appendix 7: Minutes of the Progress meeting held at Wildlands in January 2012.

A subsequent meeting was scheduled for February 2012 prior to submission for Phase 2 of the project, however it was cancelled as Roelie was unavailable.

Data management

Community site

In order to provide the project with a platform for communication with all members of the projects within the MPAH, a Group was created within the GBIF Community Site. The facility is a community website to which individuals are invited. Materials, links, photographs and other resources can be loaded into the Site, and all members can access these or contribute their own.

The Group was titled the Maputaland-Pondoland-Albany Hotspot Resource Site, and can be accessed via the url: http://community.gbif.org/pg/groups/21047/maputalandpondolandalbany-hotspot-resource-site/ .

The Group was created in January 2012.Initially emails were sent to all project leaders and relevant project staff indicating how they should sign up with the site, after which they would be invited to the group, or could request membership. Additional emails were sent over the next month as reminders and reiterating the process for signing up.

Particular objects that have been added to the site include:

- Files (documents of relevance to the projects)
- Blogs (short snippets of information that all members can read and reply to)
- Photographs
- Bookmarks (links to other relevant sites)

Available data

A list of data sources was made available on the Community Group site, including a number of online resources for obtaining biodiversity data.

An additional list of all data currently being collected by the various projects within the MPAH was also made available. The idea of this is that other projects across the Hotspot would be able to identify if similar data to that they are collecting is being collected elsewhere in the Hotspot, and similarly if there was anywhere they could provide data to other projects, thereby creating an environment of information and data sharing.

Historic data

A selection of individuals, identified through consultation with Wildlands and known persons, who were approached because of their involvement in projects in the area, were contacted with regard to providing metadata (data about data) on any biodiversity data they may know of for the MPAH. It was hoped that these individuals would be able to provide some detail on what data may be in existence in any format, and covering the entire Hotspot area. This list would then provide a starting point for data discovery in order to ensure data that have been collected in the past are adequately stored and made available for projects such as those participating in the CEPF MPAH initiative. A template was developed for this purpose with relevant fields for metadata. The template is included in this report in Appendix 4: Metadata template – list of fields and field explanation table. The individuals contacted were:

- Stephen Holness, CSIR
- Bob Smith, University of Kent
- Wayne Matthews,
- Bruce Page,

- Carl Grossman, ACT
- Andrew Whitley, Wildlands
- Craig Beech, Peace Parks

Contact details of additional individuals were requested from Wildlands, however the Proposed Phase 2 of the GIS and Data Coordination Project had already been turned down by CEPF and no additional information was supplied.

The individuals responded positively, however no actual metadata has been received thus far despite numerous follow-up emails. It is recommended that any organisations taking the data coordination of the MPAH further should follow up with this. It is, however, beyond the time-span of the Phase 1 of this project.

Project plan and proposal for Phase 2

The full project review framework, or proposed work plan, for Phase 2 of the project, as set out at the outset of Phase 1 is included in Appendix 6: Project Review Framework – Phase 2. The framework is a formulated method of structuring a work plan to incorporate all the elements of objectives, indicators, activities, timelines and outputs.

The full proposed project incorporated three objectives:

1. The effective technical coordination and management of data (including spatial data) within the MPAH project.
2. Effective strategic implementation of the GIS project through consultation with Wildlands Conservation Trust and partners.
3. Provide fundamental GIS and data management capacity building and mentorship for professionals, especially in Mozambique and Swaziland.

In application for Phase 2, a Letter of Interest (LOI) was submitted to CEPF in February 2012. The LOI is included in Appendix 5: Letter of Inquiry – Phase 2. Our application for funding for Phase 2 was unsuccessful, and the need to complete a full proposal has fallen away.

Summary of results/findings of the scoping assessment

GIS and Data Assessment

The following provides a summary of significant findings of the online survey to assess GIS and Data Requirements:

User Profiles

- 89% of survey respondents are both project leaders and are responsible for the management of their projects data;
- 89% of the organisations engaged in the MPAH are NGO's, with an educational institution and a National Agency making up the balance; and
- The majority of organisations are concerned with Biodiversity (83%) and natural resource management (67%).

Uses of primary biodiversity data

- The majority of projects within the MPAH are involved in Conservation Planning (94%) and activities related to environmental management; and
- Very few projects are involved in more specific industries such as bio prospecting, forensics or healthcare.

Access to primary biodiversity data

- The majority of organisations in the MPAH obtain data primarily through field data collection activities (94%); and
- A large proportion of organisations (83%) obtain data through hardcopy literature surveys.
- 67% utilise digital data, either online or offline.
- Data is paid for by 28% of the organisations, while the remainder obtain data through free resources.

Quality and quantity requirements

- 67% of projects have biodiversity data for the MPAH project;
- Existing project data consists primarily of occurrence records (presence only) (61%);
- The second highest quantity of data currently held by the projects are taxonomic and descriptive data and information (39%);
- Two organisations indicated they did not require any biodiversity data for their MPAH projects;
- The majority of data requested were for the wetland and grassland ecosystems (61% each) and to a lesser extent other terrestrial environments;
- Two requests were made for estuarine data;
- No marine data was requested for deep seas or for islands; and
- The most important characteristics for quality data were listed as species habitat description and precise/accurate georeferenced data (61% each).

GIS data requirements

- 28% of projects indicated they do not require any GIS data for their projects;
- 83% indicated they require vegetation data and/or protected areas data.

Species data requirements

- 28% of respondents indicated that they had no requirements for species data for their projects;

- 72% indicated they need plant species data, 78% require animal species data and 17% require fungi, viruses or microbial species data;
- The majority of requests for all species data were for the regional or local scale, with only a few at the national or global scale;
- In the plant section, most requests were for dicotyledonous plants;
- In the animal section there were significantly less requests for marine species than all the other groups;
- Very few individual species were listed, the focus is on biodiversity rather than species.

Format of the data

- The most common biodiversity data storage format is Excel (65%);
- 28% of the organisations indicated that a database format is used for biodiversity data storage;
- 50% of projects also rely on hardcopy and paper format for storing their biodiversity data;
- 72% indicated that they would not be interested in being able to access their biodiversity data in other formats than those they already utilise;
- 44% would like to access external biodiversity datasets in Excel format;
- Additional explanation of the different formats and benefits of each is required as some respondents do not have enough knowledge of the different formats to make an informed decision;
- 39% utilise ESRI shapefiles for storage of their spatial data, with 28% using Google Earth files; and
- 39% also utilise hardcopy, printed maps.

Current GIS data

- 61% of projects utilise GPS units for data collection;
- 67% of projects utilise GIS;
- ESRI proprietary software make up 59% of software used by the projects, with 25% utilising free software (Quantum GIS);
- 37.5% of projects are making use of GIS to view their spatial data; and
- Some projects are collecting data on GPS's, but have no GIS software available to work with their data after collection.

Information sharing

- 33% of organisations indicated they have no limitations to sharing data;
- The highest limiting factor preventing the sharing of data is cited as proprietary rights (33%);
- 22% are making their data available through online data repositories;
- 43% of organisations have no limitations on accessing published data;
- The highest limiting factor in accessing published data is cited as computer skills and knowledge (25%) and a slow internet connection (25%); and

GIS and training requirements

- 22% of project leaders have no understanding of GIS;
- The highest use for GIS within the projects (72%) is that of using maps to inform the decision making process;
- 22% of organisations will not be including a mapping component in their project;
- 50% of those projects that do not already include a mapping element would like guidance on how it might be included in their projects; and

- 72% indicated they would have members of their project team who would be interested in attending a 5-day basic GIS course.
- The majority of course attendees would prefer the course to be run in Pietermaritzburg, or at another location.
- There is a strong need for GIS training in both simple and more complex applications, with making a map (83%) as the highest need for skills; and
- 79% of the respondents indicated they would be interested in joining a GIS/data forum specific to the MPAH project.

Project Review Framework and Project proposal

The project review framework for Phase 2 is included in Appendix 6: Project Review Framework – Phase 2, however the Phase 2 application was unsuccessful and as a result not full proposal was developed.

Recommendations

GIS and data training

As shown by the results of the online assessment, GIS and data management training is definitely required by the majority of projects operating within the MPAH. Recommendations for training include:

- Training in basic GIS theory and tools should be offered as a 5-day course to all projects,
- A component of biodiversity data management should be incorporated into the training week to familiarise candidates with data collection protocols, field collection forms and data management structures in use within the MPAH; and
- Fundamental training should be completed in understanding and viewing spatial data in a GIS, and creating maps for use in reports and presentations

Biodiversity data and data management

- A formal geo-database structure should be developed to house both spatial data and biodiversity data that does not have a spatial component;
- Data within the system should be up-to-date and standardised to a universal standard such as Darwin-core for biodiversity data; and
- Standardised forms need to be developed to ensure that all field staff working on CEPF funded projects within the MPAH collect data in the same basic format for ease of data handling and storage.

GIS analysis and support

- A standard means of assessing impact needs to be developed that can accommodate both biodiversity conservation projects and more social, community and education-based projects;
- All projects must collect impact data though their projects and feed this into a central location where it can be analysed;
- Support in GIS can be provided for those project teams working with GIS and having attended the GIS training offered; and
- Maps and further analysis requested by Wildlands on an ad hoc basis can be done by the project executant of Phase 2 of the project;

General

- Regular meetings (at minimum quarterly intervals) should be held between EWT and Wildlands;
- A workshop to assess the impact of all projects on biodiversity conservation within the hotspot should be held once per year, including all project implementers and relevant stakeholders, and
- Monthly GIS and data newsletters could be sent to all members of the GBIF Community Group to keep everyone engaged with other projects within the Hotspot.

Conclusions

The benefits of including GIS and biodiversity data management as fundamentals in a project such as the MPAH relate directly to improved efficiency and effectiveness. GIS enables activities that would ordinarily be arduous manual tasks to be completed quickly and efficiently. In addition, the implementation of proper data management protocols and infrastructure support all effective analysis of data, including spatial.

References:

GBIF. 2010. *Best practice guide for 'Data Discovery and Publishing Strategy and Action Plans' version 1.0.* Authored by Chavan, V. S., Sood, R. K., and A. H. Arino. 2010. Copenhagen: Global Biodiversity Information Facility, 29 pp. ISBN: 87-92020-12-7. Accessible online at http://www.gbif.org.

Survey Monkey, 2011. SurveyMonkey.com, LLC, Palo Alto, California, USA. http://www.surveymonkey.com

Appendices

Appendix 1: Phase 1 Work Plan

Appendix 2: GIS and Data Requirements Survey

Appendix 3: GIS and Data Requirements Survey Report

Appendix 4: Metadata template – list of fields and field explanation table.

Appendix 5: Letter of Inquiry – Phase 2

Appendix 6: Project Review Framework – Phase 2

Appendix 7: Minutes of the Progress meeting held at Wildlands in January 2012

Appendix 1: Phase 1 Work Plan

Problem Statement and Aim of the Project:

The aim of the MPAH project is to support and strengthen the role of civil society organisations and community groups in conservation and the protection of biodiversity within the hotspot in South Africa, Swaziland and Mozambique. As a result of the sheer volume of the project and the number of groups and organisations involved, it is envisaged that there will be a vast quantity of spatial data needed for and generated by the various assignments associated with the project. Through its existing structures the IT4CP has both the infrastructure and skills to fill the niche of providing for the storage and of spatial data and capacity building for civil society groups and smaller organisations in the fundamentals of GIS.

a) EWT already has a sophisticated data storage facility in place that could be adapted to encompass this project; b) EWT is tasked, through the partnership with GBIF to assist in the mobilisation of species data across the African continent, the MPAH includes areas of both Swaziland and Mozambique; c) the GIS project within the EWT has the skills to provide the required training in basic GIS and use to smaller NGO's and civil society groups that do not already have this capacity; d) The EWT is an non-governmental organisation, and as such fits within the organisational requirements of the MPAH; and e) this project is an opportunity for EWT to nurture its relationships with other conservation organisations to the benefit of biodiversity across the region.

Overall objectives	Key results	Indicators of success (How will we know if we have achieved the key result?)	Activities	Time frame
1. The identification of data partners working on the MPAH project through a comprehensive consultation process;	1.1 All partners contacted and details included in a section in the scoping report.	1.1 Minutes of meetings held between EWT, wildlands and relevant partners, and email correspondence.A list of all project leaders and stakeholders.	1.1.1 Meet with Wildlands Conservation Trust to gain insight into the various partners in each project in order to list partners.	Jun-11
			1.1.2 Develop a comprehensive contact database for the MPAH project.	Jun-11
			1.1.3 Write up section of scoping report	Mar-12
2. To conduct an assessment of the biodiversity data needs of project partners, including base spatial layers, gaps in biodiversity knowledge and required species inventories associated with each project; (what they need vs. what is being collected)	2.1 Understand what each project partner requires to fulfil their project needs. (what is everybody doing?)	2.1 Project partners contacted and needs identified.	2.1.1 Development of an online assessment form.	Jul-11
			2.1.2 Distribute the URL for survey	Jul-11
			2.2 Dialogue held between partners and EWT to discuss details of biodiversity and spatial data needs.	Jul-Sep 2011
			2.1.4 Write up section in the scoping report	Oct-11
	2.2 Guidance in data collection and management.	2.2 Guidelines and templates produced to ensure standardised data collection and processing.	2.2.1 Determine current data collection types and standards in order to develop forms for data collection.	Nov-Dec 2011
			2.2.2 Analyse datasets against biodiversity needs and highlight gaps in knowledge	Jan-Feb 2012
3. A list of existing datasets and potential historic datasets is recorded; (what can be sourced	3.1 Identification of potential historic biodiversity datasets	3.1 List of historic datasets with associated information. Map of data availability and spatial uncertainty	3.1.1 Conduct an investigation through consultation with relevant biodiversity stakeholders and project leaders in the MPAH project into potential sources of previously lost data.	Nov 11-Feb 12

Overall objectives	Key results	Indicators of success (How will we know if we have achieved the key result?)	Activities	Time frame
from historic datasets)	through consultation and desktop investigation.	including information on data sources.	3.1.2 Compile a list of potential historic datasets along with potential sources and contact persons.	Feb-12
			3.1.3 Map spatial distribution of known data in order to supplement/compliment current data gathering.	Feb-Mar 2012
			3.1.1 Identify potential sources/methods for obtaining data for gap areas and include recommendations in the scoping report.	Mar-Apr 2012
4. Recommendations are made of available data facilities which the various projects can make use of, e.g. GBIF (Metadata).	4.1 Project leaders and stakeholders know where to find additional datasets and information.	4.1 List of available metadata sets accessible online.	4.1.1 Compile a list of data sources and other GIS and data related resources that will be of use to all projects.	Nov-11
			4.1.2 Publish list electronically.	Dec-11
5. Identification of GIS and database training needs of the MPAH stakeholders (numbers of participants, level of difficulty, software etc.);	5.1 Understand GIS skills and requirements across the MPAH projects.	5.1 Relevant training material and a schedule of training is written up.	5.1.1 Through consultation with stakeholders, draw up an assessment of current GIS and data collection and management skills (broad).	Jul-Sep 2011
			5.1.2 Develop a schedule of training to address basic GIS needs for data interrogation and map making.	Jan-Feb 2012
			5.1.3 Develop training materials to address the above identified needs.	Mar-Apr 2012
6. Assist Wildlands Conservation Trust with the implementation of the MPAH project through the provision of relevant spatial information and analysis in preparation for the remaining years of the project.	6.1 Relevantinformation available for decision making on project gaps.	6.1 Key deliverables specific to Wildlands Conservation Trust GIS requirements included in Phase 1 scoping report.	6.1.1 Liaise with Wildlands Conservation Trust to discuss the findings of GIS needs for the MPAH project and provide assistance in developing relevant outputs.	Jun-11
			6.1.2 Engage with the CEPF GIS unit to discuss methodologies, standards and specific requirements.	Jul-11
			6.1.3 Revise phase 1 work plan based on findings from discussions and agreed deliverables	Jul-11
			6.1.4 Develop project review framework for a Phase 2 to be included as appendix to Phase 1 scoping report.	Jun-Dec 2011
			6.1.5 Develop project life-cycle to be included as appendix to Phase 1 scoping report.	Jan-Mar 2012
			6.1.6 Finalise Scoping Report	Apr-May 2012
	6.2 Development of a comprehensive GIS project proposal and implementation plan for Phase 2 of the MPAH GIS project.	6.2 Comprehensive Project Proposal for Phase 2 of the GIS project	6.2.1 Collaboration with Wildlands Conservation Trust to refine objectives, indicators and deliverables of Phase 2 of an MPAH GIS implementation project.	May-12

Appendix 2: GIS and Data Requirements Survey

Please see separate report

Appendix 3: GIS and Data Requirements Survey Report

Please see separate report.

Appendix 4: Metadata template – list of fields and field explanation table.

The metadata template is an Excel spreadsheet with numerous fields. For efficiency, just the fields and an example of what is required is included below. The key for numeric fields is included in the second table.

Field heading	Example 1	Example 2
DataSetID		
Dataset_Title	Estuarine fish recorded in the Mtentu Estuary	subtidal marine ichthyofaunal survey data
Description	Museum specimens of fish species in the Mtentu river estuary. Data collected during a study undertaken by the Zooloical Society of London	Survey to provide baseline data for a proposed marine projected area of the Pondoland coastline extending from the Mtamvuna River to Port St Johns.
DatasetType	2	2
Coverage	Mtentu estuary	Shallow subtidal reefs from the Mtamvuna river in the north to Port St Johns in the South
StatusID	1	1
Spatial_Bounding_Coordinates	Unavailable	Unavailable
Temporal_Coverage_StartDate	01 January 2006	01 May 2002
Temporal_Coverage_EndDate	12 July 2009	01 July 2003
Contact_Name	Sally Penfellow	Benjamin Hallows
Email	sally@hawths.org.za	benH@sylvestor.co.za
Created	15 August 2009	15 May 2002
Keywords	Estuarine, fish, Mtentu, estuary, wild coast, Pondoland	ichthyofauna, pondoland, Eastern cape, Mtamvuna, fish survey
Resource Type	exhibition catalog	database
Source	Zoological Society of London (ZSL)	Oceanographic Research Institute
Creator	ZSL	Oceanographic Research Institute
Publisher	ZSL	Oceanographic Research Institute
Contributor	Endangered Wildlife Trust	Gleneagles Environmental Consulting
Rights Mng	2	3
Format	1	2
Language	English	English
Audience	Estuarine researchers	Protected Area researchers
Provenance	Initially the data were owned by the ZSL, but after publication ownership was handed over to the EWT	
Rights_Holder	EWT	Gleneagles Environmental Consulting
Accrual_policy	2	2

Element	Options	
DatasetID: Generic identification given to the dataset		
Dataset title: The name given to the dataset.		
Description: An account of the content of the dataset.		
Dataset Type: The nature or genre of the content of the dataset, i.e. what does the record set contain.	Dataset types	TypeID
	Event	1
	Observations	2
	Questionnaires	3
	Incident Reports	4
	NULL	NULL
StatusID: Pertains to the current publication status of the dataset.	Dataset status	StatusID
	Published	1
	Unpublished	2
	NULL	NULL
Coverage: A description of the spatial extent of the dataset.		
Spatial_Bounding_Coordinates: A bounding box indicating the spatial extent of the dataset. Coordinates in the order: top left, top right, bottom left, bottom right		
Temporal_Coverage_StartDate: The date of the first record in the dataset. Date format is written out in full (e.g. 21 April 2003)		
Temporal_Coverage_EndDate: The date of the last record in the dataset. Date format is written out in full (e.g. 21 April 2003)		
Contact_Name: An individual that may be contacted for additional information about the dataset		
Email: An email address whereby an individual may be contacted for additional information about the dataset		
Created: A date pertaining to the dataset, usually when it was created. Date format is written out in full (e.g. 21 April 2003).		
Keywords: A list of three or more words to describe the dataset		
Resource Type: The nature or genre of the content of the dataset.		
Source: A Reference to a resource from which the present dataset is derived. The present dataset may be derived from the Source resource in whole or part.		
Creator: An entity primarily responsible for making the content of the dataset. Examples of a Creator include a person, an organization, or a service. Typically the name of the Creator should be used to indicate the entity.		
Publisher: The entity responsible for making the dataset available. Examples of a Publisher include a person, an organization, or a service. Typically, the name of a Publisher should be used to indicate the entity.		

Element	Options	
Contributor: An entity responsible for making contributions to the content of the dataset Examples of a Contributor include a person, an organization or a service. Typically, the name of a Contributor should be used to indicate the entity.		
Rights Mng: Rights management - Information about rights held in and over the dataset Typically a Rights element will contain a rights management statement for the dataset or reference a service providing such information. Rights information often encompasses Intellectual Property Rights (IPR), Copyright, and various Property Rights. If the rights element is absent, no assumptions can be made about the status of these and other rights with respect to the dataset.	Rights	RightsID
	Access limited due to high sensitivity of data	1
	Access requires permission from [third party]	2
	Access not limited	3
Format: The physical or digital manifestation of the resource. Typically, Format may include the media-type or dimensions of the resource. Examples of dimensions include size and duration. Format may be used to determine the software, hardware or other equipment needed to display or operate the resource.	Format	FormatID
	Digital - spreadsheet	1
	Digital - Database	2
	Digital - other	3
	Digital - ESRI shapefile	4
	Digital - ESRI raster	5
	Digital - geodatabase	6
	Hard-Copy	7
	Collection only	8
Language: A language of the intellectual content of the dataset.		
Audience: A class of entity for whom the dataset is intended or useful. A class of entity may be determined by the creator or the publisher or by a third party.		
Provenance: A statement of any changes in ownership and custody of the dataset since its creation that is significant for its authenticity, integrity and interpretation. The statement may include a description of any changes successive custodians made to the dataset.		
Rights_Holder: A person or organization owning or managing rights over the dataset.		
Accrual_policy: The policy governing the addition of items to a collection.	Accrual Policy	AcrrualID
	Active	1
	Closed	2

Appendix 5: Letter of Inquiry – Phase 2

* Letter of Inquiry

1. **Project Rationale**

Effective biodiversity conservation is required to meet the needs of safeguarding the Maputaland-Pondoland-Albany Hotspot's rich biodiversity. Achieving this relies on the ability of civil society groups, government departments, non-governmental organisations (NGO's) and decision makers, engaged in conservation action within the hotspot, to access sound, reliable biodiversity and environmental data, and make use of operative tools, including Geographic Information Systems (GIS), to manage, analyse and visualise those data in order to make informed decisions. To this end, the EWT's MPAH Data & GIS Project aims to provide professional data and GIS tools, infrastructure and skills training, as well as a support network and the facilities to ensure those skills and experiences are shared across the entire range of Hotspot projects.

Through a phase 1 CEPF small grant for this project, the EWT has conducted a scoping assessment of the GIS and data needs of all the projects that have received CEPF funding for operations within the MPAH, from the first two calls for proposals (October 2010 and February 2011). Although phase 1 is only due for completion at the end of May 2012, preliminary results from surveys of the first 20 projects reveal a number of potential threats and opportunities that this project aims to address.

Key issues that will be addressed in phase 2 of the project:

1. Empirical biodiversity and geographic data are currently collected through independent conservation initiatives throughout the MPAH. While the data are utilised on an individual project basis, they are not incorporated into a central system, and strategic conservation decision-making across the hotspot is compromised.
2. GIS, which is recognised as an essential tool in the biodiversity conservation decision making process, is currently underutilised by many of the projects. This is a result of poor access to GIS software and lack of training or awareness of project leaders and staff. This could lead to missed opportunities for effective analysis of spatial data to further facilitate informed decisions. A simple example of this is the lost opportunity for projects to strategically engage with local stakeholders, by providing illustrative maps showing the extent of damage to wetlands and how positive remediation will improve their livelihoods. This can be far more effectively shown through maps than through numbers and text. Many of the projects are engaged with community development and environmental awareness; the provision of GIS skills for developing maps can provide a valuable tool in their role-out of such activities.
3. The integration of collated biodiversity data from individual conservation initiatives into broad-scale analytical frameworks needs to be expanded upon, in order to obtain a quantitative assessment of the factors affecting biodiversity patterns across the MPAH.
4. Results from a scoping exercise conducted in phase 1 of the project suggest that more than 50% of current CEPF grantees in the MPAH are in need of relevant biodiversity data, which they cannot easily get access to.
5. The MPAH covers a wide area geographically, and the projects included in the CEPF investment address a wide range of issues with differing objectives and outputs. Assessing the investments overall impact and extent of effected change requires that all objectives and outputs are measured to some common unit, or grouped such that a

quantitative measure can be drawn. Often working in semi-isolation, the projects themselves are removed from the bigger picture and are not aware of their role or contribution to the whole. This project will assist, by discovering common measurements across the range of projects and developing a means through which overall impact can be assessed.

Through its existing structures, the EWT has both the infrastructure and skills to fill the niche of providing for the storage and dissemination of spatial data (including occurrence / observational data), and for capacity building for civil society groups and smaller organisations in the fundamentals of GIS and biodiversity data management (including data collection, collation, management, publishing, etc).

The key benefits and opportunities presented by the implementation of this project are; (1) Facilitation of a central structure from which baseline data, relevant resources and opportunities for collaboration will be made available to all stakeholders; ensuring a richer framework from which all projects can draw data, information and experience; (2) Data generated through the MPAH projects will be coordinated, securely stored and made available for current analyses and beyond. Data will also be published to the Global Biodiversity Information Facility (GBIF; http://www.gbif.org/) network where relevant, taking into consideration sensitive data; (3) Civil society groups will benefit from training in the fundamentals of data management, GIS, spatial data display and analysis – skills that will further their opportunities beyond the scope of this project; and (4) An integrated assessment of all project outcomes will inform the realisation of the conservation impact of the MPAH project as a whole.

This project provides exciting scope for: improved data integrity, sharing of resources and experiences, and continuation of data and emergent properties for use beyond the spatial and temporal scope of the CEPF investment. Additional opportunities lie in the provision of, and training in; useful tools, technology and skills, for further interpreting and displaying biodiversity information that will both enrich the decisions made within the MPAH and the insights drawn from its many outputs. Benefits will also accrue to the global GBIF community through the sharing of data and knowledge.

2. Project Approach

The goals of this project are to ensure that data management and GIS are used efficiently to strengthen the role of the MPAH in aligning previous, new, and future biodiversity initiatives and activities in the region, and to create an enabling environment to both enhance and measure the contribution and capacity of civil society organisations in the ongoing conservation effort.

This Letter of Interest is for Phase 2 of the GIS and data implementation plan. The aim of which is to provide data and GIS facilities, and fundamental training in spatial data viewing, analysis and map making to meet the needs of stakeholders as identified in the phase 1 scoping assessment. In addition, this phase will conduct an integrated analysis of progress and measurable achievements across all the projects, in order to determine the overall impact of the CEPF investment in the Hotspot.

This project is designed to conclude within the timeframe of the greater MPAH project, in order to consolidate findings and contribute to final CEPF reporting on this hotspot.

Project objectives covered by this phase include:

a) The effective technical coordination and management of data (including spatial data) within the MPAH project.

   The development of infrastructure within the EWT's Biodiversity Data Hosting Centre to accommodate data and make it available to all projects within the MPAH, as well as standardisation and quality controls put in place for integrated data collection. These activities will ensure data is sound and stored in such a way that it is accessible and available in the long-term, including, where relevant and appropriate, publication to the GBIF network.

b) Provide fundamental capacity building in GIS and data management and facilitate mentorship for professionals working on MPAH projects, especially in Mozambique and Swaziland.

   To address the gaps and inconsistency in data management and GIS capacity across the MPAH. This objective speaks to the conducting of training courses and facilitation of support and collaborative opportunities for users across the hotspot. In order to ensure the long-term sustainability of skills in data management and GIS, the use of free and open source software and tools will be encouraged.

c) Effective, strategic use of GIS to illustrate the results of the CEPF investment across the MPAH, assess its impact in terms of positive change in biodiversity conservation; and assist Wildlands Conservation Trust (WCT) in its implementation of the project and reporting on achievements.

   Activities, identified in consultation with WCT, will include GIS support to: identifying the potential for project linkages and creation of corridors between projects, assessing the cumulative impact of all projects on biodiversity conservation through policy change, improved land management and secured conservation hectarage; and providing map resources for reporting on activities and progress within the MPAH.

A risk or assumption built into this project is the cooperation and willingness of all project stakeholders to both contribute to, and make use of, the facilities and activities provided for by the project.

3. Link to CEPF Investment Strategy

Through the provision of data management facilities and training in the use of GIS tools and generation of map outputs, this project will link directly to the MPAH strategic direction 4. The objectives outlined here will provide a framework that will support the development of individual project outputs from all the identified key biodiversity areas and conservation corridors. Integration of the information and processes within and between these areas will enhance the community aspects and cumulative impacts of the projects, thereby creating an enabling environment to improve conservation opportunities and management effectiveness of the MPAH.

4. Project Partners / Stakeholders

- Wildlands Conservation Trust: It is envisaged that this project will work in close

collaboration with Wildlands in identifying GIS and data needs and in communicating and collaborating with stakeholders in the MPAH, as well as providing GIS services to meet the CEPF investment requirements of the project.

- Global Biodiversity Information Facility (GBIF): In 2010, the EWT became a Biodiversity Data Hosting Centre based on the GBIF Global Standards. This infrastructure supports data publishers who do not have access to the technical and infrastructural capacity required to directly discover and publish datasets through the GBIF network. Integral to this process is the secure storage of datasets, and the importance of recognising data ownership, while facilitating collaborations among multiple stakeholders. The EWT is currently working with the GBIF Secretariat to develop the *Best Practice Guidelines for Data Hosting Centres*.
- MPAH CEPF grantees: All MPAH grantees will become project partners and stakeholders, as their work and activities will contribute to the objectives of this project

5. Long-term Sustainability/Replicability

Through the implementation of this project, greater mobilisation and utilisation of data across the MPAH will be enabled, skills will be taught that will increase stakeholder capacity, and a more thorough comprehension of environmental systems will be developed, leading to improved decision-making and conservation initiatives within the Hotspot. These facilities, skills and initiatives will have far-reaching impacts, beyond the time-frames and extent of this CEPF investment.

The standards and policies for data collection and management will be in line with GBIF standards, and data will be accessible to organisations and individuals across the globe long after the CEPF investment has come to a close.

GIS and data management skills training provided by the project will ensure that candidates working within the MPAH are proficient in the use of skills and tools for data collection, interrogation and basic analysis for any projects that they work on beyond the MPAH. The experience they gain using these skills in the MPAH project will give them the practical familiarity needed to apply them to other projects to ensure sound data use in decision making, and to pass on their knowledge to their successors.

The integration of project information across the MPAH will facilitate improved decision-making and conservation initiatives, which consider the broader issues across the hotspot and remove projects from operating in isolation. The results of this effort will be documented, published and available for replication in future initiatives that address similar objectives. The consolidated assessment will produce useful, cross-cutting information that will be available for use in conservation planning and biodiversity management initiatives at national, provincial and regional levels, thereby contributing to national policy.

Appendix 6: Project Review Framework – Phase 2

The aim of the MPAH project is to support and strengthen the role of civil society organisations and community groups in conservation and the protection of biodiversity within the hotspot in South Africa, Swaziland and Mozambique. As a result of the sheer volume of the project and the number of groups and organisations involved, it is envisaged that there will be a vast quantity of spatial data needed for and generated by the various assignments associated with the project. Through its existing structures the IT4CP has both the infrastructure and skills to fill the niche of providing for the storage and dissemination of spatial data and capacity building for civil society groups and smaller organisations in the fundamentals of GIS.

Overall objectives	Indicators of success (How will we know if we have achieved the objective?)	Key results	Indicators of success (How will we know if we have achieved the key result?)	Activities
1. The effective technical coordination and management of data (including spatial data) within the MPAH project.	1. Mobilise species spatial data across the MPAH region	1.1 Geospatial data used in all MPAH projects is standard, resulting in smoother integration of project outputs that feed into the greater CEPF reporting structure.	1.1 All MPAH projects have access to reliable standardised data.	1.1.1 Setup of a MPAH project specific spatial data store and sharing facility.
				1.1.3 Build partnerships with other organisations and individuals working within the MPAH area in order to find new data sources.
		1.2 Define principles and operating standards and quality controls for data collection and management.	1.2 Projects within the MPAH have a structure in which to work when collecting and processing data and a guideline document is available.	1.2.1 Develop standardised spatial data collection forms and make available online to all MPAH projects.
				1.2.2 Develop a user guide for spatial data collection and management protocols/procedures and the use of the geospatial facility within the programme.
		1.3 Spatial data layers are available.	1.3 All organisations and individuals working on MPAH projects are working with the same spatial data layers.	1.3.1 Compile a list of required base spatial layers (roads, rivers etc.) for the hotspot and identify sources (SA, Swaziland and Mozambique).
				1.3.2 Obtain data layers from various sources
				1.3.3 Provide an inventory of datasets available to the MPAH projects and metadata of additional sources (e.g. GBIF, CSIR).

Overall objectives	Indicators of success (How will we know if we have achieved the objective?)	Key results	Indicators of success (How will we know if we have achieved the key result?)	Activities
		1.4 Provide technical and infrastructural capacity to directly discover and publish MPAH datasets.	1.4 Substantial number of datasets generated from the MPAH are available online.	1.4.1 Integrate MPAH project into EWT/GBIF biodiversity data hosting infrastructure project
				1.4.2 Develop and implement appropriate technologies and applications. (i.e. Compatibility between different database programmes)
				1.4.3 Provide a platform for data hosting by the different projects and the manual capture of field data.
		1.5 Increase data and knowledge available to the MPAH project through recovery of historical datasets.	1.5 Datasets are available.	1.5.1 Identify potential historic datasets through consultation and desktop investigation.
				1.5.2 Collate datasets previously lost to science and make available to MPAH projects.
2. Effective strategic implementation of the GIS project through consultation with Wildlands Conservation Trust and partners.	2. GIS is used both to illustrate and inform the MPAH project and make good use of data collected during the 5-year.	2.1 GIS is available to the MPAH project.	2.1 Essential questions regarding the MPAH data strategy are addressed.	2.1.1 Liaison with Wildlands to discuss GIS needs for the MPAH project and provide assistance in developing relevant outputs. (e.g. A) identify gaps in biodiversity knowledge; b) develop an 'all species' inventory; and c) Measure the range as opposed to the absolute species numbers)
				2.1.2 Engage with the CEPF GIS unit.
		2.2 GIS is used in the development of outputs for the MPAH projects that effectively illustrate the results of the project and progress that has been made, in keeping with the legacy requirements of CEPF	2.2 Project documentation, media and presentations include relevant maps.	2.2.1 Consolidate data outputs from all MPAH projects to assist Wildlands in meeting their CEPF reporting requirements.
				2.2.2 Create maps and other project outputs as required for reports, presentations and media.
3. Provide fundamental GIS and data management capacity building and	3. Organisations working on projects within the MPAH utilise GIS in their	3.1 Build the necessary skills for viewing and interrogating data and making maps required for reports	3.1 Relevant training material and a shedule of training is written up.	3.1.1 Hold at least one formal training course in fundamental GIS tools and theory
				3.1.2 Develop/revise training materials

Overall objectives	Indicators of success (How will we know if we have achieved the objective?)	Key results	Indicators of success (How will we know if we have achieved the key result?)	Activities
mentorship for professionals, especially in Moz and Swaziland	contribution to the project, and are capacitated to use their skills going into the future.	etc.		3.1.3 Source external training if required
				3.1.4 Promote the use of free GIS software and tools for addressing spatial requirements of the projects
		3.2 Develop or contribute to resource materials (i.e. Newsletter, blog)	3.2 Established resource materials to ensure open communication with key members of MPAH projects	3.2.1 Produce a mini newsletter or contribute to an existing newsletter that reaches the various projects.

Appendix 7: Minutes of the Progress meeting held at Wildlands in January 2012

MPAH GIS meeting – January 2012

Minutes

1. Welcome

2. Attendants: Kirsten Oliver (KO), DumileTshingana (DS) and RoelieKloppers (RK)

3. Progress on Phase 1 and mid-term report

    a. Dumile went through a few comments on the mid-term report and objectives already worked on in the first period of phase 1:

    b. Objectives:

- Objective 1 – stakeholder map

    - KO will add the new project areas to the maps in the next period. DT to send KO info on new projects

    - RK mentioned that the maps have been used in various reporting documents and sent through to CEPF.

    - Feedback from CEPF indicates that it would be useful to see where there is potential to create corridors with and between projects, and how the various projects will link together.

    - DT informed the meeting that a few more small grants focussed on biodiversity and conservation are in the pipeline for approval in the near future:

        - Umgani forest, Umzimkulu

        - Mozambique project

        - Crane Foundation (education etc.)

- Objective 2

- 2.2.2 will be informed by the results of data needs from the survey, and data availability. Using this info, we will be able to report on gaps in the data that are needed for the projects to achieve their work

- Changes to the online survey were discussed briefly. KO informed that the new survey should be up and running by the end of this week – Friday 20 January.

- Objective 5

  - DT enquired if it would be possible to provide training in GIS to stakeholders identified in the first period. KO reiterated that this was proposed for the second phase of the project – for which EWT will be applying in February.

  - RK mentioned that Robert Smith, base in the UK, but conducting projects in Mozambique is putting in a grant for some GIS training in the area.

    - Bruno (attended the SANBI workshop) is his student (coordinator for Moz unit until this this call is finished)

    - Looking at a project to reassess GIS in moz south of Maputu

  - Sarah Frazee put in for a 20 year strategy for Mzimvubu catchment, into which the results of this survey will definitely feed and be useful.

- Objective 6

  - Assistance to Wildlands – An important aspect that GIS could be used for to assist in reporting back on the MPAH project is the creation of 'hectare maps' that indicate area of impact of the projects. Assess impact in terms of how much hectarage are brought under conservation and improved management through MPAH projects

    - Consider some of the projects, e.g.

    - WildlifeACT,

    - Dargle Conservancy – have a meeting to the conservancy to a talk that may improve their management ethic (consider in terms of hectarage that this activity might have an impact on) Map this impact (farm boundaries of those attending – just an idea)

- Working with the communities on the wild coast (KO discussed the idea of the community mapping exercise in Pondoland and extending it to other communities across the hotspot – well received)

4. Phase 1 discussion

    a. Data lists (old data that needs to be secured) – recommendations for sources

        i. Stephen Holness's biodiversity data (CSIR, SANBI)

        ii. Bob Smith - Mozambique

        iii. Wayne Matthews (ecologist KZNWildlife – expert on maputuland, Bruce Page etc)

        iv. ACT

        v. Andrew Whitley

        vi. AraMunachem (Swaziland – UNISHWA) most respected scientist in Swaziland.

        vii. Jack Jackilman – all the planning for the wild coast project before GEF

        viii. Peter Titsley – Wild coast project

        ix. Keith Cooper – Biodiversity ex-director at WESSA

        x. Jennifer Jones – Phd on CGIS on Maputuland-Mozambique

        xi. SANBI

        xii. Marine projects – Peter Chadwick (WWF)

        xiii. Craig Beech (Peace Parks – world bank project in Mozambique mapping stuff)

        xiv. Roelie to send contact details where possible

    b. Available data (for use by all MPAH projects)

        i. KO presented the GBIF Community site for the MPAH

ii. Site approved – Roelie set up his own profile and was invited to join

iii. Decision was made to invite all current grantees to join, but not additional people. An email will be sent to those that attended the SANBI workshop informing them of the group, if those that are not already grantees decide to request membership, they will be accepted, but no blanket invite will be sent.

iv. The group is a private site – i.e. only invited users will have access – as opposed to a public site that anyone can join.

c. Presentation at Biodiversity Planning Forum 2012

i. Approved to present at forum.

ii. KO will send proposed presentation abstract through to Wildlands before submitting to the Forum.

iii. The subject of attending the ESRI user conference was also raised, but no decisions made – somewhat funding dependent.

d. New projects (info on all the new projects that have started in the last couple of months)

i. DT will send this through to KO shortly

5. Phase 2 Application

a. Review Framework format

i. KO asked that review of the proposed project framework, objectives etc. be postponed until a later meeting after EWT have revised the original in line with lessons learnt and additional information emanating from phase 1. This was agreed upon.

b. Requirements of Wildlands (what do you require of phase 2)

i. Capacity building – critical for bigger funding, especially in the Mozambique area

1. If including workshops in funding application, then will likely require more than $20 000.00, so should apply for large grant.

ii. Corridors – linking projects and identifying how and where projects feed into one another to increase coverage and impact.

iii. Helping Wildlands to report

1. Portfolio for MPAH – Need to ascertain hectarage under conservation, changed management or influenced by policy change as a result of MPAH activities and projects

2. "How this will enable the regional implementation team to accurately report on targets achieved by the projects in terms of hectares under conservation"

c. Community Mapping project/picture building resource

i. Include in phase 2 proposal – still to establish detail and the 'How'

ii. Valuable as a resource and tool for communities and grantees – less valuable for Wildlands directly

iii. Lessons learnt from Pondoland that can be shared with S Mozambique

6. General

a. Anthony's project

i. KO relayed enquiries from Anthony Bernard's (EWT Source to Sea Programme) questions regarding a proposed project in the North Eastern Cape Region.

ii. The idea was met favourably by Wildlands and advice was given on some collaborators and further ideas for a project – these have been forwarded to Anthony.

b. EWT need to submit invoice for the second tranche of monies whenever required.

7. Next meeting

    a. The next meeting was set for 13 February 2012 at 10am at Wildlands offices.