

## 6 CASE STUDY: TREE CONSERVATION DATABASE

### 6.1 Overview

With support from the Government of the Netherlands, the World Conservation Monitoring Centre (WCMC) and the Species Survival Commission (SSC) are working closely with a range of other national and international organisations to develop a global information service on the conservation and sustainable-use of trees. Reliable and up-to-date information on the distribution, conservation status, local uses and economic values of trees is a priority requirement for the planning of sustainable forest management and biodiversity conservation.

The Tree Conservation Information Service aims to be of value to individuals and organisations whose decisions rely on access to high quality data and accurate information. Whether determining the best use of local land or negotiating the obligations of an international treaty, authoritative data and information on tree species will inform the process and increase the likelihood that sustainable practices are employed and negative environmental consequences are minimised.

The service is underpinned by a **Tree Conservation Database**, developed with the following objectives:

- to enable the collation of data on the distribution, conservation status, local uses and economic values of tree species worldwide;
- to provide a low-cost software tool for the management and reporting of these data; and
- to provide the basis of a tree conservation information service on the Internet.

The database will be distributed to users in electronic form to enable storage, editing, analysis and reporting of tree-related data. It will also be analysed centrally to produce outputs such as a **World List of Threatened Trees** (using the new IUCN threat categories).

## **6.2 Target Audience**

The Tree Conservation Information Service aims to help governments make informed and justifiable decisions on the conservation and sustainable use of trees. In addition to national governments, the information service will serve the needs of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the International Tropical Timber Organisation (ITTO), the Convention on Biological Diversity (CBD), the Forest Stewardship Council (FSC), industry and other groups.

## **6.3 Information Needs Analysis**

Before building the information service, considerable time and effort was invested in consulting with prospective users and collaborators (see Volume 2). Early in the project, a tree and timber database questionnaire was prepared and posted (July 1995) to over 500 organisations, representing national governmental forestry and conservation departments, bilateral and multilateral development agencies, national and international non-governmental organisations, research organisations, forest product trade organisations, and individual experts. The questionnaire had two main aims:

1. to identify priority needs for the Tree Conservation Information Service; and
2. to determine the availability and quality of existing data sources.

Following this exercise, the information needs analysis became more interactive. Scientific and technical experts were brought together at a workshop, which provided further opportunity to identify key data requirements and the types of information products the service could provide. A range of possible questions which the service could shed light on, and which could be addressed potentially by the Tree Conservation Database, are listed in Box 8.

Following this consultative process, the broad categories of data to be included in the database were analysed (see Volume 3). These included data on taxonomy, species distribution, conservation status, local uses, trade, threats, legal protection, contacts and other data sources.

## **Box 8 Potential issues to be addressed by the database**

- Is the species of conservation concern?
- Has the species been evaluated for the new IUCN threat categories?
  - if so, what is the category and criteria by which it was assigned?
  - what information is available to support the threat category?
- What is the distribution of the species?
- What are the uses of the species?
- Is the use of the species sustainable?
- What are the current levels of trade in the species?
- What are the types, levels and values of use that are being made of the species?
- Is the species legally protected – regionally, nationally, internationally?
- What are the administrative and legislative structures pertaining to the conservation/sustainable use/management of tree species in any particular context?
- What are the implications of specified human actions and/or natural phenomena?
- What current actions are being taken to manage tree species, and how effective are they in achieving their objectives?
- Which individual or organisation holds, has access to, or can generate the data or information relevant to a specific issue?

## **6.4 Database Design**

On the basis of the information needs analysis, and on-going discussions with other organisations and SSC specialist groups, a functional specification was developed for the database. This included an entity-relationship (E-R) diagram, table and field descriptions, plus a description of all the required functions and outputs of the database. The E-R diagram, which illustrates the links between the main data tables and look-up tables, is illustrated in Figure 2.

In terms of functionality, the main outputs (products) of the Tree Conservation Database were conceived at an early stage. These range from simple list-type reports, to more complex fact-sheet summaries and statistics. To provide flexibility within the database, there are comprehensive user- defined reporting capabilities. Standard reports and statistics include:

- species lists by distribution and/or threat category;
- species summaries by taxonomic group and/or distribution and/or threat category;
- total number of species in each threat category by taxonomic group and/or distribution; and
- total number of endemic species by taxonomic group and/or distribution.

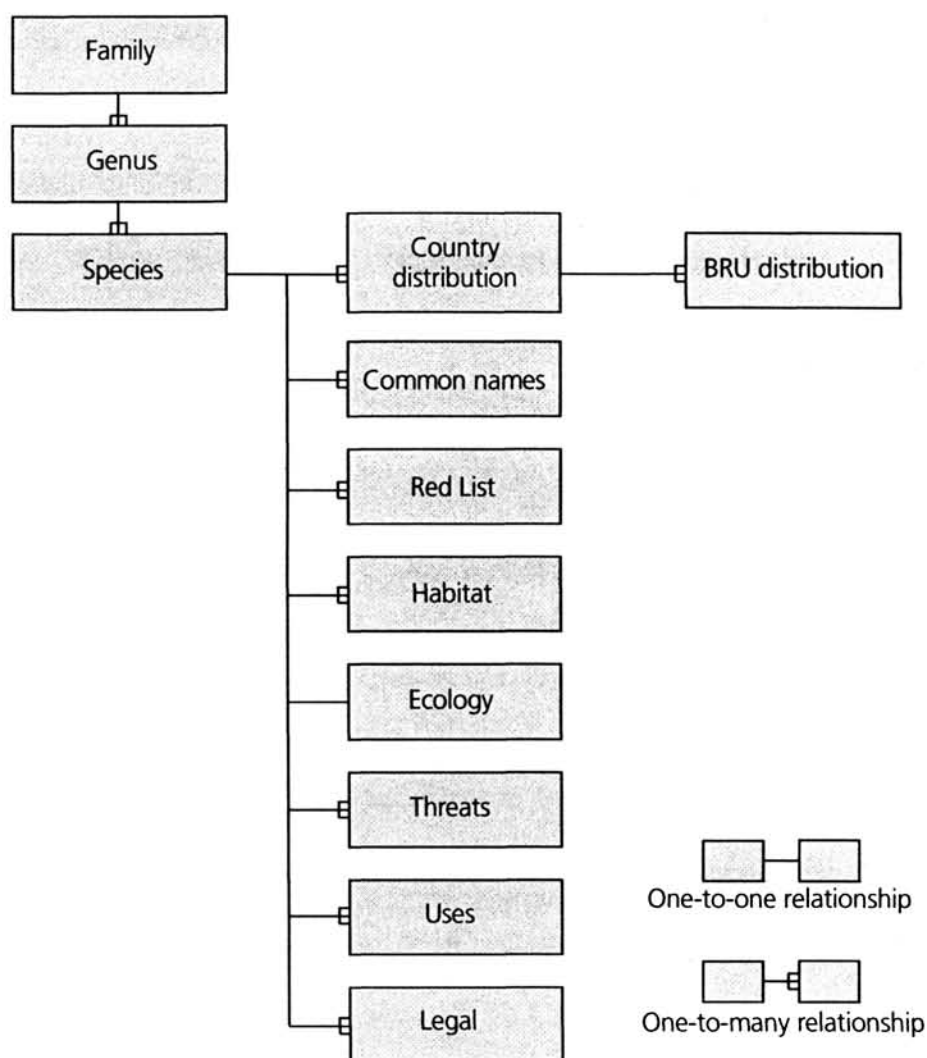
Each report can be printed and/or saved as a text file (and then, for example, used in a word processor) or as a delimited file (and then, for example, used with a spreadsheet). Reports may be written to file in many standard formats, including plain text, delimited text, dBASE and Excel.

## **6.5 Applications Development**

A prototype database application was developed using data management software (RDBMS) familiar to WCMC staff. The prototype enabled an interactive approach to database development, and ensured that the final database correctly met user expectations. It was built quickly and cheaply, and served to focus attention on user requirements at project workshops.

Following review of the prototype, it was possible to make final decisions on the database design, plus the hardware and software to be used for implementation. The

**Figure 2 Entity-relationship (E-R) diagram for the database**



selection of hardware and software was also guided by the need to link effectively with other applications, including geographic information systems (GIS). In addition, it was necessary to run the database in single-user and multi-user environments, and to ensure compatibility with the latest generation of Windows-based network environments, especially Windows 95 and Windows NT.

## 6.6 Data Standards

The database employs standards in three main areas, as described below:

- **Taxonomy**

Through the use of look-up tables, only valid entries of family and genus name are permitted, according to Brummitt (1992). In addition, the inclusion of scientific authority aids identification of particular species.

- **Geographic areas**

Country names follow those specified by ISO (International Organization for Standardization) in standard ISO 3166 (codes for the representation of names and countries). At the sub-national level, areas are named in accordance with the internationally-agreed Basic Recording Units (BRU), described by Hollis and Brummitt (1992) and endorsed by the Taxonomic Database Working Group (TDWG).

- **Threat categories**

The IUCN categories and criteria (adopted by the IUCN Council on November 30, 1994) provides a system for classifying the conservation status of species on a global scale. Species are evaluated and classified into one of eight categories: Extinct (EX), Extinct in the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Lower Risk (LR), Data Deficient (DD), Not Evaluated (NE). The criteria by which the categories are applied are specified for each species.

## 6.7 Data Quality

The project's approach to data quality-assurance is essentially an *ad hoc* process, complemented by more thorough, structured reviews. In particular, the Tree Conservation Database allows data to be added and updated continuously, to reflect on-going changes in the assessment of the conservation status of species. As environmental conditions change, and as new research broadens the knowledge-base,

then such re-evaluations are often required. The Tree Conservation Database caters for new assessments and new data by allowing modifications to be made, whilst retaining the original data.

Effective back-up is a further important issue addressed by the database. Although users and organisations may have their own back-up procedures, it was felt necessary to provide a special-purpose back-up option within the database, to compliment these other processes.

In some cases, access to the database may need to be controlled and, for this reason, password entry is included. Once a user has successfully logged into the database, the functions available to them are also determined by their privilege settings, of which three are defined as follows:

- basic user (view only; no access to database administration tools);
- user (add and edit data; no access to database administration tools); and
- administrator (all functions).

## **6.8 Cooperation and Partnership**

Cooperation with other organisations is an important feature of the *Tree Conservation Information Service*, aimed at maximising the contribution of the project to related initiatives. For example, important partnerships were developed between WCMC and IPGRI and between WCMC and FAO, relating to the following initiatives, respectively:

- *REFORGEN* database system. This global database (developed by the Forest Resources Division of FAO) is designed to house information related to the world's forest genetic resources.
- *TREESOURCE*. This global information system on forest genetic resources represents a collaborative effort between FAO, the Centre for International Forestry Research (CIFOR), the International Center for Research in Agroforestry (ICRAF) and IPGRI, and has been designed to provide readily reliable and accessible information on forest genetic resources.