"Developing the Functionality of the IABIN Ecosystem Thematic Network Database"

Proposal submitted to IABIN in response to the request for Proposals of Value Added Tools for Decision Making

November 12, 2008

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Project Summary

The project goal is to catalyze collaboration and cooperative data development among ecosystem specialists throughout the Americas through the IABIN Ecosystem Thematic Network (ETN heretofore). We propose to continue implementing integration of available text, tabular, and mapped information for NatureServe terrestrial ecological systems and TNC freshwater ecological classification into the ETN classification framework and geospatial portal to serve the purpose of Hemispheric reference classifications.

The ETN has already implemented the terrestrial and the marine Standard Formats database. Its web interface is being used by countries to enter the national ecosystems data and NatureServe has uploaded its terrestrial ecosystems database of Latin America and the Caribbean to the ETN database to serve as the reference classification. With the use of match funding NatureServe is preparing for upload a terrestrial ecosystems database of Mexico and the US to increase the hemispheric coverage of the reference classification. With this progress, additional funding is needed to make sure that the database is not only useful as it is now for data providers, but for users overall and for decision makers seeking information that provides context in a way that they can find out about specific ecosystems in relation with their global distribution, conservation issues, habitat for species, and through text, tabular and mapped outputs.

Approach

We propose to achieve the goal of a fully functional ETN database by carrying out the following activities.

- Test and provide recommendations to make sure that the ETN database structure allow the automatic cross referencing between different terrestrial ecological classifications, by using the reference classification as the common language.

- Work with IABIN programmers to identify the contents and outline of the reports that the database should provide as outputs of different types of queries, and make recommendations for improvement where needed.

- Develop functional links between the existing maps of the reference classifications of ecological systems of US and Latin America and the database entries for each ecosystem type. We will also coordinate with GEOSS in regards with the spatial layers that represent the different levels of the GEOSS framework which are also represented by the different levels of standard attributes included in the Standard Format.

- Building on the experience gained through the development of the IABIN ETN, we will develop a plan to support the sustainability of the ETN in the long term that includes agreements with institutions relevant to the network.

- Organization of two workshops

The counterpart funding is being used primarily to develop the US terrestrial ecosystems standard format, the uploading of the US terrestrial ecological systems classification onto the ETN database, and to begin documenting conservation status (Global ranks, IUCN red list proposed criteria) for a subset of terrestrial ecological systems as a proof of concept to raise additional funding to complete the task across the Americas. Since the freshwater classification for South America and Central America are still in progress (though they will be ready very soon), the development of the freshwater ecosystems standard format and the uploading of the LAC freshwater classification onto the ETN database, will be planned in terms of the timeline of the project as the second main task of the counterpart funding.

Final Product

The final product is a functional database that support comprehensive information about ecosystems of the Americas, facilitates the cross referencing between classifications, provides ecosystems distribution maps at different levels of resolution, informs about conservation status of the ecosystems, and relates subsets of its data to other IABIN thematic network databases, all this through a web interface that is user friendly for both, data providers and information users. Specific products envisioned as a result of this project (including IABIN and counterpart funding) are:

- Terrestrial ecosystems standard format in English and Spanish versions
- Fresh water ecosystems data in English
- US and LAC terrestrial ecosystems classification entered as reference classifications in ETN database (English and Spanish respectively)
- Latin American fresh water classification in ETN database
- Maps of US and South American terrestrial ecosystems served over the IABIN ETN geoportal
- Map of South America freshwater ecosystems served over the IABIN ETN geoportal
- Query options with retrievable reports that inform users about
    - Ecosystems diversity by defined geography or related theme (regional, country, ecoregion or biome)
    - Conservation status of ecosystems (a subset of South American ecosystems at this point) linked to distribution maps.
    - Similarity of ecosystems across different geographies and classifications (crosswalks)
    - Links between species and habitat, particularly for plant species, based on level 6 of terrestrial standard format that includes diagnostic plant species of the ecosystem type (could link ETN database with species database)
    - Total distribution range of queried ecosystems as portrayed by maps available over the IABIN geoportal

- Clickable maps as means of content search

Explanation of functionality and use of Final Product

There is an increasing demand for environmental data that is accurate, current, complete, and linked to or supported by global standards or approaches. This demand is driven both, by increasingly sophisticated analytical approaches from conservation groups and by more strict demands from multilateral agencies and governmental regulators that investors adhere to environmental safeguards to reach a better balance between productive activities and related infrastructure development, and sustainable use of natural resources.

Thus far the ecosystem information available for the Hemisphere is spotty, difficult to find, and non-standard, and for some countries, even the national level information is affected by these problems. The datasets that we are proposing to put together using a set of standards to characterize, cross reference, and obtain mapped products across the Continent will be the best and more detailed ecosystem level information currently available.

NatureServe has a recognized experience in the development of standards that make possible the collection of data under unified criteria in order to support region wide application of analytical tools and seamless thematic mapping. With this project we propose to continue developing what could be considered the building blocks of a tool that can become the main or one of the main resources to inform local and country governments, advocacy groups, conservation NGOs, foundations, regional agencies, and landowners to better understand the distribution, condition, and significance of the continent's natural landscapes.

Tasks to be accomplished with IABIN funding

1. Work with the ETN consultant in charge of developing the standard format database function of crosswalk between different classifications. This task entails coordinating with him about the key classifiers represented in the attributes of the standard format, on which the cross-referencing should be performed to ensure the most accurate crosswalk possible. Entails also reviewing numerous trials to achieve the expected results.
2. Define and provide specifications of the types of queries and content and layout of output reports. Work with ETN programmer to build the required functions in the database, test results and provide recommendations.
3. Work with ETN programmer to define the type of query and mapped output that can be built into the database as a function of hotlinks between database contents and map products in the IABIN geoportal.
4. Organize workshops.

5. Participate in the workshop about the freshwater standard format to be organized by IABIN ETN (IABIN will cover separately all travel costs associated with NatureServe participation in the workshop).
6. Coordinate with TNC to identify specifications needed for the integration of ETN databases with TNC's Effective Conservation Monitoring tool.

Work plan

Key project activities will include:

1.
Complete the US terrestrial Standard Format and the user manual. This task is going to be accomplished with the input of working groups formed by ecologists from the different regional offices of NatureServe in collaboration with the ecologists of the Natural Heritage programs of the states. The regional inputs will be collected to be presented and discussed during a workshop.

The goals of this workshop are:
Obtain an agreed upon list of ecological attributes and the classification categories of each of them that will be represented as fields and corresponding categories menus at the different levels of the Standard Format.
Make sure that the attributes represented in the spatial layers that GEOSS is developing to map ecosystems across the US, are included in the SF.
Gather ideas about querying options for the IABIN ETN database and required data model.
Share with US and Mexican ecosystems specialists the development of the IABIN ETN to disseminate it to a wider audience in North America and promote the use of the resource.

2.
In parallel, another team will coordinate with the ETN consultant in charge of developing the standard format database function of crosswalk between different classifications. This task entails coordinating with him about the key classifiers represented in the attributes of the LAC terrestrial standard format, on which the cross-referencing should be performed to ensure the most accurate crosswalk possible. The data model should be able to produce outputs of the degree of similarity between different classes based on which and at what levels the attributes are corresponding. It also entails to engage in the testing phase to achieve the expected results.

3.
The next activity will be to define and provide specifications of the types of queries and content and layout of output reports (text, tabular and spatial), working with ETN programmer to build the required functions in the database, test results and provide recommendations.

Related to the latter, is the task of defining with ETN programmer the type of spatial query and mapped output that can be built into the database as a function of hotlinks between database contents and map products served through the IABIN geoportal. Examples will be based on the national ecosystems maps provided by the countries grantees who are feeding data to the ETN database. Besides these maps, it is expected to have also available the South America map of the reference ecosystems classification as well as the US map of terrestrial ecosystems, on which to develop other type of mapped output prototype.

4.
Regarding freshwater information, the counterpart project will make possible to count with a map of the freshwater riverine ecosystems of South America and its related geodatabase classification information. Through the IABIN funding we will participate in the workshop about the freshwater standard format to be organized by IABIN ETN. The goal of this workshop will be to discuss how best to use the South America freshwater classification and geodatabase in the context of the ETN, and what kind of additional information would be useful to ask from data providers.

5.
A proposal and a pilot application about the approach and criteria to assign global conservation status to ecosystem types will be presented at the end of this project. This task involves the coordination of a few small working groups representing several geographies across the Continent and different approaches, who are involved and active in this issue. Factors that have been considered so far are:

- Number of occurrences or total range area
- Reduction of ecosystem range area
- Number of occurrences or proportion of range area with Good Viability
- Threats (Severity, Scope, and Immediacy)
- Intrinsic Vulnerability (High, Moderate, Low)
- Environmental Specificity (ecological pattern) (Very narrow, Narrow, Moderate, Broad)

These groups will then participate in a workshop to discuss and agree on the rules and the types of data that would need to be captured for IABIN ETN in order to assign conservation status to an ecosystem type (national and global ranking). This task will involve intense coordination with the Conservancy (TNC) group that is developing the Internet-Based GIS Ecosystem Assessment and Reporting Tool for Conservation Decision-Making, in order to identify specifications needed for the integration of ETN databases with the TNC's tool.

We will also take advantage of this workshop to discuss the use of existing comprehensive datasets of terrestrial ecological systems viability and threats for South America to apply the agreed upon ranking rules to obtain maps that could be served over the ETN website showing the distribution of ecosystems categorized by their levels of current vulnerability.

Deliverables and Time Frame

No.	Outputs	Months										
		1	2	3	4	5	6	7	8	9	10	11
1.a	US Terrestrial Standard Format preparation and workshop											
1.b	US Terrestrial Standard Format final version											
2.	Recommendations on cross-referencing function of Terrestrial Standard Format database											
	First Progress Report											
3.a	First version of output reports of SF database (tabular and text)											
	Web based demo of reporting function - revision											
	Final version of output reports of SF database (tabular and text)											
3.b	Spatial outputs of database functioning											
	Second Progress Report											
4.	Freshwater ecosystems information in ETN database											
5.1	Conservation status ranking workshop											
5.2	Global conservation status of subset of ecosystems in ETN database											
	Final Report											

Description of Workshops

As part of this project it will be necessary to convene the two aforementioned workshops. The travel costs of these workshops will be covered directly by IABIN and budgets are provided independently.

Workshop 1 is related to the development of the US terrestrial ecosystems standard format.

The goals of this workshop are:
Obtain an agreed upon list of ecological attributes and the classification categories of each of them that will be represented as fields and corresponding drop down menus at the different levels of the Standard Format. This version of the terrestrial ecosystems Standard Format should cover all the terrestrial ecological settings represented in the Hemisphere and become available in English and Spanish versions.
Make sure that the attributes represented in the spatial layers that GEOSS is developing to map ecosystems across the US are included in the SF.
Share with US and Mexican ecosystems specialists, outside of the NatureServe group, the development of the IABIN ETN to disseminate it to a wider audience in North America and stimulate them to become data providers.

Budget Wkshop. 1: US $ 8,484.00 for travel expenses of 7 people for a two days workshop.

# of person days of travel (7*3)	21
Airfare r/t	$ 3,150.00
Lodging	$ 2,625.00
Per Diem	$ 1,344.00
Ground Transportation	$ 1,365.00
TOTAL TRAVEL	**$ 8,484.00**

Workshop 2 will be convened to discuss the approach and criteria to assign global conservation status to ecosystem types*

This workshop will serve to open to a diverse group of ecosystems experts, a discussion that NatureServe ecologists have already started internally about how to assign a global conservation status rank to an ecosystem type. Factors that have been considered so far are:

- Number of occurrences or total range area
- Number of occurrences or proportion of range area with Good Viability
- Threats (Severity, Scope, and Immediacy)
- Intrinsic Vulnerability (High, Moderate, Low)
- Environmental Specificity (Very narrow, Narrow, Moderate, Broad)

We will take advantage of this workshop to discuss the use of existing comprehensive datasets of terrestrial ecological systems and threats for South America to come up with maps that show the distribution of ecosystems categorized as rare, endemic, widespread, and their levels of current vulnerability.

As a result of this workshop we expect to have an agreed upon methodology and criteria to apply to a subset of ecological systems as a pilot application.

Budget Wkshop. 2: US$ 9,372.00 for travel expenses of 6 people for a two days workshop, including international flight fares.

# of person days of travel (6*3)	18
Airfare r/t	$ 4,800.00
Lodging	$ 2,250.00
Per Diem	$ 1,152.00
Ground Transportation	$ 1,170.00
TOTAL NATURESERVE TRAVEL	**$ 9,372.00**

Team Composition and Task Assignment

Professional Staff				
Name of Staff	Firm	Area of Expertise	Position Assigned	Task Assigned
Carmen Josse	NatureServe	Terrestrial Ecology	Terrestrial Ecologist	Coordination with ETN consultant to develop cross referencing function between terrestrial ecosystems classifications. Specifications of the types of queries and content and layout of output reports. Evaluation of trial versions and recommendations on improvements.
Patrick Comer	NatureServe	Terrestrial Ecology	Terrestrial Ecologist	Coordination with GEOSS about spatial layers for the different levels of the GEOSS framework. Organization of Workshop 2 on conservation ranking of ecosystems
Damian Rybock	NatureServe	GIS Specialist	Spatial datasets manager	Advise and coordination with IABIN programmer on hotlinks between spatial data and standard format.
Kristin Snow	NatureServe	Ecological	Database manager	Database content and

		Information Manager		functionality support. Coordinate with TNC team on the integration of ETN databases with their Effective Conservation Monitoring tool
Shannon Menard	NatureServe	Terrestrial Ecology	Terrestrial Ecologist	Organization of Workshop 1 on US terrestrial ecosystems standard format

Budget

		Cost
I.	Personnel Costs	$ 45,490.00
II.	Other Direct Costs (includes travel)	$ 1,288.49
III.	Subagreements	$ -
IV.	Indirect Cost @ 36.4%	$ 469.01
V.	TOTAL COST	$ 47,247.50