

Fifth and Final Progress Report of Implementation Phase

# *Information Context for Biodiversity Conservation*

Project No. 5052



Submitted to



by

Union of International Associations  
World Conservation Monitoring Centre  
Nordic Center for Innovation  
AIDEnvironment

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## **1 Introduction**

This is the fifth and final Progress Report for the Implementation Phase of the project called *Information Context for Biodiversity Conservation*. The project is developing an integrated information package for biodiversity conservation using a variety of software for Internet and CD-ROM delivery; search, translation, visualisation and mapping techniques; user workshops and feedback programmes; product testing and marketing; and long-term project financing and commercialisation.

The project partners are:

- Union of International Associations, Brussels, Belgium (UIA)
- World Conservation Monitoring Centre, Cambridge, UK (WCMC)
- Nordic Innovation Centre, Norwegian School of Management, Oslo, Norway (NSM)
- AIDEnvironment, Amsterdam, Netherlands (AIDE)

The project is co-funded by the European Commission's INFO2000 programme, (Directorate-General XIII). Contract No INFMM5052 – 22895/0.

The project is of 28 months duration, extended by 4 months from the original 24. It commenced 1 January 1998. This document reports the last four months of work January to April 2000, inclusive. It is online at [http://www.uia.org/projects/ip5\\_report.doc](http://www.uia.org/projects/ip5_report.doc).

Previous progress reports of this project are also available at the above web location. For information on the project achievements during its Definition Phase in 1997, see *FINAL REPORT OF DEFINITION PHASE, Information Context for Biodiversity Conservation*, INFO2000 Project No. 5052, at <http://www.uia.org/projects/i2000rep.htm>.

A final report that summarises the project is being prepared. It will annex the "final reports" on individual work packages, as noted in the table below, and will supersede the progress reports.

## 2 Project Deliverables

This report is intended to satisfy the contract requirements for the deliverables marked “\*” and outlined by a heavy border in the following table. The basis of the Table is Form INF4 of the Contract, as amended by formal prolongation of the contract.

*Note: shaded Work Packages (WPs) have already been delivered, in whole (dark) or part (light).*

Unique ID No.	WP No.	Description	Status	Expected Delivery	Revised Date of Delivery	Actual Date of Delivery
5052-1	I	Progress Report No 1	Restricted	31-08-98		30-06-98
5052-2	I	Progress Report No 2	Restricted	30-04-99		28-02-99
	I	Progress Report No 3	Restricted			30-09-99
	I	Progress Report No 4	Restricted			30-04-00
	I	Progress Report No 5	Restricted			30-06-00
*5052-3	I	Summary Report on Project	Public		31-07-00	21-08-00
*5052-4	II(i)	Review of User Needs	Public	31-02-99	28-02-00	30-06-00
	II(ii)	Recommendations for design: interactivity on the Internet	Internal	31-01-99		28-02-99
	II(iii)	Recommendations for design: user searches	Internal	31-01-99		28-02-99
	II(iv)	Recommendations for design: language-related issues	Internal	31-01-99		28-02-99
5052-5	II(v)	Draft Report: Product Design and Development Plan	Restricted	30-06-98		30-06-98
5052-6	III(i)	Web module: species of conservation concern	Public	30-11-98	Final delivery 30-06-99	Partial 30-11-98 Full 30-06-99
5052-7	III(ii)	Web module: national parks and reserves	Public	30-11-98	Final delivery 20-12-99	Partial 30-11-98 Full 20-12-99
*5052-8	III(iii)	Web module: implementation of international agreements	Public	30-11-98	Final delivery 28-02-00	Beta test mode 30-12-98 Final version 28-02-00
5052-9	IV(i)	Web module: conservation issues, actions, treaties and feedback loops	Public	30-11-98	Final version 31-12-99	Beta version 31-01-99 Final version 31-12-99
	V(i)	Draft Report on integration of information	Internal	30-11-98		30-09-99
*5052-10	V(i)	Final Report on integration of information	Public	30-11-99	31-07-00 (31-03-00)	31-07-00
	V(ii)	Draft Report on feedback loops	Internal	31-12-98		30-09-99
*5052-11	V(ii)	Final Report on feedback loops	Public	30-11-99	31-07-00 (31-03-00)	31-07-00
	V(iii)	Draft Report on information on habitats	Internal	31-01-99		30-09-99
*5052-12	V(iii)	Final Report on information on habitats	Public	30-11-99	31-07-00 (31-01-00)	31-07-00
*5052-13	IV(ii)	Final Report on integration of biographies	Public	30-09-98	29-02-00 (30-06-99)	29-02-00 Beta test mode
*5052-14	V(iv)	Final Report on interactive generation of indicators and summaries	Public	30-11-99	31-07-00 (31-03-00)	31-07-00
	V(v)	Draft Report on links to other information services	Internal	30-04-99		30-09-99



*5052-15	V(v)	Final Report on links to other information services	Public	30-11-99	31-07-00 (31-03-00)	31-07-00
	VI(l)	Draft Report on multimedia visualization	Internal	29-02-98	Draft 23-04-98	30-06-98
*5052-16	VI(l)	Final Report on multimedia visualization	Public	30-06-99	31-07-00 (31-03-00)	31-07-00
5052-17	VI(ii)	Report on mapping national (country) information	Public	30-06-99	30-11-99	30-11-99
	VI(iii)	Draft Report on virtual reality (VRML) 3-D displays	Internal	29-02-98	Draft 23-04-98	30-06-98
*5052-18	VI(iii)	Final Report on virtual reality (VRML) 3-D displays	Public	30-06-99	31-07-00 (29-02-00) (31-10-99)	31-07-00
5052-19	VII(ii)	Report on upgrading CD-ROM software	Public	31-03-98	Draft 23-04-98	30-06-98
	VIII(l)	Guided tour of product/service using HTML facilities	Public	Renewed periodically		Last revised 15-05-99
*5052-20	VIII(ii)	Report on subsidy and sponsorship options	Public	30-06-99	31-07-00 (31-03-00) (30-12-99)	31-07-00
*5052-21	VIII(iii)	Report on on-line charging options	Public	30-06-99	31-07-00 (31-03-00) (30-10-99)	
	VIII(iv)	Revised draft marketing plan	Internal	30-05-98		25-03-98
	VIII(iv)	Revised draft marketing plan	Restricted	31-12-98		28-02-99
5052-22	VIII(iv)	Marketing and launch plan	Restricted	31-10-99	31-07-00 (31-03-00)	31-07-00

### 3 Progress on scheduled tasks

#### 3.1 Review of user needs

Deliverable 5052-4  
 Original delivery 31-02-99  
 Interim delivery 30-10-99  
 Final delivery date (amended) 30-06-00

##### 3.1.1 Background to the workpackage

This workpackage focused on the needs of users. The goals were to identify user groups and draw them into the process of product development. The methods would seek participation as “user-partners” -- an *interactive process* of continuing communication between providers of the information in the database, passive users of that information, and active users concerned to improve / query / debate that information in an interactive mode.

##### 3.1.2 Pre-assessment of user needs

#### Stakeholders

In the evolving information society, provision of information on any topic is necessarily of great interest to a range of bodies. These include:

- intergovernmental organisations with specific mandates: a number of such bodies, whether international, regional or nationally-oriented, will necessarily develop information strategies, more or less independently of each other but possibly in direct competition with one another;
- international professional and scientific bodies concerned with the conceptual treatment of particular categories of information;
- advocacy and activist bodies of various forms, who may be impatient with certain criteria and procedures;
- commercial bodies seeking to provide or exploit information, whether for profit or as a public relations exercise in support of other profit-making initiatives; these may include high tech companies seeking to add content to their competitive advantage in information technology.

#### Profile of user groups

As part of the Definition Phase work, all the partners in the consortium collaborated in working sessions to discuss and develop a user profile. IEEP (a Definition Phase partner) developed a user profile for the professional sector, particularly those working with environmental policy. NSM produced a marketing strategy structured around product recognition, sales and marketing within the Internet environment. The potential user groups of the envisaged product were thus categorised in various ways.

An obvious and basic distinction fell between professional and non-professional users. In general, professional users will require the information in order to fulfil their corporate tasks (including in some cases for commercial purposes). They will place high demands on the quality of the information acquired. They will place a premium on the time needed to collect the information. They will usually have access to relatively sophisticated technical resources and their information-handling skills will be of a relatively high level. They will be more used to work in English, even if this is not their language of daily use. In principle, they will be willing to pay for useful information. Non-professional users will tend to the opposite in all these respects.

It was also seen as important to take into account that:

- Both partners providing content to this product, WCMC and UIA, are developing their individual websites as “educational” resources rather than “information” resources;
- Datasets for this product are largely in English and currently written in a style which may be termed ‘professional/academic’;

- All the project partners aspire to create a product that responds to users with second- and third-order inquiries, rather than solely the first-order needs of the present, *ie* by developing future user needs and user skills for inquiry.

These considerations, together with the fundamental differences between the needs and capabilities of professional and non-professional user groups, argued for the consortium to design its product for professional users.

However, professional users themselves fall into different groups, each with its own particular needs and capabilities. The design of the product databases would have to take into account such differences. Two important distinctions between different professional users were made.

First was the distinction between those working in the field of biodiversity and those who require information on some aspect of biodiversity relevant to their work in a different field. In general, biodiversity professionals are more familiar with the kind of information made available through this project, the organisation of this kind of information and the various sources of relevant data on biodiversity than those active in other areas. They are also likely to use environmental databases more frequently and may require more detailed and specialised information.

Second were other professionals who would be potentially interested in accessing the databases and who are distinguished according to work/occupation. The major groups identified<sup>1</sup> were:

**Policy-makers:** Policy-makers who are likely to make most use the databases are somewhat low in the organisational hierarchy. They have the task of consolidating policy-relevant information and identifying and elaborating policy options as the basis for the higher-level tasks leading to decision-making. Depending on the particular circumstances, either summarised or detailed information will be required.

**Researchers:** Many researchers require high quality, detailed information, often of a scientific nature. They will in most cases also possess high information-handling skills and relatively sophisticated technical resources.

**Consultants:** Given the nature of their work, consultants will generally require project-specific information. Information-gathering activities will often be strongly influenced by commercial constraints concerning time and financial investment and the usability of the information acquired.

**NGOs:** Environmental NGOs range from small, highly specialised and poorly resourced groups to large international organisations such as WWF. Despite such differences, their staffs are as a rule highly expert and capable.

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<sup>1</sup> This preliminary analysis was borne out by an independent user profile made of WCMC, which became available to the project team towards the end of this project period. (Environmental Resources Management (1998). *Review of the Future of the World Conservation Monitoring Centre*. Commissioned by Department of the Environment, Transport and the Regions, UK). The report also provides valuable insights into market sectors and target audiences, as follows:

**User Profile:** Private Sector; Governments; Official Bodies; NGOs; Environmental Organisations; Secretariats of International Treaties and other Intergovernmental Initiatives; United Nations Agencies; Education – Universities, Colleges and Schools.

**Private Sector Markets:** All national and international organisations with key interests in the environment which virtually includes everyone but priority might be given to the following market sectors: Petrochemical; Automotive; Pharmaceutical; Mining; Construction; Timber/Loggers; Manufacturing; Tourism; Utilities – water, gas, electricity; High Technology; Financial Institutions; Environmental and Management Consultants; Retailers such as Ikea, Tesco and B&Q.

**Private Sector Target Audience:** Decision makers and influencers such as Chairman/CEO/Directors/Senior Managers; Health, Environment & Safety Officers; Planners, Scientists/Biologists; Engineers; Environmental Specialists; Marketing Departments – Marketing, PR, Community Affairs, Sponsorship.

**Media:** Both the audio-visual and the written media can be expected to access the databases. Of all the potential user groups, the media are the most skilled at information gathering, but will generally require easy-to-understand, readily digestible data together with named sources where additional inquiries can be made. It can be expected that specialised scientific media will make regular use of the database and will require information that is detailed.

**Educators:** Like the media, educators require easy-to-understand, readily digestible data. However, language may be more of an issue with educators in their ability to understand the information provided. It should also be noted that both the media and educators are vehicles for the redistribution of the information in the databases.

### **Nature and Scope of Product in relation to User Needs**

It was clear during the Definition Phase that the scope of the envisaged product was a source of particular challenge. On the one hand, within the "professional conservation community" there is clearly a need for data that meets scientific standards of evidence. This is the strength of WCMC-type data, as described on the following and related pages: <http://www.unep-wcmc.org/reception/whoare.htm>. At the same time, and in the absence of high quality data, there is a need for indicative information that can trigger warning signals and further inquiry, as appropriate. This is the strength of UIA-type data, as elaborated in the following background texts on uses of the Encyclopedia <http://www.uia.org/encyclop/16intent.htm>; <http://www.uia.org/encyclop/17usage.htm>). Integrating these two types of data is an essential value of the project. The challenge is to do so without confusing the user.

Additionally, both UIA and WCMC consider their stand-alone services to be educational sites first and foremost. Naturally, both cater for users who see them as providing "answers" to "questions". But more importantly, the integrated service was intended to place the user in a learning mode that ensures that the question can be explored in a context which may lead to its being totally reframed. In fact the project's prime purpose is enabling users, notably policy-makers, to refine the questions to which they seek answers.

Concerning multiple aims, criticism was also received that simultaneously directing the product to many potential end-users (government, NGOs, and private sector) subtracts from its value. It was argued that, for any product, the more it aims to please everybody, the less value it has to any individual user<sup>2</sup>. In this case, each user group would require differing content on biodiversity issues. The response to this challenge was to ensure varied entry points and surface layers to access the information. This has called for site and interface design and knowledge structuring to allow for differing tolerances of complexity. The aim was to allow users, to the extent possible, to quickly identify themselves in terms of their data needs, search style etc. Such preferences could be recorded in their user profile to enable more satisfactory future searches. We believe that the period of development with volunteer users should help clarify such aspects.

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<sup>2</sup> It is of course correct that governance and policy-making aimed at pleasing a particular sector is no great challenge. Information systems in support of such policies would of course be of great value to the sector or constituency so favoured. This is one classical option for policy-makers -- whether in governance or the corporate world. Such projects would indeed be viable in response to the needs of that constituency. Unfortunately governance is increasingly challenged precisely by its democratic mandate to "please everybody". Increasingly it is "everybody" that is also a prime source of information which a single sector finds it too costly to extract or purchase in a timely manner by conventional means. A degree of cross-sectoral, multi-level cooperation is therefore required involving the active cooperation of a wide range of stakeholders for this service to be of use to anybody.

### **Developing Country Users**

The team also did some research on user needs in developing country needs, using India as an example<sup>3</sup>. Though endemic restrictions will limit most from having direct access to full Internet, many have, or will soon have, the benefits of a lower-bandwidth facilitated interface with the Internet and/or email interrogation of the Internet<sup>4</sup>.

It was clear that the need for this type of information service in India is undeniable. Most Indian independent sector organisations are starved of information that could support their sustainable development. They have little access to development innovations and project results in their own country, much less from outside it. There is a lack of timely, reliable and user friendly information on environment and development issues in India. What is available is not automated and thereby not accessible in the time required. Indian organisations are often dumped with foreign information because it is easily available. The information is either not inherently useful or not converted into a format in whereby it can be used effectively by most organisations in India. Substantive query response and customised information services on environment and development themes are very few in India. Here again, they operate through conventional means of communication with virtually no use of electronic communication systems<sup>5</sup>.

### **Inferences from Website Usage**

One of the project partners, WCMC, had been using the Internet to disseminate information for several years before the project started. In 1997, WCMC had extensively reviewed the usage made of its website, and as part of this review looked carefully at frequency of access to each of the different pages. As a result of this review the way that the WCMC website was arranged was changed considerably.

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<sup>3</sup> This work was done with the assistance of an Indian based NGO partner, Development Alternatives, which is working to increase access and exposure to networked communication services in India and build capacity for its use by NGO groups.

<sup>4</sup> India holds a unique position amongst developing countries with respect to information technology. It is highly competent, with an unusually large domestic production and consumption of computing products and services. Nonetheless, it has many of the features characteristic of developing countries, notably cultural and language diversity, general poverty, undeveloped telecommunications infrastructure, etc. An entry level PC is now not much more than \$200. This brings the potential for electronic communications within the economic access of millions and no more financially demanding than a television. Even though "reception" (bandwidth) may be less than ideal and language issues will initially limit access, people will still aspire to enjoying the benefits of a computer. (It is now easy to forget that most "western" offices did not have Internet access or CD-ROM drives five, even three, years ago.)

<sup>5</sup> India has between 30,000 and 100,000 independent-sector organisations (ISO or NGO-type organisations). Electronic connectivity is the lowest among ISOs when compared to other constituencies of society. Even those with connections are unable to use it to its potential. Currently 100 to 500 such organizations can use full Internet services (including multimedia), the minority using it frequently and fully; the remainder incompletely or infrequently. A further 1,000 use text-only Internet or email. Greater than 95% of NGO organisations still use postal services, hand delivery and word of mouth as their primary means of means of information recovery. Full Internet service delivery for most ISOs is infeasible for at least ten years. Limiting factors are national infrastructure policy and costs (notably government as monopoly service provider), incomplete geographic access, bandwidth, and user charges.

However, telephone services are already adequate for considerable expansion of email and fax services and, for those already using such basic automatic services, for a progressive increase in frequency of use and their facilitated interface with more automated systems such as the Internet. There are probably about 5,000 ISOs with computer and telephone connections, but not electronically connected due to non-availability of modems and other support services customised to meet their requirements. There are about 30,000 to 100,000 ISOs who are non-automated, who also require more systematic information support for their environment and development activities. Of these at least 5,000 have adequate working knowledge of English.

The principal lessons learnt from usage and the actions taken were as follows:

- **Usage of information is far higher than of pages describing programmes and activities.** As a result, the second iteration of the WCMC website contained far more information, and access to information was made much easier.
- **Different user groups were trying to access particular parts of the WCMC website.** As a result, a series of themes were identified and focal pages established so that users could “bookmark” these pages and thence move more quickly to the information they required.
- **Users wanted to make feedback on specific issues.** As a result, certain parts of the WCMC website were provided with theme-specific feedback opportunities, in addition to the general feedback pages.

### 3.1.3 Design and ergonomic considerations

The following guidelines were used in structuring the user interface<sup>6</sup>.

#### Navigation

- Are there a variety of information preferences: text, image, map, table, language, experimental?
- Are there a variety of entry points; *eg* multiple "home" pages?
- Is the navigation bar content consistent different points in the site?
- Is site mapping facilities available?
- Is the dialogue that is aimed at the user clear and unambiguous?
- Is the interface language understandable to the user?
- Is the type of user tasks the site offers clearly outlined on the site's index page?
- Are the steps for each user task available throughout the task the user is completing?
- If the user enters the site on a non-index page, is a clear marker provided to the site tasks?
- Is there a clear entry to the sequence of events the user needs to perform to complete a task?
- Is there a clear exit route for users during their execution of the sequence of events?
- Are their shortcuts? Are these shortcuts marked?

#### Errors and feedback

- Are user errors possible?
- If user errors are possible, are informative error messages provided?
- Is feedback provided for users who are making errors in the task?
- Are users allowed to retrace their route if they have made an error?
- Are users offered a clear exit if they make an error?
- Are users offered a chance to start over if they make an error?
- Have ways been evaluated to prevent user errors?

#### Comprehensibility

- Challenge of understanding the whole without confusing the specific information required
- Is each task visually and functionally discrete?
- What function does each task "module" perform?
- Is there a visual cue indicating to the reader when they have left or completed one task module and entered another?
- Is there a way to limit the number of options to a user in order to prevent cognitive overload or distraction from task completion?
- Are the functions available on the website functions people really do use, or functions the site builders could build?
- Are the available user functions readily apparent in the interface?

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<sup>6</sup> Lisa Schmeiser, 1998. *The Complete Website Upgrade and Maintenance Guide*. SYBEX, San Francisco.

- Does the user always have a sense of being in control of their site interaction experience? Do they feel as though they are completing the tasks of their own volition?

### **Help facilities**

- Is a direct route to help available on every page of the website?
- Does the supporting documentation address specific user problems?
- Does the supporting documentation group possible problems by task?
- Does the supporting documentation describe the factors that led to a task failure for user recognition?
- Does the supporting documentation provide step-by-step tasks to address any user difficulties?
- Does the supporting documentation provide the user with a means of querying the site?
- Are resources set aside to provide users with direct responses?
- Is there specific topical help available while the user is executing a complex task?
- Does the supporting documentation provide a period for users to anticipate feedback?
- Is there an instructional angle to the supporting documentation?
- Is the supporting documentation linear, or can users answer specific queries on demand?

### **Design, layout and aesthetics**

- Neutral vs Original?
- Hand crafted vs Automated?
- Complex vs Simple?
- Is there consistency of design? General vs Specific exceptions; use of templates etc.
- Has the design been optimised? In relation to over-design or under-design.
- Is ample white space provided?
- Does the color scheme accommodate color-blind people and other preferences?
- Does the HTML degrade for stripped-down, non-visual browsers?
- Is all positioning and formatting separated from the text elements they affect?
- Are keyboard shortcuts provided for links and image maps?
- Are alternatives provided to drop-box style forms for mobility-impaired users?
- Are alternatives provided to layouts that are strictly dependent on tables?
- Does the navigation scheme allow for clear and functional use by audio browsers?
- Is an equally functional site provided for users with non-applet supporting browsers?

### **Expertise and accessibility**

- Are transcripts and descriptions of any audio and video files provided on the site?
- If standard accessibility measures compromise the functional integrity and presentation of the site, is a link to an alternate, access-abled analogue provided?
- What level of experience will a user have to have before using the new product?
- What level of technical expertise will the user have to have before using the new product?
- Are the technical requirements for optimal product use made clear to the user at the beginning of the product?
- Does the website provide users with advice/means to upgrade to optimal product performance?
- Is there a clear exit route for users who elect not to use the product?
- Does the interface contain a visual point of reference that calls on a user's prior knowledge and experience?
- Is the user offered a means of returning to a familiar product from the cutting-edge one?

### **Maintenance and development**

- Can the site and the technologies used be understood by more than one person, especially if there are overlapping responsibilities for updating portions of the site? Complex and sophisticated techniques may pose maintenance problems. This may affect any decision to have portions of the site developed externally, when it subsequently has to be maintained internally.

- Is careful consideration being given to prioritising new development in relation to maintenance? Where development can be undertaken such as to avoid impact on the global design and large numbers of pages, this is to be preferred, provided it is not creating precedents and design obligations for other pages which may have different constraints.
- Is attention being given to the challenges of a multi-faceted site? Proposed changes are seldom of isolated significance; problem of partial application of design changes
- Is careful consideration being given to the costs of development and any subsequent maintenance in the light of the site as a whole?
- Is consideration being given to the respective strengths and limitations of editing tools?
- Are experiments in development contained appropriately, offering (or phasing in) access?

#### **Legacy issues**

- Is there a redirection policy after page displacement?
- Are old pages phased out?
- Are changes sensitive to inertia in search engine indexing?
- Are changes sensitive to user bookmarking?
- Are changes sensitive to site caching by third parties?

#### **Website testing issues**

- What is the speed of connectivity for average users? Page-loading speed can be a major discouraging factor if the user has a low-level line. This should influence the way images, movies, templates, and table nesting is used.
- Is browser friendliness maintained across generations and variants? Issues relating to *Java*-capacity, Cookie-capacity, DHTML, Frames, browser-friendly colours. It is important for UIA to recognise that some users do not have the latest browsers (even if they are free), and do not choose to download them. This includes users in developing countries and users behind institutional firewalls.
- What is the testing policy?
- How and when are link checks to be performed?
- How is access to be tested?

#### **Technical constraints**

- Is there a server-side way of serving a different site to people who do not meet the technical parameters for the new site?
- Is time built into the development cycle for recursive scheduling?
- Have persistent interface elements that will not change over iterations and updates been built into the product?
- Is a separate troubleshooting area provided for advanced or cutting-edge technologies?

#### **Security and abuse issues**

- Backup server facilities and failover
- Vulnerability to hacking?
- Vulnerability to plagiarism?
- Vulnerability to being framed within another portal?
- Transparency: dis-enabling directory listing and statistics?

#### **Revenue generation issues**

- How is banner advertising used: necessity, appropriateness, alienating potential, and revenue?
- Is “click through” by users facilitated: to Amazon, etc?
- What facilities are available for E-commerce transactions (purchases, donations towards editorial support etc)?

#### **Website promotion issues**

- What are design implications for direct promotion campaigns?



- What are design implications for indirect promotion campaigns, notably via search engines, exploiting the advantage of the wide range of keywords?
- How are multiple entry points used to enhance user access? *eg* various "home pages" according to user needs

#### **Website decision-making issues**

- How are design choices made?
- Who has responsibility for development and maintenance?

#### **3.1.4 Interactive assessment of user needs**

An essential part of the workpackage was the work directly with users. User needs for the online product were assessed interactively in several ways.

#### **Serendipitous user feedback**

Components of the project were delivered online in beta mode or final form from around the sixth month of commencement of the project. This has enabled the project team to receive several months of feedback from web users. Feedback facilities are provided on the websites of both UIA and WCMC and user feedback has been received mostly in the form of emails. More recently feedback has been coming via online comment facilities, made possible because the feedback system is built into user interaction with the system.

#### **Feedback from conference gatherings**

The project team attended some 20 conferences or meetings during the project period. The conferences were related either to (1) biodiversity conservation or (2) knowledge management. At some meetings, the project team had a display area; at some meetings, aspects of the project was presented to specialist workshops or in plenary sessions; at other meetings, information about the project was broadly disseminated and the project objectives discussed with participants whenever the opportunity presented. The insights gained from these interactions and discussions were a valuable source of user input and variously incorporated into the project design.

#### **Focused user feedback**

These activities were designed to provide specific feedback on the design and content of specific databases and information services and their delivery. They stressed active interaction with the data systems as user-partners rather than a passive user role.

**Feedback from conservation professionals:** The project partner AIDEnvironment is an environmental consultancy, with particular competence in European environmental policy and management. A delegated group of five of its staff was briefed on the databases in a demonstration early in 1999 and again later in that year. They then proceeded to rigorously interrogate the databases over several months and endeavoured to use them as research tools for their current project work (including:

- Netherlands Future Environmental Problems Study (2020)
- International Instruments and Conventions Study for Council of Europe
- Inventory of Econet Models
- Asian Palm Oil Industry Study
- Partners for Wetlands Programme and
- Biodiversity Awareness Raising Studies.

Some tested the interactive comment facility by inserting specialist material in areas that were deficient or would benefit from additional perspectives (in the process information on a total of 45 additional Strategies was included in that database). Recommendations were made for improvements in various respects:

- the main structure of the database;
- key international environmental problems which could be addressed by the database;
- specific information on selected themes, such as environmental education and wetlands; and

- the appropriateness of the indexing of existing Strategies related to biodiversity conservation (see Annex 1 Annex 1: The contribution of Aidenvironment to the Implementation Phase of INFO2000:)

**Feedback on specific databases and services:** WCMC works on a collaborative basis with a number of expert networks, and with the secretariats of a number of international agreements on biodiversity. On a number of occasions the assistance of these groups was sought in reviewing databases and information services on the Internet, and in providing feedback. WCMC has also been investigating the use of interactive update and comment facilities on its more recent web-based services, and is beginning to see not only valuable feedback, but also new information coming in via this route.

**Student feedback:** The project partner Norwegian School of Management and Marketing (NSM) is a business school and university. Prof. Ken Friedman assigned his first-year students of management the task of visiting the databases and testing out the features. The text of the student assignment is provided in Annex 2. Twenty-six students responded. The principal value of this exercise was that a significant number of remote users, of varying competencies, tested design aspects of the system using a variety of different computer systems. The feedback assisted in identifying unsuspected technical faults and inconsistencies in displays and feature accessibility arising in different operating systems and browsers.

**Feedback from collegial cooperation partners:** “User friends” also worked with the team on an *ad hoc* basis. These were professional colleagues, family members and friends interested in the project. They included people in the following categories: “environmental professional”, “educated unemployed”, “volunteer”, “information consultant”, “business consultant” and trainer. Such partners were especially helpful in being “guinea pigs” for newly designed interfaces, instructions, explanations and so on.

#### **Feedback from other sources**

The project team took the opportunity to talk about their work in the course of doing other projects and at other suitable opportunities.

An example of resulting feedback was from an international NGO development office based in Amman, Jordan. This office runs a country programme dealing with agriculture, rural development, environment, education and training, women's issues, food security and poverty. The prototype UIA databases were made accessible on the internal network system and senior management staff was given a demonstration of its application for local project planning. The INGO management staff was sufficiently impressed with the contextual planning applications of the system to convene a number of spontaneous staff training workshops where local and foreign staff were given demonstrations of the system<sup>7</sup>.

This simple informal field test highlighted of the main challenges for practical use of information which the project aims to address; how development work most often operates in single, separated, project-specific and issue-specific actions, often overlooking opportunities to include environmental components in otherwise non-environmentally focussed activities. Enhancement of in-country development comes in some measure from access to more meaningful presentations of information offering a context for strategic choice. The focus of this project is on the provision of context for development-related information (rather than data) that may be available from a variety of sources. Context is the key to strategic responses to questions that can then be more appropriately formulated.

<sup>7</sup> Local management staff were most impressed by the problem analysis of the system; notably (1) how sustainable development could be presented to local staff in integrated planning approaches where single issue project development - *ie* women's development - could be expanded to consider environmental aspects; also (2) how issues not previously considered relevant to local problems and project development (eg water or trees) could be highlighted within a more holistic approach. The opinion was that the databases offered a unique planning tool, enabling trained local project staff to substantially broaden their project appraisal and project planning perspectives, identifying ancillary problems relevant to main theme project objectives and additional opportunities to cross link initiatives and programmes in more community orientated and environmentally relevant packages.

The project uses extensive hyperlinking (horizontal and vertical relationships, vicious loops, fixed destination and open-ended search queries) as a basis for creating patterns of meaning.

Another example concerns internationally recognised and designated protected areas. At the start of the project it was recognised that there was a confusing array of international agreements and programmes that designate or otherwise recognise protected areas internationally. WCMC began to put together a series of webpages that explained these in a standard way. As a result WCMC also decided to approach the preparation of the next UN List of Protected Areas in a different manner, focusing on international protection. This new approach has received substantial endorsement from UN agencies and other international agencies involved in biodiversity conservation.

### **Feedback recommendations**

Feedback was received in the following major areas:

**Standard of content:** Feedback on databases content related almost entirely to quantity or deficiencies, rather than quality. Where it was possible to remedy, this was done. Other content issues have been noted for future work.

It is pertinent here to note that the information managed by WCMC and its collaborators is largely compiled using expert networks or from official sources and in many cases is managed using methods advised by those experts. Information managed by UIA on World Problems and Strategies managed is largely derived in response to regular mailings to the international organisations it profiles. Both partner organisations are increasing the use of Web sources and “data mining” techniques to supplement other sources. Generally, the quality of the data is considered of a very high standard, both by internal and external opinion.

**Features:** Specific feedback was received from AIDEnvironment on the features considered to offer the greatest added value to the site: These are:

- the provision of summary information on biodiversity conservation;
- the provision of a portal to a large number of specialised sites;
- the provision of continuously updated information and sources.

At the same time, it was noted that the website must match the attractiveness and accessibility of comparable sites in an environment that is developing at a remarkable rate.

With regard to specific priorities for the further development of the database, AIDEnvironment recommended that the following points be taken into consideration.

- The interactive capability of the database as a means to respond to user needs – which may be unique to this product -- has considerable potential, providing that users can be encouraged to make full use of this facility. This requires primarily a number of technical improvements that would make it simpler and quicker for a user to provide input.
- The number of hyperlinks to specialised sites related to biodiversity conservation should be increased. This may go hand-in-hand with the expansion of the number of profiles in the database. Conversely, it is equally important for hyperlinks to the product databases to be included in other relevant sites.
- The indexing feature should be further refined to ensure that more keywords are recognised. For example, many users will search for information on specific Problems or Strategies, which should be immediately accessible.
- The mapping function is an interesting feature and may well have considerable potential for certain kinds of searches. We would certainly like to see this facility further developed.
- Although considerable progress has been made in improving the user-friendliness of the database, we believe that a greater number of users would be encouraged to access the

database if further improvements were made, mainly with the aim of ensuring that new users immediately understand the structure of the database, the kind of information available and how to access the required information. Practice in this area has developed considerably since the start of the project and many newer websites are more "state-of-the-art" in this respect.

Much improvement was made along these lines during the latter half of the project period. However, since the points are goals, the project team realises that much remains that could be done in the future.

### **3.1.5 Development of access policy**

In the case of the UIA, it is expected that "access" to the dynamic pages will continue to evolve with respect to the following:

- **Procedures:** A more stable logon procedure was implemented in July 1999. Further changes have continued to be made since then, notably in the light of user feedback. It is expected that these changes will be transparent to the user and to any bookmarking of profile pages in any database.
- **Facilities:** The range of facilities associated with any database continues to evolve. Users may expect to get more facilities, notably with respect to the visualization software. Some of the more advanced search facilities are already limited to Registered Users.
- **Comment facility:** This feedback facility is currently open to Registered Users and is expected to lead to an increasingly valuable supplement to profile data.
- **Databases:** Users, whether as Guests or Registered Users will continue to have full and free access to the databases on World Problems, Strategies, Human Values and Human Development. Access to some other databases may be made available freely in the same manner. Access to databases on international organisation profiles and international meeting profiles will be subject to restrictions, which are under continual review. With respect to the international organisation database, both Guests and Registered Users do however have minimal access in order to obtain the URL of the organisation, if available.

Users are invited to specify their needs for wider access than that automatically accorded through registration.

Registered Users do not normally acquire access to a greater range of databases. They do however acquire the ability to make on-line comments on specific profiles within databases. These are then accessible to other users.

Requests for access to other databases will be noted and users will be contacted when it becomes possible to respond creatively to their specific need.

It is expected that access to some databases will only be possible in the future against some form of payment. This possibility is being studied.

## 3.2 Web module: implementation of international agreements

Deliverable 5052-8  
 Original delivery 30-11-98  
 Delivered in Beta test mode 30-12-98  
 Final delivery (amended) 28-02-2000

### 3.2.1 Background to the workpackage

Three partners in the project have expertise and documentation on international treaties and accompanying measures concerning biodiversity. UIA has 2133 international agreements as database profiles in its Organisations file. This is a comprehensive global list of all treaties involving three or more countries but excluding European agreements at the level of directives, programmes and action plans. AIDEnvironment is expert in the field of European-level instruments and larger international instruments to which the EU is party. WCMC manages data relating to several international agreements on biodiversity, notably concerned with threatened species and protected areas.

This workpackage would develop interfaces for each of the major international agreements and programmes, allowing for more integrated linkage of information on strategies and biodiversity status. This would be done in collaboration with convention secretariats, which would provide opportunities for co-financing and for synergistic support. WCMC would also work closely with a number of agreement and programme secretariats on issues relating to information management and reporting, and especially on harmonisation of the work of the different agreements and programmes so as to increase synergy and reduce duplication of effort.

Documentation of international treaties and membership held in UIA databases, and that available on the WCMC website, has been integrated into the project website. This work has proceeded along several fronts.

### 3.2.2 Identification of international strategies and agreements

WCMC used its experience of global and regional conservation issues to identify strategies and agreements that are essential instruments in biodiversity conservation, and would therefore be key to the current project. The project team drew up diagrams illustrating the major conventions and programmes that should be covered by the project, and the information links between these conventions and programmes and other components of the project:

- **International strategies:** Global Biodiversity Strategy; Caring for the Earth; Caracas Action Plan; World Conservation Strategy.
- **Regional strategies:** Pan-European Biological and Landscape Diversity Strategy; Parks for Life: Action Plan for Protected Areas in Europe.
- **International Agreements:** CITES; World Heritage Convention; Ramsar (Wetlands) Convention; Convention on Biological Diversity; Convention on Migratory Species.
- **Regional Agreements:** EC Birds Directive; EC Habitats Directive; Bern Convention.

WCMC worked with UIA to locate electronic copies of the texts of these strategies and agreements, and to identify other documents and information sources that clarify the intent and implementation of these agreements.

AIDEnvironment provided a summary of the international conventions, treaties, agreements and non-legal instruments in place for environmental conservation<sup>8</sup>.

<sup>8</sup> The fact that a substantial proportion of the agreements is European is not simply a consequence of the location of this project. There are far more international European agreements related to biodiversity conservation than for other parts of the world, mainly because of the pressing need for international cooperation on a continent made up of over 50 countries.

### 3.2.3 Integration of treaty material

UIA then integrated this material into the *Ecolynx* site. UIA incorporated this text and other appropriate information into the Strategies database and enabled these texts for keyword searching. It ensured that all the relevant documents were accessible and built the necessary links between documents. This provided a significant part of the framework for the *Ecolynx* website index option for international legal instruments on biodiversity.

### 3.2.4 Development of related services by WCMC

While the following activity is relevant to a greater or lesser extent to the work of this project, it is not necessarily an integral part of the project.

#### **CITES and the EC Wildlife Trade Regulation:**

A website has been developed for the European Commission on the EC Wildlife Trade Regulation. There is significant information on the regulation itself, and its implementation, and then a database to support this. The overall objective of the site is to support within the European Union the implementation of CITES and the EC Regulation, through the provision to national authorities of a comprehensive and up-to-date reference database covering all relevant species and EU decisions affecting their trade. The information presented is produced from databases maintained by UNEP-WCMC on behalf of CITES and the EC. Information is provided interactively on taxonomy, common name, synonyms, IUCN threat category, trade decisions, listing on CITES and EC regulation No. 338/97.

<http://www.unep-wcmc.org/species/trade/eu/index.html>

WCMC also manages the CITES website on behalf of the CITES Secretariat, and this also includes a wide range of data. The *Checklist of CITES Species* and the *Annotated CITES Appendices* are produced from databases maintained by WCMC, this information is available on the WCMC website in and interactive format. This information resource is a result of collaboration between the CITES Secretariat, the Joint Nature Conservation Committee (UK), the European Commission and WCMC. There are separate databases for animals and plants.

<http://www.wcmc.org.uk/CITES/common/dbase/fauna/index.shtml>

<http://www.wcmc.org.uk/CITES/common/dbase/flora/index.shtml>

WCMC will be working with the CITES Secretariat during 2000 on the further implementation of their information strategy, which include harmonisation issues, and development of further information services for contracting parties.

#### **Convention on Biological Diversity:**

During the Implementation Phase, WCMC completed work with the Secretariat of the Convention on Biological Diversity, which will lead to simplified and more complete reporting of national implementation of this Convention, and the ability to provide more comparative analysis of implementation of the Convention on the Internet in the future. This work was not done using resources from INFO 2000, but contributes directly to the aims of the project. More details can be found at: <http://www.wcmc.org.uk/cbd/assessment/>.

WCMC is also working with a number of contracting parties to assist them in compiling information at the national level to review implementation. The aim is to collect information in a manner that will both support national requirements and provide input to the reporting process. More details can be found on the website mentioned above.

#### **Convention on Migratory Species**

During the Implementation Phase WCMC was contracted by the CMS Secretariat to prepare an information management plan for the convention and its agreements. This included a range of recommendations on information services and the harmonisation of approaches to the management of information and reporting, including the sharing of information between agreement secretariats. Further work will be carried out on this during the coming year.

WCMC also manages the website for the convention secretariat, and for the Africa Eurasia Waterbirds Agreement.

### **International agreements and programmes on protected areas**

A significant number of international agreements and programmes designate or recognise specific protected areas or other sites. During the course of this project, WCMC developed a prototype information service on those international agreements and programmes and the sites that they designate or recognise site, with information and links organised in standard format. The purpose here is to provide access to information in a straightforward manner, wherever that information may actually lie. To support this WCMC is to developing further the data that the World Database on Protected Areas holds, and has reviewed the data held in both this and the WCMC Biodiversity Map Library.

### **Harmonisation of information management and reporting**

During the Implementation Phase, WCMC worked with international agreement secretariats on various information management projects including efforts to harmonise information management and reporting across the five global biodiversity-related treaties. This led to the development of common approaches to web sites, development of a metadatabase of reports and publications, ideas for development of common approaches to national reporting, and development of mechanisms for exchange of experience.

WCMC has also done significant work on the reporting requirements for international agreements, and there is potential for linking information on these requirements to the strategies and agreements within the UIA databases (see below), to the reports themselves on the different agreement websites, and to information in the WCMC databases (see web pages following):

<http://www.biodiv.org/sbstta3/sbstta3-i16.html>

<http://www.ecnc.nl/doc/projects/desisite.html>

<http://www.wcmc.org.uk/convent/treaties.htm>

[http://www.grida.no/prog/cee/enrin/htmls/ukraina/kiev\\_rep.htm](http://www.grida.no/prog/cee/enrin/htmls/ukraina/kiev_rep.htm)

WCMC is working with UNEP to organise a workshop later this to identify options for modular and streamlined national reporting, and is working with the UK Joint Nature Conservation Committee on a project to identify reporting obligations of biodiversity-related agreements and questionnaires.

## **3.3 Final Report on integration of information**

Deliverable 5052-10

Original delivery 30-11-99

Draft delivery 28-02-99

Final delivery 31-13-00

### **3.3.1 Background to the workpackage**

UIA and WCMC are the data providers for this project. The data is either held on site or integrated and delivered by various means from other sources. Both organisations have extensive digitised holdings and websites on which increasing amounts of this material are being made available (respectively <http://www.uia.org/> and <http://www.unep-wcmc.org/>). The datasets held by the organisations have been generated, and are maintained on a more or less continual basis, by the respective partners.

One notable feature of the project was the essential difference between the nature and scope of the database activities of the principal partners. Improving the interlinkages between these datasets would increase their value in policy analysis, issue identification and public comprehension. This highlights a major value of the project but also was the source of a continuing challenge in achieving any viable integration to honour this complementarity.

Leading into the Definition Phase, a major concern therefore was to explore the feasibility of linkage between UIA data, WCMC data and relevant external websites. At the same time, given the large quantities of data involved, another concern was to develop estimates of additional work required to integrate, by hyperlinking, the text information held by UIA and WCMC.

During the Definition Phase, and for purposes of demonstrating and testing the integration between UIA and WCMC data, effort was devoted to further articulating the UIA content with respect to environmental issues. This provided a pattern of links (including query links) into WCMC data and relevant external websites. It also developed estimates of additional work required to develop more effective linkages between the databases managed by the two organisations, so as to be able to deliver integrated policy-relevant information products and services.

After this early work, the original idea of physically “integrating” the WCMC and UIA data was quickly replaced by “integration” using the web. This approach avoided the complications of harmonising source data and is also highly consistent with the current evolution of web organisation.

During the Implementation Phase, WCMC and UIA periodically reviewed the possibilities of integration between their two sets of databases as their respective information systems evolved during the period of the project. The following work was done.

### **3.3.2 Integration within websites (WCMC or UIA)**

During the project, both UIA and WCMC have engaged actively in increasing the degree of integration between the various databases and information services within their own websites.

#### **UIA**

##### *Within databases*

In the case of the many profiles in the UIA databases, great importance was attached to grouping them into multi-level hierarchies, refining these hierarchies progressively – if necessary by splitting or combining profiles. This process was vital to enable the functional links to be usefully positioned. The loop analysis procedure was very helpful in focusing editorial attention on profiles that called for extra work. Information on new Problems or Strategies, for example, was very helpful in testing the robustness of such hierarchies and consolidating profiles (eliminating duplicates, detecting gaps and inconsistencies). Formation of appropriate hierarchies was a key technique to enable the UIA to hold information on millions of species for which individual profiles could not necessarily be provided at the species level.

These links identify the reported causal relationships between Problems or between Strategies. They are the basis for any loop analysis. They are also vital to any understanding of the inter-sectoral (or interdisciplinary) relationships between Problems or Strategies, notably the manner in which Problems are aggravated by other Problems.

##### *Between databases*

The UIA was able to convert its integrated in-house DOS-level database structure into an equivalent *Windows*-based form based on a web in order to generate pages dynamically in response to user queries. This process involved the intermediary step of moving data provisionally held on a static page server (for demo purposes, during the Definition Phase) onto a dynamic page server, whilst building up pages on the static server (indexed by search engines) to facilitate access into generated pages from the dynamic server. This integration between the two distinct servers works very satisfactorily

The UIA was able to develop a common search interface for its Problems, Strategies, Values, References, and Organizations database.

The UIA explored several alternatives to the conventional text entry points and was able to ensure that these could be used in conjunction with the text entry points.

#### **WCMC**

In the case of WCMC, three approaches have been tested further.

- The first is using a map-based interface to access all information relevant to a particular region, which has been tested for data on the Mediterranean region and will be expanded to other marine regions shortly.



- The second is a new test interface for accessing all databases on the WCMC website which have information relating to a particular country from a single point.
- The third is the integration of information on species, so that data of the status and distribution of species is linked to information on the inclusion of the species within international legislation.

Another issue tackled by WCMC was the redevelopment of the library catalogue, which allowed improved linkage of bibliographic information to different parts of the WCMC website.

#### **Integration between partner databases (between WCMC and UIA)**

**Ecolynx entry page:** The project website domain was registered in January 2000. The URL is <http://www.ecolynx.org/>.

The website is a principal vehicle through which data integration is achieved. To date, the website is structured as a portal into the UIA and WCMC sites and other websites. There is a frame index with selected subject groups, which should represent the first concerns of most users. Later efforts may improve upon aesthetics and design, in response to user feedback.

**Generated query links:** A prime focus for work was on the development of query links from relevant profiles in UIA database profiles into WCMC database profiles. Users of UIA databases can now be passed from a large number of UIA profiles directly into the relevant part of the WCMC databases. These links are generated automatically. To achieve this, UIA had to build up sets of entries on species (plants (including fungi), animals and other living organisms) with relevant names to seed such searches appropriately.

**Bibliographic links:** Automatically generated bibliographic searches were enabled from relevant UIA profiles into the new WCMC bibliographical database.

**Hardlinks:** Where appropriate, hardlinks were inserted into UIA data entries, notably in the Strategies database, to provide access to sets of pages on the WCMC site. These now number over 100.

#### **3.3.3 Integrating users**

As described with regard to the user feedback facilities, steps were taken to offer users the opportunity of actively participating in the evolution of the UIA database entries (rather than just reading them as passive users).

#### **3.3.4 Integration from partner databases to other websites**

Here the concern was to enable linkages into other relevant information services, especially to biodiversity sites). Again a combination of generated query links to search engines and hardlinks to relevant sites was used.

#### **Hard links**

During the course of the project, 3,989 links were inserted from Problems and Strategies profiles of the UIA databases to websites of other organisations, in addition to made from these databases into the Organisations database (with its own hard links to their websites). None were present before the project commenced.

WCMC has concentrated on development of links in four specific areas, both to test working practice, and to develop the potential for future work. These are as follows:

**Protected Areas Virtual Library.** There is significant information on the world's protected areas to be found on the Internet, ranging from a number of excellent sites managed by national authorities, to the information services provided by international conventions and programmes. However, locating valuable information is not always easy unless users know what they are looking for, and are familiar with the use of Internet search engines, much time can be wasted in trying to locate the information required; and content and quality of Internet sites can vary widely. The moderated *Protected Areas Virtual Library* provides a series of links to relevant websites in a structured manner from a single

interface, thus facilitating access and ensures that these websites contain appropriate information, and are managed by competent authorities.

**Country Knowledge Server.** This service is a preliminary attempt at identifying links to websites that provide biodiversity information organised by country. This includes those sites delivering national reports for international agreements, the country profiles produced by bilateral and multilateral aid agencies, and so on. This is a preliminary effort at promoting avoidance of duplication of effort at national and international levels.

**International protected areas.** A significant number of international agreements and programmes designate or recognise specific protected areas or other sites. This is a prototype information service on those international agreements and programmes, and the sites that they designate or recognise site, with information and links organised in standard format. The purpose here is to provide access to information in a straightforward manner, wherever that information may actually lie.

**Africa-Eurasia Waterbirds Agreement website.** WCMC is developing this website in collaboration with the secretariat of the agreement (based in the Netherlands) and Wetlands International. The website is on the WCMC server, but the maps are being prepared by Wetlands International and placed on their server.

#### **Generated query links (web generally /web for books / web for images)**

In the case of UIA profiles, query links are generated on the basis of each of the alternative titles for Problems or Strategies. This enables the user to employ a search engine to query the web for further sources of information based on the title as a phrase. The search engine currently used is Google (rated number 1) which also provides a modest income stream to the UIA for maintenance of the [Ecolynx](#) website.

The UIA continues to experiment with generated links into the amazon.com book search facility. It is also intended as a modest source of revenue. A particular difficulty encountered in testing this facility has been to determine what keywords to use in the search string in the case of Problems or Strategies with more complex titles, or many alternative titles. Further testing of this was beyond the current means of the project. (WCMC did have, and intends to reinstate, direct search links from bibliographic records to amazon.com, and intends similar links to distributors of partners' publications. This was not possible for a time because of VAT implications.)

#### **3.3.5 Collaborative links**

As a result of contacts with the European Environmental Agency (EEA), UIA was encouraged by representatives of the Agency to explore the possibility of adapting its data to query via servers using the Z39.50 protocol. UIA discussed this with WCMC and the situation of the two bodies with respect to this possibility was transmitted to the Agency with a view to special funding to adapt the two sets of databases to such querying. On 25 August 1998, an EEA information officer who was enthusiastic about the prospect visited UIA; the matter was also referred to others in the EEA by WCMC. Unfortunately, none of the parties could commit the necessary resources to the activity during the project period, and so it remains a future possibility. This collaboration is likely to cover information on internationally designated sites and species covered by international legislation, and may also cover nationally designated protected areas.

WCMC met with representatives of the EEA and the ETC/NC on several occasions to discuss future collaboration in delivery of information services on the Internet. The only programme where this is currently happening is on protected areas. WCMC works with the EEA and the Council of Europe on the *Common Database on Designated Areas*. The aim of this work is to ensure that each country is only approached for information once, not once by each international organisation.

### 3.4 Final Report on feedback loops

Deliverable 5052-11  
 Original delivery 30-11-99  
 Delivered in beta test mode 04-04-99  
 Final delivery (amended) 31-03-2000

#### 3.4.1 Background to the workpackage

In parallel with the work on individual data elements in the Strategies and Problems files, UIA undertook to advance its explorations of feedback loops (both self-reinforcing and self-damping), specifically for this project in the fields of environment and conservation. The specifications for this work were to:

*Develop, refine and seek to dynamically display the self-sustaining, interlocking loops of conservation issues and solutions. In the event that on-the-fly generation and visualisation of loops is feasible during web server access, such dynamic displays would be developed as a means of shifting the level of analysis beyond seemingly isolated environmental Problems and Strategies. The visualization tools would then be adapted to assist editorial and error detection processes. The key issue here is speed of detection and generation of loops. This will be explored as a combination of machine capacity, algorithm logic and display design.*

The significance of this work is that there has long been recognition of how one problem can aggravate another and of how several Problems can reinforce each other. The UIA data register many relationships between Problems in complex networks. Clearly such relationships may form chains or pathways linking many Problems. But hidden in the data as presented is also the existence of chains that loop back on themselves. The UIA data offer a unique opportunity to identify such feedback relationship loops or cycles through which several Problems constantly reinforce one another.

The notion of “loops”, and its relevance to this project, requires some further explanation. As defined by the authors of *Making Strategy*<sup>9</sup>, a loop represents a description of a chain of consequences that produces a dynamic outcome by feeding off itself (positive feedback = “vicious” or “virtuous” loops), or by controlling itself (negative feedback). Typically a feedback loop will be an important strategic issue in its own right. The purpose of detecting feedback loops is to raise the level of analysis of individual issues to a higher, systematic level. It is a technique which has the potential to add extra meaning to basic data, particularly relevant for policy makers (one significant user group for this product) and others concerned with understanding the interrelationships and root causes of environmental problems, notably those relevant to biological conservation. This is one perspective on the title of this project: *Information Context for Biodiversity Conservation*. A self-reinforcing (“vicious”) problem loop, then, is a chain of Problems, each aggravating the next, and with the last looping back to aggravate the first in the chain. An example is:

*Man-made disasters → Vulnerability of ecosystem niches → Natural environment degradation → Shortage of natural resources → Unbridled competition for scarce resources → Man-made disasters.*

Such cycles are “vicious” because they are self-sustaining problem cycles. organisational strategies and programmes that focus on only one problem in a chain may fail because the cycle has the capacity to regenerate itself. Individual “vicious problem cycles” also tend to interlock, forming tangled skeins of interlinked global Problems which implicate single environmental problems in chains and complexes of multi-sectoral issues<sup>10</sup>. Without the means to untangle the relationships, the response to a conservation challenge may be ineffective, self-defeating or, even, harmful.

<sup>9</sup> Colin Eden and Fran Ackermann, 1998. *Making Strategy: The journey of strategic management*. Sage Publications, London.

<sup>10</sup> In some cases the relationship may be a feedback loop in its own right where A influences B and B influences A -- creating a nested negative feedback loop within a positive feedback loop.

Before commenting on the project work in detecting vicious cycles, it is important to recognise that it is precisely through the detection of such loops that attention can be drawn to defects in the pattern of relationships in the data. It is possible for some loops to be the result of incorrect relationships rather than being representative of genuine feedback, and so “accidental” loops appear. Detection of loops is therefore in the first place an editorial tool for hyperlinkage within a relational database. It raises questions as to the appropriateness of certain links which otherwise may go unquestioned. It also sharpens the discussion on how distinctions are made, using verbal categories and definitions, and how system boundaries are drawn grouping what is represented in this way. The results indicate this is a very interesting area for further exploration.

### 3.4.2 Loop analysis

Prior to the Definition Phase of this project, experiments in 1995 gave rise to the results in Column 1 of the Table (below). It was concluded that the procedure had promise but needed refinement, notably to detect Problems erroneously excluded from loops, as well as loops excessively connected to a single problem.

Progressive Refinements of Problem Loops					
	Prior to Project	INFO2000 Project			
Date	1995	1999	1999	2000	2000
	Column 1	Column 2	Column 3	Column 4	Column 5
Machine	386/486	486	Pentium III	Pentium III	Pentium III
Processing Time	many weeks	Some days	37 hours	12.5 hours	500 hours
Chains tested	9,519,722	15,000,000	46,474,882	16,091,877	1,239,769,768
Profiles			6,891	1,217	12,397
2-Loop	-				5
3-Loop	35				173
4-Loop	115				230
5-Loop	527				473
6-Loop	3,058				1,163
7-Loop	3,568				3,473
8-Loop	excluded	excluded	excluded	excluded	10,600
9-Loop	excluded	excluded	excluded	excluded	35,438
<b>Total</b>	<b>7,303</b>	<b>6,000</b>	<b>15,958</b>	<b>8,253</b>	<b>51,555</b>

During the Definition Phase for the project, the data file on loops in the Problems data was critically reviewed. The programme previously written to detect aggravating pathways in the data and identify loops was re-run. Loops were identified for selected types of problems only and for a maximum of 7 problems per loop (since chain searching requires many days of computing time, even with 133 MHz PCs available to us at that time). Two weeks of judicious source editing of aggravating links between Problem profiles reduced the size of the file from 19,000 problem loops to around 7,000. A preliminary detection analysis was also made of cycles of facilitating strategies in the Strategies database. At the completion of the Definition Phase, there were 200 loops recognised to contain environmental issues relevant to biodiversity conservation. They were presented on the prototype CD. Work was also done in improving the display of loops, using popups, from single data records on the prototype CD.

It was anticipated that the number of loops detected in the data would increase significantly following the editing work on content and hyperlinks during the Implementation Phase of the project. One need for this work was to acquire a faster computer (to avoid having to segment the data). This was done with project funds.

However, loops are relatively rare in chains of problems. It was anticipated that the technique to detect loops (to this point explored in a DOS environment in batch mode and delivered online in a static mode) would need to be improved to make it easier for an online user to explore them dynamically. The algorithm through which such loops are detected was referred to a mathematician, but with no breakthrough. However, our objectives were achieved in other ways.

The next step in this work was enabling the contextual listing of Problems and Strategies on user request relating to a selected node. The list was provided “on the fly” at the request of the visitor to the UIA website. This facility provided a rich pattern of information in which loops were indicated if detected in the data.

During 1999, some 15 million chains of Problems were searched to detect those that looped back on themselves within 7 links maximum. Some 6,000 loops were detected and were scanned for potential errors and hyperlink redundancy. The results of this work were integrated into the facilities offered to web users via the UIA website. Loops were flagged in the hit index and so became available to webusers for the first time in beta test mode in October 1999. This web module was delivered in beta mode at <http://www.uia.org/data.htm> in early 1999 and has been continuously upgraded on numerous occasions since that time. Later in the year, as a result of third-party contribution to *Java* graphics capability, loops were visualised as an integral feature of the bespoke *Java* spring mapping facility. This was a major step in the online graphic presentation of feedback loops in the data..

The non-web standard editing software was augmented to detect local link redundancies and errors in the cross-relationships of Problems and Strategies. This meant that the daily work of editing database profiles was also directly contributing to the refinement of loops. Of particular interest in any loop analysis were Problem profiles indicated as being the most highly connected to loops, namely members of the largest numbers of loops. These were treated as indicative of inappropriate hierarchical clustering and encouraged redistribution of functional relationships to broader or narrower Problems.

The final stages of the loop detection and visualization activity were completed towards the end of 1999. First, the loop detection program was run in batch mode for all Problems (except the most detailed and minor). The result was 15,958 feedback loops. Loops that involved the more detailed and minor Problems were edited at source to correct anomalous linkages<sup>11</sup>. This activity reduced the number of loops to 5,873. To further eliminate errors, entries involved in more than 80 loops were carefully edited; redundant and anomalous links were corrected. This activity reduced the number of loops to 2,675. It is believed that this list effectively represents “keystone” biodiversity issues -- problems that are implicated in many negative feedback systems concerning the natural environment.

Finally, the loop detection program was run again for the entire Problems database. The resulting 51,555 loops were subjected to the error tests developed in previous iterations. A total of 9,315 Problem loops were uploaded onto the website.

A similar procedure undertaken on the Strategies database produced over 2,000 loops, but of inconsistent quality. No project time remained to invest in refinement of these links and the loops were not uploaded at this time.

It is expected that procedures developed in this project for working with loops will become the standard for future reiterations as the databases evolve in the future.

### 3.4.3 Loop patterns

In order to give users a sense of the pattern that multiple loops formed, a colour-coded tabular presentation is generated on-the-fly from database entries with loops. Users are able to manipulate the displays. The elements of the *Java* spring map can be dragged to redisplay them. The same is true of the three-dimensional virtual reality display, which in this case is dynamic. Clicking on the nodes in either display will open a window with the corresponding profile text from the database.

## 3.5 Final Report on information on habitats

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<sup>11</sup> The logic behind this is that it is inappropriate for broad and detailed Problems to be *directly* aggravating narrow and minor Problems, and *vice versa*; this connection is best shown through hierarchical relationships where “suites” of problems are so aggravating. The most common remedy was to remake the link higher up the hierarchy of the detailed or minor Problem.

Deliverable 5052-12  
Original delivery 30-11-99  
Delivered in beta test mode 04-04-99  
Final delivery (amended) 31-01-2000

### 3.5.1 Background to the workpackage

The conservation of natural habitats is a vital component of the protection and conservation of species of wild flora and fauna and of biodiversity in all its forms. Intact habitats are relatively undisturbed areas, which have maintained most of their original ecological processes and have communities with most of their original native species. Although around 5% of the world's natural habitat is formally protected from development, much of this area is threatened by activities that encroach on park borders and/or reduce overall environmental quality. It is universally agreed that levels of protection both in and outside existing protected natural habitats need to be strengthened. Organising available information to support this objective presents a challenge.

One contextual problem is that around the world, and across sectors, the term habitat is used with a multitude of different meanings<sup>12</sup>. Vernacular usage loosely aligns "habitat" with "the place an animal or plant lives". But the place may be geographic (Mediterranean region) or may be descriptive (high mountain areas). The description may be scientific (lotic) or in simple language (flowing freshwater); it may be generic (wetland) or particular (peat bogs). The scale may be small (forest clearings) or may be vast (Boreal taiga).

Aside from different classification systems, there is also a multitude of existing lists concerning habitats and their larger aggregations. Some are comprehensive reference lists, some are operational lists indicating protection status and priorities for protection; some are appended to regional legal instruments; some apply to global policy objectives; some are for alpine areas, some for coastal; some

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<sup>12</sup> According to the Convention on Biological Diversity, 'habitat' means the place or type of site where an organism or population naturally occurs. 'Natural habitats' means terrestrial or aquatic areas distinguished by geographic, abiotic and biotic features, entirely natural or semi-natural.

According to the EU Habitats Directive the habitat of a species means an environment defined by specific abiotic and biotic factors, in which the species lives at any stage of its biological cycle. The conservation status of a natural habitat means the sum of the influences acting on a natural habitat and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species. The conservative status of a natural habitat is favourable' when: (i) its natural range and areas it covers within that range are stable or increasing, and (ii) the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and (iii) the conservation status of its typical species is favourable.

The *Convention on the Conservation of European Wildlife and Natural Habitats*, known as the *Bern Convention*, aims to conserve wild flora and fauna and their natural habitats, especially those species and habitats whose conservation requires the co-operation of several States, and to promote such co-operation. Particular emphasis is given to endangered and vulnerable species, including endangered and vulnerable migratory species.

The aim of the *EU Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, 1992* (Habitats Directive) is to contribute towards ensuring biodiversity through the conservation of natural habitats and of wild fauna and flora. The implementing measures are to be designed to maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest. The *Habitats Directive* requires the EU member states to identify, designate and conserve areas that are necessary to maintain or restore habitats and species of Community interest at a favourable conservation status. Annex I lists natural habitat types of Community interest whose conservation requires the designation of Special Areas of Conservation (SACs), and includes priority natural habitat types.

are produced by botanists, some by zoologists. The variations go on<sup>13</sup>. Authors of one list rarely point to correspondences in other lists.

Irrespective of special or local nomenclature, the issues concerning conservation and management of seagrass beds, or of alpine meadows or of semi-arid scrublands are much the same across the world, wherever (politically or geographically) they are located. However, it is common that in research reports different authors may use quite different names for what are the same habitat types. Valuable recommendations concerning conservation of a local habitat or a certain species rarely point to their relevance in other parts of the world. So potentially valuable insights within one locality or region are hidden.

All these inconsistencies pose a challenge in organising contextual information for habitat conservation.

### 3.5.2 Activities of the workpackage

As with the species information, it was first essential to investigate and develop data-management techniques. The immediate need was to avoid handling detail on the universe of habitats whilst maintaining the coherence and inclusiveness of the overall data structure.

The approach taken was to use taxonomic clusters of habitats as identified in the various source lists. Top-level classifications were particularly sought after. Taxonomic branches of habitats were opened to the levels of detail necessary to capture available information. Where information was unavailable, or represented an excessive input investment impossible to justify at this time for this project, it was noted as a potential resource for future work. In this way, the comprehensive nature of the database was ensured without expanding taxonomic structures to their fullest potential. This logistical compromise ensures the product is relevant to unforeseeable developments, since it provides a *context* for information on the global range of habitats -- any one of which may emerge as a nexus of environmental concerns. As resources and collaborators become available, higher levels of detail can be documented.

During the Definition Phase, using this methodological approach and a variety of sources available on the Internet, an experimental hierarchical framework was created within the UIA Problems database containing 303 threatened habitats, ecosystems and biomes. The habitat types were arranged in interlacing hierarchies corresponding to the classification parameters of the information source<sup>14</sup>. This structure was used to explore the feasibility of interlinking individual species and protected areas through data on habitats<sup>15</sup>.

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<sup>13</sup> At the largest scales there are “biomes”, “biogeographic provinces”, “biotic kingdoms”, “dominant ecosystems” and “ecoregions”. In some parts of the world (notably North and South America), divisions are based on faunistic criteria (sometimes called faunal provinces). The names tend to be tied to geographical places, *eg* “The Everglades Province”. Elsewhere in the world, floristic provinces (usually called floral regions) have been described and mapped based on dominant or major vegetation types and the regional climate (eg tall sclerophyll woodland), and these are used by zoologists. They are identified according to the climax vegetation type. But some classifications recognise not only of the climax vegetation, but also of associated successional communities, persistent subclimax communities.

<sup>14</sup> For example, Holdridge’s set of the world’s major ecosystems is classified by climate (temperature and rainfall). Other sources used classify habitat principally by vegetation structure or geographic factors. Sources included the UNESCO terrestrial cover classification, the US Forest Service vegetation classification system and other North American materials, the Ramsar Convention wetland classification system and the UNEP/GRID world vegetation map.

<sup>15</sup> It was baffling that the CORINE habitat types for Europe were so difficult to come by, despite various requests to specialist consultants, the European Commission and the European Environmental Agency (from whom was obtained the CD-ROM *Natural Resources*, but not containing the classification system). Only a French language version was obtainable from the web, and that incomplete. By the time a comprehensive source was located, it was too late in the project to incorporate the CORINE items in the databases for the end of this project period. It is earmarked as a future activity.

During the Implementation Phase, a wider review of habitat classifications systems was made, with WCMC providing many of the resources from its global map indexes. Six different systems were entered into the database using the “overlapping hierarchy” method. At the completion of this work was at total of 311 Problem profiles of the form “Threatened habitats of [..... ]”, 134 Strategies of the form “Conserving [...] ecoregion<sup>16</sup>, and hierarchies of smaller numbers covering biogeographical provinces, regions and their subcategories, biomes, floral and faunal provinces<sup>17</sup>, and forests<sup>18</sup>. Various other regional and national sources were used for more detailed classifications, such as freshwater wetlands, including those in Annex 1 of the *European Habitats Directive*<sup>19</sup>. Wherever possible, reasonable correspondences between classification systems were considered alternative expressions, and therefore synonyms, of a single data item<sup>20</sup>.

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<sup>16</sup> WWF has identified the most outstanding terrestrial, freshwater and marine ecoregions have been identified on which to focus conservation efforts. Using representation as the guiding principle, they identified the Global 200 -- truly outstanding examples of the major habitat types in each of the Earth's biogeographical realms and ocean basins.

<sup>17</sup> Udvardy, Miklos D F, 1975. *A Classification of the Biogeographical Provinces of the World*. IUCN Occasional Paper No 18, Morges, Switzerland .

<sup>18</sup> FAO's Forest Resources Assessment (FRA2000).

<sup>19</sup> Natural Habitat Types of Community Interest whose Conservation Requires the Designation of Special Areas of Conservation and which uses the NATURA 2000 code for Europe.

<sup>20</sup> Examples taken at random show that the following have been taken from two or three different systems and placed into the same entry (“=” indicates equivalence for many conservation purposes): (1) “Threatened temperate broad-leaf forests or woodlands biome” and “Threatened subpolar deciduous thickets biome”; (2) “Threatened temperate grassland habitats” = “Threatened cool grassland/scrub habitats” = “Endangered montane steppe habitats”; (3) “Threatened warm temperate desert scrub habitats” = “Endangered scrub-steppe habitats”.



### 3.6 Final Report on integration of biographies

Deliverable 5052-13  
Original delivery 30-09-98  
Partial delivery 30-11-99  
Final Delivery 30-06-00

#### 3.6.1 Background to the workpackage

WCMC has a unique collection of formally and informally published information on biodiversity, at national and international levels, comprising around 100,000 bibliographic holdings. One of the strengths of its collection is 'grey literature' about biodiversity. The UIA has no sizeable library holdings but over decades has compiled over 9,890 citations of publications relating directly to global issues and strategies of international organisations and others. At the start of this project, neither resource was available online. Integration of data and online delivery were the principal objectives of the workpackage.

#### 3.6.2 Activities of the workpackage

After early discussions, the original idea of physically "integrating" the WCMC and UIA bibliographies was quickly replaced by "integration" using the web. This approach avoided the complications of harmonising source data.

During the project, the following activities were undertaken.

1. WCMC and UIA had several rounds of discussion about "integrating" their bibliographies.
2. UIA continued to develop its bibliographic data file, notably with recent publications by international organisations concerning biodiversity conservation.
3. The UIA References database of bibliographic references was made available over the Web. This was done late in 1998, at the same time as enable access to the Problems, Strategies and Human Development databases (<http://www.uia.org/data.htm>).
4. During the development phase of the project, WCMC made a copy of its catalogue available online; however, the interface was relatively cumbersome to use, and the database on the Internet was separate from the actual catalogue and required the periodic transfer of files (which with the previous catalogue system was not an easy process).
5. Subsequently WCMC reviewed its library catalogue. WCMC has made a major overhaul of the management of its literature holdings and library reference system with a view to making the information more readily accessible over the Internet. This included review and purchase of new library software, which offers many suitable features, including automatic web publishing capabilities.
6. The old WCMC cataloguing software was replaced with new software, which was then tested in in-house and online mode. Trials of the WCMC software and training were undertaken. This new development has enabled WCMC to offer access to its library catalogue over the Internet (<http://www.unep-wcmc.org/resources/resources.htm>), including improved access and functionality for staff.
7. The final step was to make the online integration between the new library catalogue, and between different parts of UIA and WCMC databases and information services. This activity was undertaken in the fifth phase of the project. UIA was able successfully to generate search strings from within relevant profiles, on user request, in order to search the WCMC bibliographic database

and present the user with bibliographic record information. This feature is available through the [Ecolynx](#) website.

### 3.7 Final Report on interactive generation of indicators and summaries

Deliverable 5052-14

Expected (original) delivery 30-11-99

Final delivery 31-07-00

#### 3.7.1 Background to the workpackage

Although WCMC has managed major datasets relating to biodiversity conservation for many years, it has made relatively little use of this information in the development of indicators, and at the time the project started had few summaries of information available either on line or in the published literature.

The intention was therefore to seek ways to display and interpret data, with the ability for users to perform such analyses themselves (giving consideration of the full range of user from policy-maker to educator) providing the ability to derive simple indicators from the available data, which can be linked to particular environmental pressures.

#### 3.7.2 Activities of the workpackage

During the project WCMC has used counterpart funds from other organisations to review the extent to which summary information from the WCMC databases can be used to illustrate key issues.

#### Living Planet Report

WCMC has been working with WWF on the *Living Planet Report*. This is an attempt to provide a quantitative answer to questions concerning the loss of biodiversity. The annual reports (so far prepared for 1998 and 1999) present the most reliable data available on forest area and populations of marine and freshwater species world-wide. The report also examines consumption of critical resources in countries around the world.

The central component of the *Living Planet Report* is the *Living Planet Index*, an indicator of the overall state of the earth's natural ecosystems. WCMC carried out a substantial amount of the work on development of the indicators relating to biodiversity, reviewing the information available and its reliability, and trying to identify what was meaningful. The report includes maps, graphs and histograms.

This information is available as published reports, and on the WWF website at:

<http://panda.org/livingplanet/lpreport.cfm> with the main biodiversity statistics at:

<http://panda.org/livingplanet/lpr/flash.htm> (or at the "lite" webpage:

[http://panda.org/livingplanet/lpr/lp\\_index.html](http://panda.org/livingplanet/lpr/lp_index.html)).

#### Global Biodiversity: Earth's living resources in the 21<sup>st</sup> century

This is a major WCMC publication launched in early 2000, funded by a German foundation are not strictly speaking part of the present project. The aim is to provide a comprehensive review of key global issues in biodiversity, outlining some of the broad ecological relationships between humans and the rest of the biosphere, and summarising information bearing on the health of the biosphere. There is a considerable amount of illustrative material in the book (maps, graphs, diagrams), based on summarisation of the biodiversity information available to WCMC, but this is not yet available on the Internet and is therefore not yet built into the project's deliverables. This is currently under consideration.

#### Species and protected areas databases

It had been hoped to develop tools to display summary information on-the-fly from the two major databases that are been developed and placed on the Internet as part of this project. This work has not been completed for two reasons Firstly the databases have taken longer to implement on the Internet than was originally expected. Secondly, counterpart funding for this work was expected as part of

another WCMC project, and this was not achieved. This area of work was therefore developed less than other areas that had more secure counterpart funding.

### 3.8 Final Report on links to other information services

Deliverable 5052-15  
Original delivery 30-11-99  
Final delivery 31-07-2000

#### 3.8.1 Background to the workpackage

The objectives of this workpackage were to develop linkages to other relevant information sources, and at the same time build links with the organisations involved so that there is an ongoing relationship in the management of mutually supportive datasets. This will involve creating (hyper)linkages between various WCMC and UIA datasets, notably with respect to national organisations, protected areas and systems.

It should be said at the outset that the project partners see partnership and linkages as a natural part of their activities. WCMC, for example, has a wide range of operational links and partnerships with agencies in conservation/biodiversity networks in which it participates. Our strategic approach in this project was not dependent on particular partnerships outside the project frame, however "logical" in principle, but rather on partnership building wherever and whenever it proves possible in practice. We also recognised that the degree of "partnership collaboration" within the project frame could also vary in practice in the light of experience and need.

The Web and email environment proving ideal in that it offers the possibility of rapid partnership formation (and dissolution) in response to changing needs and priorities -- without requiring the administrative overhead traditionally associated with formal partnerships. It is in this sense, for example, that the UIA has a long record of "collaborating" minimally with some 20,000 international organisations by requesting and receiving information on their organisation profiles and on the problems and strategies that engage them<sup>21</sup>. WCMC similarly has "collaboration" with thousands of contributors of data to its databases.

#### 3.8.2 Links to other information services

##### Collaboration with the European Environment Agency

WCMC is continuing to collaborate with the EEA and the ETC/NC in Paris on the *Common Database on Designated Areas*. This helps to ensure the quality of information available on European protected areas and access to it over the Internet.

##### Collaboration with the CBD Clearing-House Mechanism

WCMC has been working on several projects that are concerned with implementation of the Clearing-House Mechanism (CHM), and regularly attends official meetings at both the global and European levels (WCMC is a contractor on the EC CHM project managed by the EEA).

##### Country profiles

There is a significant number of country profiles available on the Internet, and similarly a number of national reports to international bodies. WCMC has developed a webpage that facilitates location of these reports, and is considering the development of search tools for improving access to content. [http://www.wcmc.org.uk/information\\_services/other/country.htm](http://www.wcmc.org.uk/information_services/other/country.htm)

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<sup>21</sup> Such "minimalist partnership" is in fact vital to information collection in circumstances in an information society increasingly riven by mutual suspicion (this is not a generalization, but certainly true of some of UIA's more problematic exchanges).

SAMPLE OF 1,000s of INTERNET SITES LINKED to <i>ECOLYNX</i>	
International Institute for Sustainable Development Information Centre	<a href="http://iisd1.iisd.ca/ic/">http://iisd1.iisd.ca/ic/</a>
IISD Linkages – Commission for Sustainable Development (CSD)	<a href="http://www.iisd.ca/linkages/csd/">http://www.iisd.ca/linkages/csd/</a>
UN Department for Policy Coordination and Sustainable Development	<a href="http://www.un.org/DPCSD/">http://www.un.org/DPCSD/</a>
United Nations Division of Sustainable Development	<a href="http://www.un.org/DPCSD/dsd/">http://www.un.org/DPCSD/dsd/</a>
Commission for Sustainable Development (CSD)	<a href="http://www.un.org/DPCSD/dsd/csd.htm">http://www.un.org/DPCSD/dsd/csd.htm</a> <a href="http://gopher://gopher.un.org:70/11/esc/cn17">gopher://gopher.un.org:70/11/esc/cn17</a>
Search the Sustainability Publications on the WWF Global Network	<a href="http://www.panda.org/cgi-bin/wwf/AT-wwf_sustainsearch.cgi">http://www.panda.org/cgi-bin/wwf/AT-wwf_sustainsearch.cgi</a>
International Development Research Centre	<a href="http://www.idrc.ca">http://www.idrc.ca</a>
The Food and Agriculture Organisation	<a href="http://www.fao.org">http://www.fao.org</a>
United Nations Development Programme	<a href="http://www.undp.org/undp/comm/index.html">http://www.undp.org/undp/comm/index.html</a>
Communication for Development (FAO)	<a href="http://www.fao.org/waicent/faoinfo/sustdev/CDDirect/Cdhomepg.htm">http://www.fao.org/waicent/faoinfo/sustdev/CDDirect/Cdhomepg.htm</a>
International Small Business Consortium	<a href="http://www.isbc.com/">http://www.isbc.com/</a>
TOOL	<a href="http://www.tool.nl/">http://www.tool.nl/</a>
The Earth Charter Consultation Homepage	<a href="http://www.earthcharter.org/">http://www.earthcharter.org/</a>
Sustainable Development Dimensions	<a href="http://www.fao.org/waicent/faoinfo/sustdev/Welcome_.htm">http://www.fao.org/waicent/faoinfo/sustdev/Welcome_.htm</a>
Biodiversity Conservation Information System	<a href="http://biodiversity.org/">http://biodiversity.org/</a>
The African Information Society Initiative (AISI)	<a href="http://www.bellanet.org/partners/aisi/">http://www.bellanet.org/partners/aisi/</a>
Bellanet	<a href="http://www.bellanet.org/index.html">http://www.bellanet.org/index.html</a>
The Acacia Initiative	<a href="http://www.idrc.ca/acacia/">http://www.idrc.ca/acacia/</a>
International Institute for Environment and Development (IIED)	<a href="http://www.oneworld.org/iied/">http://www.oneworld.org/iied/</a>
International Development Network	<a href="http://www.idn.org/">http://www.idn.org/</a>
Consortium for International Earth Science Information Network (CIESIN)	<a href="http://sedac.ciesin.org/">http://sedac.ciesin.org/</a>
TERRA	<a href="http://www.olcommerce.com/terra/">http://www.olcommerce.com/terra/</a>
The Online World	<a href="http://www.puc-rio.br/parcerias/presno/">http://www.puc-rio.br/parcerias/presno/</a>
The German Federal Environment Ministry (English Pages)	<a href="http://195.80.205.111/englisch/index.htm">http://195.80.205.111/englisch/index.htm</a>
Environmental Treaties and Resource Indicators (ENTRI)	<a href="http://sedac.ciesin.org/pidb/">http://sedac.ciesin.org/pidb/</a>
International Treaties Database	<a href="http://sedac.ciesin.org/pidb/IUCN-guide.html">http://sedac.ciesin.org/pidb/IUCN-guide.html</a>
International Year of the Ocean	<a href="http://www.yoto98.noaa.gov/oceanl.htm">http://www.yoto98.noaa.gov/oceanl.htm</a>
UNEP-HEM	<a href="http://www.gsf.de/UNEP/index.html">http://www.gsf.de/UNEP/index.html</a>
European Centre for Nature Conservation	<a href="http://www.ecnc.nl/">http://www.ecnc.nl/</a>
ERIN: Environmental Information Servers by Region	<a href="http://www.erin.gov.au/other_servers/region/server_region.html">http://www.erin.gov.au/other_servers/region/server_region.html</a>
ENVIROLINK	<a href="http://envirolink.org/">http://envirolink.org/</a>
ICONS	<a href="http://www.iucn.org/icons/">http://www.iucn.org/icons/</a>
Global Environmental Information Locator Service (GELOS) – G7 ENRM	<a href="http://enrm.ceo.org/">http://enrm.ceo.org/</a>

Global Environment Information Centre	<a href="http://www.geic.or.jp/">http://www.geic.or.jp/</a>
World Resources Institute	<a href="http://www.wri.org/wri/">http://www.wri.org/wri/</a>
Biodiversity Clearing House Mechanism	<a href="http://www.biodiv.org/">http://www.biodiv.org/</a>
START – Global Change System for Analysis Research and Training	<a href="http://www.start.org/index/index.html">http://www.start.org/index/index.html</a>
International Human Dimensions Programme on Global Environmental Change	<a href="http://ibm.rhrz.uni-bonn.de:80/ihdp/">http://ibm.rhrz.uni-bonn.de:80/ihdp/</a>
International Geosphere and Biosphere Programme IGBP	<a href="http://www.igbp.kva.se/">http://www.igbp.kva.se/</a>
Sustainabledevelopment.org	<a href="http://www.sustainabledevelopment.org/">http://www.sustainabledevelopment.org/</a>

### Complementary projects

Around 20 complementary projects of the partners have been linked with the *Ecolynx* website, including:

- Threatened Plants of the World / 1997 United Nations List of National Parks and Protected Areas
- IUCN World Commission on Protected Areas
- EU Wildlife Trade Reference Database
- AEAW website
- EC Clearing-House Mechanism
- IHEAL Europe Interactive Database
- IPIECA Internet Map Server
- Global coral disease database
- Forest and poverty mapping in South East Asia
- European forests and protected areas: gap analysis

### 3.8.3 Links to commercial data

A situation may well emerge in which information of significance to biodiversity conservation is held by commercial services. *Ecolynx* proposes to address these challenge 1) by referring users on (via hyperlink) to commercial services holding such information, and leaving it to them to follow that path and to negotiate the access transaction; 2) exploring partnership arrangements with certain services to reduce the financial and administrative hassle of this procedure for the user.

At the same time, *Ecolynx* could benefit from “loyalty” association with certain commercial service providers. As mentioned elsewhere, experiments are already in place with the search engine *Goggle*, *amazon.com* and banner sites.

### 3.8.4 Links to non-commercial organizations

This project, and the integration of databases between UIA and WCMC was designed to be "light" on governance and administration (and their associated costs) and "heavy" on operational links between data elements that are of value to users. We have taken the route of building on existing partnerships and demonstrating capability. Success to date is described in section 3.11 Final report on subsidy, sponsorship and online charging options. This philosophy would be extended to future partnerships with other institutions.

Potential partners, especially if they have their own databases, tend to be understandably reluctant to constrain their own data strategies in response to others. However, by the use of hyperlinks (and especially query links between such databases), real "operational partnership" can be achieved without the requirement for extensive "administrative partnership". We envisage such opportunities will emerge in the future.

## 3.9 Final Report on multimedia visualization

Deliverable 5052-16  
Original delivery 30-06-99  
Final delivery 30-06-00

### 3.9.1 Comprehension and multimedia

“Why do we put so much emphasis on audio-visual means of portraying goal, trend, condition, projection, and alternative? Partly because so many valuable participants in decision-making have dramatizing imaginations. ... They are not enamoured of numbers or of analytic abstraction. They are at their best in deliberations that encourage contextually by a varied repertory of means, and where an immediate sense of time, space, and figure is retained.”<sup>22</sup>

An important focus of the project was on the development of multimedia facilities through which users could interact with databases. Such use of multimedia is to be strongly contrasted with the predominant concern with decorative preoccupations that are a focus of much web design.

The UIA is faced with a major challenge of how to provide greater insight into complex networks of relationships amongst international organisations, world problems, strategies in response to them, human development and human values. Extensive databases are maintained on each of these sets of entities. There are (hyper)links between the entities in each set, and between entities in different sets.

To clarify options for visualisation of complex patterns of conservation-related information, during the Definition Phase of the project Anthony Judge attended the CODATA Euro-American Workshop on the Scientific and Technological issues of Data and Information Visualization *Where are we and where do we go from here?*. He discovered that little attention had been given by corporate and academic researchers to generated virtual reality displays of the style explored by the UIA for this project. It was possible that some graph layout and distortion methods (fisheye, etc) could be relevant. It was clear that innovations are being rapidly copyrighted in this area<sup>23</sup>.

### 3.9.2 Multimedia potentials

The principal partners in this project have until quite recently presented their data in text form, although numeric data, maps and other display structures may be associated with the texts or calculated from them. The key policy-related issue here is how such textual information can best be rendered more immediately comprehensible. The interest of the partners in multi-media development is therefore intimately related to how such interactive media can improve comprehension of more complex patterns of environmental information than is possible through pure texts, tables or traditional graphics. In this sense, the key to the product's success lies in the development of an interactive learning environment. The challenge is to facilitate the emergence of meaning rather than simply the collection and dissemination of information for its own sake.

The overarching objective was for the product to contain a balance of graphics content, pre-generated or generated on-the-fly that genuinely enhances the value of the product and the comprehensibility of the data for the user. Priority is given to policy-relevant comprehension tools. These might include: species and protected area information distribution maps, photographs and graphics of other kinds (*e.g.* taxonomic relationships of species, vicious cycles of environmental problems and sustainable cycles of conservation strategies).

A feature of WCMC's datasets is identification of the geographic location of biodiversity and the factors that affect it. The UIA records the countries in which each international organisation has members, including signatories to treaties. These data have immediate potential to be converted into maps (some of which may be clickable). These may be pre-made graphics (GIF) files, or 'flood-fill' displays

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<sup>22</sup> Harold D Lasswell, 1968. The transition toward more sophisticated procedures In: Davis B. Bobrow and J.L. Schwartz (Ed.), *Computers and the Policy-Making Community: applications to international relations*, Prentice-Hall, pp. 307-314.

<sup>23</sup> The USA Central Intelligence Agency (CIA) has articulated its own interest in the field in the report of the P1000 Committee on *Strategic Information Visualisation* (1996).

generated on-the-fly, or both. The UIA also has other data that is amenable to mapping, notably (1) hierarchies (2) networks and (3) feedback loops of conservation issues and strategies, while the WCMC may have data relating to the international treaties which a country is party to, or percentage cover of protected areas at the national level.

During the Definition Phase it was shown that images and sound files could be located using generated search strings. This work was to advance to enhance user access to such third-party resources, notably by making arrangements with Web image and sound providers for user access, for free or at cost, as appropriate.

### 3.9.3 Activities of the workpackage

The period of the project saw a distinct shift in industry investment towards a new sector defined by the term “visualization of information”. The obvious constraints continue to be the exorbitant prices of commercial packages, many of which offer only marginal cognitive advantages in relation to the data.

Throughout the project, evolution in multimedia software packages and facilities was a constant preoccupation and reframed the work that had been outlined by the Definition Phase. In particular, the shift from the focus on virtual reality to *Java* spring maps is described above. The further possibilities of products such as *Decision Explorer* and *NetMap* had also not been foreseen, as with the *Koan* generative music software applications.

We were disappointed that that the large range of geographic software available did not offer us the simple tools relevant to some of our particular needs especially in the case of geographical display of some UIA data.

Several distinct lines of development were explored by UIA, some of which emerged subsequent to the Definition Phase. Initial work focused on tracing valuable software packages, and people, that could in some way assist in presenting the data in new and more meaningful ways. The obvious constraints continued to be the exorbitant prices of commercial packages, many of which offer only marginal cognitive advantages in relation to the data. Proprietary constraints and the obligation for users to acquire software were also a preoccupation.

It became clear that the most striking advances at minimal cost lie in the area of using either VRML or *Java* in relation to HTML pages, since these can be most closely related to planned delivery of data. Such work also has the advantage of being least locked into licensing arrangements and most open to further adaptation.

The project achieved several significant breakthroughs in allowing users to employ visual displays as entry points to text data. As a result of the project, users now have access to several different kinds of on-going experiment, which are described in detail below.

It must be stressed that the following visual experiments are designed to find ways of representing, comprehending and exploring complexity. The purpose is to provide sophisticated techniques which generate structures that are visually interesting in their own right but raise interesting questions about what they are able to represent and how they might be developed. It is a deliberate intention to give the user as much control as possible in exploring these structures creatively. The intention is also to make this process as interesting to academic researchers, students, the media, and to those concerned with formulating more appropriate policies in a complex society. For further discussion see: *Envisaging the art of navigating conceptual complexity: in search of software combining artistic and conceptual insights* (<http://www.uia.org/uiadocs/artnavig.htm>)

### 3.9.4 Virtual reality (VRML)

This is the subject of another part of this report. Essentially the UIA web server now generates unique virtual reality displays in response to user queries from individual text profiles of Problems.

The constraints with respect to VRML remain those of acquiring competence in VRML 2.0 beyond that acquired in VRML 1.0, notably in relation to the new browsers. It has been irritating to discover that colour values on work already done, that were very satisfactory in VRML 1.0 have been lost in VRML 2.0. The challenge of generating VRML on-the-fly for web users of the data appears to have been solved.

In the on-line form of these databases (<http://www.uia.org/data.htm>), these are as follows:

- **Tensegrity**: an experiment in mapping a network of relationships onto a tensegrity form as a coherent framework
- **Polyhedra-1**: an experiment in mapping a network of relationships onto a polyhedral form selected from a set of such forms according to the properties of the network
- **Polyhedra-2**: a development of the previous experiment in which the user can endeavour to control the way in which the software selects the polyhedron and projects the network onto it.
- **Loop display**: use of VRML 2.0 as the basis of a dynamically generated display of problem loops

A selection of earlier experiments using virtual reality to display complexes of problems and organisations is presented elsewhere (<http://www.uia.org/uiademo/vrml/vrmldemo.htm>). These structures were generated in 1997 as *static* pages (in contrast to the *dynamic* generation of structures described above). They were converted to VRML 2.0 in the final phases of the project.

### 3.9.5 Spring maps (Java applet)

Subsequent to the Definition Phase, the possibility emerged of developing a network graph layout facility in *Java* in order to portray information on sets of UIA database entities (Problems, Strategies, Organizations, Values, etc). This involved two areas of development:

- Progressive development of a spring map applet, was undertaken with third party assistance ([Beautiful Code BV](#), Netherlands), through a series of iterations as new possibilities became evident on testing
- Progressive development by the UIA of the generated web page calling the applet to offer the user a range of additional ways of feeding parameters to the applet to redesign the display.

Spring maps are characterised by their dynamic self-organising properties. Instead of having to pre-allocate elements of the map over the screen surface, the network is randomly distributed over the surface and then reorganises itself according to the length (strength) of the relationships between individual nodes (based on spring mechanics). In addition, users are then free to manipulate portions of the map, configuring it according to preferences, colouring its parts, and freezing the result progressively.

### 3.9.6 NetMap

According to the producers of the software, *NetMap* is a relational data visualisation tool, providing visual analysis of multi-related data from both a strategic and tactical view, providing the analyst or user with full train of thought analysis on large data sets to identify areas of interest within the data. *NetMap* can be used in conjunction with data repositories or as a stand alone analysis tool importing flat ASCII files for analysis. The flexibility of *NetMap*'s design enables many other tools such as algorithms and neural networks to be included as an integrated tool.

In 1995, the UIA had provided an extensive dataset to NetMap (UK) for a demonstration of the software on an expensive platform beyond the UIA budget. The demonstration was a success and various visualisations of the data were published by the UIA. Of great interest is the possibility of providing *a single overview of hundreds of thousands of links* and drilling down to subsets or details. It is this feature which makes it a powerful tool for tracing fraudulent financial transactions (a major market for the software).



In 1999, a visit was made by Nadia McLaren to the Australian inventor of *NetMap* in order to re-establish contact in relation to the INFO2000 initiative. It became apparent that the constraint on further collaboration was that the development licence for the non-Pacific region had been sold to a US company. The only opportunity for further co-operation lay in use of an Australian server.

In 2000, at the close of the final phase, Anthony Judge followed up this visit and was informed that NetMap (Australia) was currently testing an Application Service Provider (ASP) formula. It was agreed that it would be possible for users of the UIA website to be passed through to the ASP to have *NetMap* analyses performed on the UIA data (and then passed back to the UIA website). A new set of test data was left for them to explore. This facility could be provided to users for a commercial fee.

### 3.9.7 Decision Explorer

According to its producers, *Decision Explorer* is a proven cognitive mapping software package for managing "soft" issues - the qualitative information that surrounds complex or uncertain situations. It allows users to capture in detail thoughts and ideas, to explore them, and gain new understanding and insight. The product was developed by academics at the universities of Bath and Strathclyde and currently by Banxia Software (UK), in conjunction with major organisations. It now has hundreds of major international users.

Anthony Judge had explored this package in 1997 but found it lacked a variety of features that would have made it relevant to mapping UIA data online. The most recent release, however, allows importation of data in formats compatible with those that can be output under user control during the *Java* spring mapping process. In effect the web user can now save the UIA relationship data in a format that allows it to be read by *Decision Explorer* (at the user's location) and formed into a cognitive map. Alternatively the saved data can be converted into such a map at the UIA site (as a fee paying service) and sent to the user.

A considerable advantage of this package, from the policy perspective of this project, is that it has been designed with strategy-making as its main focus. The package therefore has a whole range of analytical and display tools built in. The inventors (Professor Colin Eden and Dr Fran Ackermann of the Strathclyde Business School) provide background argumentation in a recent book, *Making Strategy: The Journey of Strategic Management* (1998), offering an integrated and practical resource for all those concerned with translating strategic theory into management practice using cognitive mapping tools and in the light of a number of case studies, including the Scottish Natural Heritage, the National Health Service, the Northern Ireland Prison Service and Reed Business Publishing.

The package can handle several thousand conceptual entities and relationships, meeting a basic requirement of the complexity of the UIA data.

The UIA has therefore been able to provide users with an alternative way of presenting relationship networks. But, unlike the preoccupation of many *Decision Explorer* users, the UIA has been able to bypass the cognitive mapping phase and allow maps to be directly constructed from the UIA relationship data on the fly by web users, after preliminary exploration using the spring map technique.

Users can either work with static maps provided on request from users by the UIA, or else with the full facilities of *Decision Explorer* to analyse (with over 40 functions) and restructure a cognitive map. The software allows very large and complex maps, of the kind emerging from UIA data, to be printed as a linked set of individual maps. As with the *Java* spring maps, URLs can be associated with individual maps to link into the full profiles in the UIA databases.

For the UIA this facility also means that it will be able to provide meetings, at any location, with preliminary cognitive maps from its data with the possibility of exploring ways of building on, or correcting, such a map in the light of insights emerging during the meeting. This has the considerable advantage of allowing meetings to optionally access data at a higher level of complexity rather than having to work solely with a weaker overview because of communication challenges during the meeting. In this way a meeting can see an explicit picture of an issue, clearing indicating the inter-

relatedness and interdependencies between different aspects so that these can be explored and debated in a controllable setting.

### 3.9.8 TheBrain

As a knowledge management system, *TheBrain* software provides interface to any complex back-end knowledge system with rich patterns of interconnected information. It is designed to increase accessibility, avoiding the need for clumsy list boxes and tree views. *TheBrain* interface provides the ability to display complex relationships from a database with a consistent and dynamic display.

UIA experimented with demo versions of this software and was impressed its possibilities for organising some of the information in its databases as well as access to them. Unfortunately, despite interaction with the manufacturers, it was decided that the professional version was too expensive (in excess of \$2,000), especially because its licensing arrangements were based on numbers of users.

### 3.9.9 Visual products

At the close of the Implementation Phase, and as a marketing and communication experiment in support of the *Ecolynx* website, the UIA invested in a variety of multimedia products based on specially selected and crafted spring maps. These products available for sale and can be ordered from the UIA website (see <http://www.uia.org/visuals/index.html>). It was necessary to develop in online credit charging capability.

### 3.9.10 Images

The Definition Phase demonstrated the ability to associate images, such as those of endangered species, with the relevant text page. The results were quite satisfactory. The possibility of automatically generating web query searches for such images was also demonstrated. It was decided that, where possible, arrangements will be made with image providers for user access for free or at cost, as appropriate.

UIA intended to spend time during the Implementation Phase in making arrangements with Web image and sound providers for user access for free. However, given that this rather routine activity would have consumed time which could be given to the more exciting developments described above, this facility was treated as low priority and was the subject of no further work during the project.

WCMC carried out similar experiments as part of the prototype website being developed on the Africa Eurasian Waterbirds Agreement (AEWA).

### 3.9.11 Sound

Much of the challenge for the *networks of strategies* developed by *networks of organisations*, in response to *networks of problems*, based on *networks of values*, lies in how these are to be coordinated or "harmonised" in some way. The well-explored conventional approach, based on some simplistic consensus, has a relatively poor track record and few prospects for greater efficacy. The dimensions explored by music redefine "consensus" in richer musical terms that offer many more ways to explore relationships between seemingly disparate elements, using both consonant and dissonant features to advantage.

The use of sound is therefore seen as a way of benefiting from insights into harmony that are widely and intuitively understood. Hopefully it will also help to reframe strategic responses to complex issues in ways to which younger generations can resonate more optimistically.

In the Definition Phase, the possibility of attaching sound files to profiles or images was foreseen. This was not considered especially challenging (and could be taken up as a routine task at some later date). Subsequent to the Definition Phase, two possibilities were explored:

- **Attaching sound files to spring map features:** This mapping initiative (described above) initially explored the possibility of attaching simple sound files to each node, allowing the user to trigger them individually by mouse operations. This was seen as the basis for developing an acoustic mnemonic code for structures. Ways of packing sequences of notes into each nodal file were envisaged.
- **Use of generative music:** A more structured approach to the use of sound to enhance comprehension of complex patterns of information emerged as a result of exploration of use of the *Koan* software provided freely over the web as a browser plugin by SSEYO (UK). This focuses on the use of *generative music* seeded by particular (data) patterns and controlled by an extensive array of parameters familiar to musicians. Generative music has the additional advantage of avoiding some of the obvious copyright issues associated with supplying sound over the web; this may not be the case with the seed pattern, but seed patterns can be developed. Of special interest is the fact that the amount of data transferred as a pattern to the plugin is normally less than 30k, since the music is generated by the plugin on the user's computer rather than having to be downloaded in its entirety. The plugin is free of charge.

The prime interest of using sound was to explore ways of offering sound cues to facilitate comprehension and identification of complex data structures, reinforcing visual cues. This is in contrast to conventional uses of sound to associate distinct ambience music with a web page or a web site.

In the fourth quarter of the Implementation Phase, this facility was successfully implemented as an experimental extension of the spring map facility to enable users to explore its possibilities on the basis of a set of seed patterns supplied for demonstration purposes by SSEYO, UK (who were extremely interested in the database application). The technical challenge of enabling the plugin through a cgi script, rather than in relation to static web pages, was partially solved. Difficulties for the user were occasionally encountered in relation to loading or obtaining the plugin.

Phases for further development of use of generative music in relation to the data were envisaged in some detail. These ranged from simply allowing the spring map data set to modify the seed pattern, through defining a unique seed pattern from the map data, to allowing the user to input music to trigger movement of selected parts of the map or its total reconfiguration.

Unfortunately lack of resources prevented rapid development and exploration of these facilities although new releases of the plugin have continued to be released.

### 3.9.12 Geographical maps

#### WCMC mapping

During the project WCMC made extensive progress in implementation of an Internet Map Server to allow deliver of a map-based interface to a number of its databases on the web.

A review of two Internet mapping products was carried out. A demonstration version of *MapObjects* IMS was acquired and installed, in addition to *ArcView* IMS, to enable a comparative review of the two systems. ESRI UK was contacted to ensure that a free swap of software was available should that be deemed necessary.

A Mediterranean demonstration was developed including elements from the two Internet mapping tools. In addition to the map display and query functionality of the early demonstration pages based on *ArcView* IMS; the new system based around *MapObjects* IMS also incorporated data download functionality. Experience gained from this exercise is summarised below:

	<i>ArcView</i> IMS	<i>MapObjects</i> IMS
Mapping and querying	Easy and quick to set-up using <i>JAVA</i> based tool. Available to all Internet	Becoming easier using Active X based tool, but still not quite as straight-forward

	browsers.	as <i>ArcView</i> IMS. Available only to Internet Explorer.
Data download	Data must be pre-packaged by WCMC.	User can select region and data sets to download interactively.
Customisation	Limited customisation.	Fully customisable, but using programming languages unfamiliar to WCMC staff.
Future support	Future development plans unknown.	Most new Internet related developments are with <i>MapObjects</i> IMS.

At the annual conference of the Internet mapping software supplier (ESRI) in 1999 it was clear that future developments of their Internet mapping technology would be based on a different product: *MapObjects* IMS. It was decided that the *MapObjects* IMS would provide the better longer-term development environment in which to develop the IMS service. However, the development of the system took longer as new skills needed to be developed.

To ensure that mapped information is delivered to the user at the highest possible quality, the format in which the map server delivers information has been changed. By switching the file format from a JPEG file to a GIF file far clearer images are provided. However, the UNISYS Corporation has copyright on the compression technique used in the GIF file format. To enable the GIF functionality within the IMS an agreement was signed with UNISYS. The standard contract issued by UNISYS requires the licensee to pay a percentage of all income from a system using their technology with a minimum annual payment of \$5,000. Through negotiations with UNISYS, these costs have been reduced to \$1,000 per annum.

Following development of the Mediterranean pilot, a number of other applications have been developed, each of which is described in other parts of this report. These include:

- Coral disease database
- Marine turtles database
- World Heritage sites
- European forest gap analysis
- Forest poverty mapping

It should be noted that developments in the field of delivering maps over the Internet are moving very fast, and WCMC is now considering changing the method that is currently being used to one that is more flexible.

### **UIA mapping**

The prime focus of "mapping" for the UIA was of the non-geographical variety related to representation of networks of problems or strategies as described in terms of the visualization techniques discussed above.

Throughout the project, the UIA explored the possibilities of low-cost mapping software that might have been used to provide users with a sense of the geographical distribution of problems. The UIA does maintain large datasets on the country location of members of international organisations. Given the links between Problems (or Strategies) and organisations, these data could have been used to colour fill world maps by country to provide users with an indicative sense of where the preoccupations with problems were originating.

Unfortunately no suitable, simple, low-cost software was located, despite the availability of more sophisticated and expensive alternatives. Tentative specifications for what is required have been indicated below.

### 3.9.13 Promotional Video

In 1999, at the request of DG Information Society the project produced a promotional video together with a series of streaming video interviews intended for release on CD-ROM to illustrate the achievements of the INFO2000 programme. A copy of the video is accessible on the *Ecolynx* website at Project Information > *Ecolynx* Movie.

### 3.9.14 CD-ROM prototype

As part of the completion of the Definition Phase, a comprehensive CD prototype was produced to demonstrate online and offline capabilities of the proposed service. Further work on this medium has not been given priority, for reason outlined in 19.1.

### 3.9.15 PowerPoint presentation – guided tour

A *PowerPoint* presentation was made for the Definition Phase project. Illustrated were seven scenarios of typical user applications:

- Threats to World Heritage sites;
- Endangered species;
- Trade in endangered species;
- Polar bear *Ursus maritimus*;
- Steller's eider *Polysticta stelleri*;
- Protected areas for biodiversity conservation;
- Conserving global biodiversity.

This *PowerPoint* presentation provided the basis for a presentation tool for potential users and sponsors. It was updated in April 1999 and shown at various conferences. The most recent version is also available for download or viewing online at: <http://www.uia.org/projects/completx.ppt>

## 3.10 Final Report on virtual reality (VRML) 3-D displays

Deliverable 5052-18

Expected (original) delivery 30-06-99

Final delivery 31-07-00

### 3.10.1 Background to the workpackage

The original proposal presented a series of individual prototype VRML displays (generated off-line from the UIA databases using the VRML 1.0 standard). The intention of the project was to build on this facility and to incorporate it into the databases served dynamically as web pages.

The purpose of using virtual reality (via VRML) displays was:

- to offer users a way of grasping more complex patterns of relationships between problems or between strategies, as well as allowing them to explore complex institutional networks in new and potentially more powerful ways.
- to offer access to people who have not been habituated to classic database output but have acquired familiarity and preference for multi-media style presentations. This is especially the case with younger people and is consistent with some of the predicted developments of knowledge visualization.

### 3.10.2 Virtual reality (VRML)

As indicated in the discussion below on virtual reality, the opportunities of developing *Java* spring maps during the project led to higher priority being given to that mapping approach early in 1999, with a view to continuing work on virtual reality later in the project. For this reason this final report is split into two parts. The two mapping approaches were seen as complementary features of value to users in different ways.

At issue at the start of the project was whether 3-D displays could be generated from UIA databases to produce files readable virtual reality (VRML) environments through standard browser plug-ins (such as Live-3D on *Netscape*). During the Definition Phase, techniques were developed to convert clusters of hyperlinked entities from the UIA databases into 3-D structural configurations via Web browsers. The networked relationship structures able to be displayed include problem loops and multiple loop interlocks, and clusters of interrelated organisations. These experimental structures have been placed on the UIA website to evoke comment from potential users (<http://www.uia.org/uiademo/vrml/vrmldemo.htm>).

Over 50 displays were originally generated using VRML 1.0. The experiments explored several display metaphors: intersecting polygons, networks, tagging polygons forming a sphere, and a solar system. Techniques demonstrated include: colour tagging diverse elements, multiple complexes in the same display (different relative coordinate systems), insertion of lines linking common elements in different complexes of a display (between different relative coordinate systems), representation of complex networks, use of parameters to regulate size of display elements according to measures of importance, hyperlinking to explanatory local HTML text and to external websites. The results suggested interesting new ways of looking at environmental problems and institutional complexes (including the UN, the World Bank and the European Union institutions).

Constraints originally encountered were the labelling facilities within VRML 1.0, the size of files relative to the complexity to be displayed, and browser speed on lower capacity machines.

The intention of the project was to build on this facility and to incorporate it into the databases served dynamically as web pages.

The purpose of using virtual reality (via VRML) displays was:

- to offer users a way of grasping more complex patterns of relationships between problems or between strategies, as well as allowing them to explore complex institutional networks in new and potentially more powerful ways.
- to offer access to people who have not been habituated to classic database output but have acquired familiarity and preference for multi-media style presentations. This is especially the case with younger people and is consistent with some of the predicted developments of knowledge visualization.

During the early course of the project, this development was retarded by the following factors:

- the industry switch from the VRML 1.0 standard to the VRML 2.0 standard and development of UIA capacity to handle the dynamics of VRML 2.0 (partially dependent on availability of error checking software, more recently built into relevant plugins)
- the industry transition period for browser plugins to stabilise and adapt to the VRML 2.0 standard through the recent succession of browser generations
- the priority given to the unforeseen opportunity of the *Java* spring mapping visualization (developed by the UIA during 1999 with third party assistance); the final report on virtual reality was deferred for a second time because of the significant continuing progress being made on the parallel initiative involving development and testing of a *Java* applet to provide mapping facilities which may affect the way in which any VRML work is completed.
- the UIA challenge in switching to dynamic serving of database pages (successfully completed only in November 1999)
- the clarification of loop analysis and the presentation of such loops as part of the data offered to users (completed in the Fifth Phase)

During the early phase of the project, the experiments with virtual reality took the following forms:

- **Tensegrity:** This experiment is an effort to make use of a somewhat unique tensegrity structure displayed through virtual reality (viewable through freely available browser plug-ins). Individual entities (eg Problems or Strategies) are associated with the struts in such a structure. The aim being to produce a coherent configuration that a user can rotate and explore using the virtual reality plug-in navigational tools. So the structure can be turned, zoomed into, etc. In principle clicking on an active strut with which a problem (say) is associated will bring up the corresponding text profile.
- **Polyhedra-1:** Through this experiment, software selects a polyhedron onto which relationships from a problem (say) are projected. Each facet thus becomes the interface to another problem. The polyhedron as a whole is thus a configuration of facets representing the problem as it interfaces with related problems. Clicking on the facets should bring up the corresponding text profile. This experiment is based on a similar justification to that based on tensegrity. In the current version, the selection of polyhedron is crude and the colouring is random. The virtual reality browser enables the user to manipulate and explore the structure.
- **Polyhedra-2:** This is a development of the previous experiment in which the user can endeavour to control the way in which the software selects and designs the polyhedron. The user is free to include or exclude particular types of relationship and to colour the corresponding facets differently, as well as selecting a preferred shape. Again clicking on a facet should bring up the text profile. The virtual reality browser enables the user to manipulate and explore the structure.

The work on the logic of dynamically generating *Java* spring maps however facilitated virtual reality visualisations using VRML 2.0, which were made available to users during the Fifth Phase (Jan-Apr 2000) as an alternative to the *Java* map mode of display.

The approach taken to the virtual reality displays, as with the spring maps, has been experimental but with an emphasis on enabling users to explore the experimental displays as they were developed.

The final priority for the displays was to increase capacity to present information on problem loops and to ensure a hyperlink from nodes on these displays into the corresponding text data. The displays can therefore be used a front-end interface.

The project enabled some specific technical challenges to be resolved in ensuring dynamic adaptation of loop data into a visual display of loops in virtual reality from any problem in the database (provided it was part of a loop) and delivery through a cgi interaction. This successfully sets the stage for further developments that are primarily constrained by determination of meaningful design metaphors through which data from UIA databases can be displayed. It is now possible to make use of the full range of VRML 2.0 facilities (including those requiring dynamics within the structures of the display) to generate visual structures focused on any part of the UIA database as determined by a user.

Several interesting design challenges are still to be resolved to enable even more powerful access (see 4.1 below). For some of these reasons, and the fluid nature and exotic status of VRML software, users may experience some difficulty and frustration in getting virtual reality browser plug-ins to work correctly.

### 3.10.3 Java spring maps

As noted above, the UIA took advantage from early 1999 of the unforeseen possibility of collaborating with a Netherlands-based software company to develop *Java*-based spring mapping visualization. Essentially the UIA paid them for third-party assistance in developing software that related closely to a software initiative that they had been undertaking on a non-commercial basis for several years.

The product, which they developed in the light of UIA specifications and their own experience, was an applet that allowed a network of entities to self-organise on a web page. Through several iterations, additional functions were added to the applet. The applet is controlled via a web page offering the user a

range of possibilities. The web page (with a unique map) is itself generated on-the-fly in response to user request from many UIA database profiles.

This facility has been developed to the point that unique maps are now generated from any database entry in response to user queries. Users are able to increase or decrease the complexity of a map. Nodes on the map serve as clickable entry points -- either to the relevant text profile in the database, or to a new map centred on the selected node. In effect the map may be used as a front-end entry point to the database.

A series of desirable further developments to this 2-dimensional mapping facility have been identified. Unfortunately resources did not permit these to be undertaken within the framework of the project. The applet has now been registered as "open source", avoiding difficulties in the creative relationship between UIA and Beautiful Code.

The constraints with respect to *Java* are due to the fact that *Java* compatibility across browsers and platforms is far from satisfactory. Steps have been taken to acquire some facility with *Java* or the adaptation of *Java* packages. However the challenge of ensuring predictable safe delivery of applet-based maps across all platforms remains. Such work also has the advantage of being least locked into licensing arrangements and most open to further adaptation. The planned release of a *Java*-oriented version of *OpenInsight*, announced for 1999, has been postponed and, according to the latest information, may be abandoned.

Subsequent discussions with Beautiful Code have focused on the development of the 3-D variant of the underlying algorithms (to be eventually marketed as *Fluidiom* by Beautiful Code). In the further development of the 3-D variant, Beautiful Code has sought UIA collaboration to enable it to use UIA databases to populate a 3-D universe for demonstration purposes. This is being done in conjunction with an adaptation of the database structure to XML to enable further testing to be done within an XML database (under development by a Netherlands-based company) using Fluidiom as a front end. Both partners need a rich dataset to demonstrate the viability of the unusual applications envisaged.

For explanations concerning the other visualization experiments, see elsewhere (<http://www.uia.org/dyna/vizexp.htm>).

The maps are generated under user control via <http://www.uia.org/data.htm>. There are several pages from which a map may be (re)generated:

- From the **search screen**, after specifying a keyword (for example "forests" for the database World Problems), and clicking on Map against display choice.
- From an **index listing**, after running a search (for example "forests" for the database World Problems), and clicking on "Map" at the top of the listing
- From a **text profile**, after running a search and selecting a profile for display (for example "forests" for the database World Problems, then click on "deforestation"), and then click on "[map]" against any of the lists of cross-references of different types

The purposes of these self-organising displays are to create a visual index to show the complexity of relationships between (data) profiles and reveal the data rich domains. The maps are generated directly from the data in response to user requests. Each display is dynamic and continues to organise itself in response to user constraints applied via the mouse. Further improvements to the display are under development in order to offer new insights into the data.

User instructions and commentary on the maps can be found at <http://www.uia.org/dyna/mapexp.htm>.

### 3.10.4 Unforeseen developments during the project

During the early course of the project, this development was retarded by the following factors:



- the industry switch from the VRML 1.0 standard to the VRML 2.0 standard and development of UIA capacity to handle the dynamics of VRML 2.0 (partially dependent on availability of error checking software, more recently built into relevant plugins)
- the industry transition period for browser plugins to stabilise and adapt to the VRML 2.0 standard through the recent succession of browser generations
- the priority given to the unforeseen opportunity of the *Java* spring mapping visualization (developed by the UIA during 1999 with third party assistance)
- the UIA challenge in switching to dynamic serving of database pages (successfully completed only in November 1999)
- the clarification of loop analysis and the presentation of such loops as part of the data offered to users (completed in the Fifth Phase)

### 3.11 Final report on subsidy, sponsorship and online charging options

Deliverables 5052-20 and 21  
 Expected (original delivery) 31-06-99  
 Interim report 09-10-99  
 Final delivery 31-07-00

#### 3.11.1 Background to the workpackages

The product has been developed in a “not-for-profit”, “public interest” environment. As non-profit organisations, the partners are primarily interested in “financial sustainability” (cost recovery), namely the long-term maintenance of the product and its services with minimal call on fresh funds, rather than “commercial viability”, namely making profit. In practice, however, the business model is much the same and is one that the project partners have used to finessed the art of not-for-profit business practices over many decades.

The main difference is that “profits” are redistributed by (1) charging at different rates (discounted, standard, commercial) and being rather more flexible over services to those who are not in a position to pay anything and (2) ploughing surplus income back into service management and development. The ‘commercial’ strength of both principal partners is that the project builds on their ongoing and developing information systems, whose development strategies are having to confront these realities anyway and have already demonstrated success in doing so.

In much the same way as equivalent private sector organisations, the partners gain their income by the sale of products and services in their various fields of publishing, environmental consulting, information development, knowledge management and education. In the case of UIA and WCMC, this income derives in large part from the value placed on their databases, which are being continually improved and updated using the proceeds of their work. Over the past 30 years, these partners have proved that the long-term development of their data activities is viable, although at times the level of resources has been of concern because of its potential to affect the currency of the information available.

At the broad level, UIA and WCMC do not distinguish between the financial sustainability of this project and that of their ongoing concerns. This is because the work is essentially on their development paths. They have been prepared to contribute considerable amounts of matching funds and bring in other funds and partners to accelerate this process. This is likely to build into the project a considerable amount of shared risk with other “non-project partners” because it is designed to be (1) modular and additive (adding content to long managed databases; adding new coverage to already funded initiatives) and (2) interwoven with information developments funded by other parties in other domains (eg Internet and e-commerce initiatives).

Both “content partners” in this project (UIA and WCMC) rely heavily on the contributions of what might appropriately be termed “hidden” partners. These are the providers of information and, at the same time, are often the prime users of that information. As such, they are motivated to ensure its

accuracy and improvement and may be sensitive to the manner in which it is used. Such partners may be private sector organisations (including corporate sponsors), non-profit organisations, academics and scientists<sup>24</sup>. With each relationship, there is a set of understandings, usually implicit, about ownership, care and use of the data. This raises rather complicated issues about the redistribution of aggregated data, particularly if it is to be sold in digitised formats (not books or CDs). Although cost recovery is essential, especially in an increasingly competitive information environment, means must nevertheless be found to ensure the involvement of the constituencies identified above, notably through differential pricing schemes so that they do not experience themselves being charged unreasonably for information that they have freely provided.

At the start of the project, charging for information services on the Web was still in its infancy. Appropriate security/authentication/billing software started to become available in 1996-7. One expected outcome of this workpackage was to demonstrate the feasibility, or otherwise, of using online-charging for the Web delivery of some or the entire product. This would involve experiments with: suitable packages and formulae using a mix of zero cost and billed access to Web information; billing for selected portions of the data; and offering facilities to sponsors to subsidise access to data in particular domains.

It was also clear that the business plan for the post-Implementation Phase of the project would itself be a matter of trial and development during the Implementation Phase.

### **3.11.2 Commercial sponsorship**

Commercial sponsors potentially benefit from a range of activities including:

- Access to information and services in a preferential manner
- Opportunities to help set priorities
- Training sessions and seminars in use of information and services
- Sponsor brand included in selected literature and on website
- Hot links between project websites and sponsor sites where appropriate
- Joint PR activity.

Plus other tailor made activities to help sponsors achieve their set objectives.

Sponsors would improve and enhance brand and corporate images within the environmental arena whilst communicating clearly defined messages for all those striving towards self-management and environmental stewardship. As a result, sponsors would benefit from increasing prosperity whilst being seen to conserve the natural world and its resources.

WCMC has had meetings and discussions with a range of commercial sponsors, including:

#### **Discussions with corporate IT sponsors**

WCMC has had a number of discussions with leading international companies, one working in software development, the other in development of Internet search engines (June/July 1998).

Discussion with the software developer concerned potential support from them in the development of web-accessible databases and other Internet-based information services. Unfortunately this fell through because of the unreasonable expectations of the software company. In WCMC's experience non-experts always consider that database related to biodiversity are non-complex and easy to implement, whereas the reverse is the case.

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<sup>24</sup> In the case of the UIA, much of its information is obtained from international non-profit bodies, whether intergovernmental or non-governmental. In the case of WCMC, much of its information is obtained from networks of "volunteers", whether professional scientists or dedicated amateurs. As noted below, updating and improvement of the information is primarily dependent on the involvement of these constituencies as partners/users.

Discussion with the company developing Internet search capability concerned future development of search engines that can target specific information subsets on other web sites. In this case the company provided its Internet search tools (*Muscat Empower*) at a significantly reduced price.

WCMC has also had numerous discussions with other hardware and software suppliers outside the context of this project. Our usual experience is that the companies are prepared to provide more equipment for a given price rather than to donate equipment. WCMC has in the past benefited in this way from both *Sun Microsystems* and *ESRI* (who make *ARC/Info* and the related GIS products).

### **International Petroleum Industries Environmental Conservation Association**

During the project WCMC has also been working closely with IPIECA, which is supported by a number of oil companies. In a number of areas the projects have been working synergistically. Initially it had been intended that IPIECA members would sponsor a part of the WCMC website that was only available to members, but this is not now the case and IPIECA is interested in sponsoring development work that is available to whoever wants it.

### **ECOSearch**

During the last few months WCMC has been working with three major multinational companies to develop an approach to making the biodiversity-related information that these countries hold more widely available. While this is still under development as a concept, the signs are good, and it seems likely that a feasibility study will be funded in 2000. The industries concerned will then be making funds available in order to increase access to information that they hold.

### **3.11.3 Discussions with potential partners**

The project partners had numerous meetings during the course of the project where the purpose was to discuss potential partnerships, funding or sponsorship. Most of these have produced genuine involvement, which in several cases is still in the process of being appraised. Examples of such meetings and discussions are:

#### **Discussion with the South Pacific Regional Environment Programme (SPREP)**

In 1991, WCMC published with IUCN and SPREP the *Directory of Protected Areas in Oceania*. In a meeting of 20 May 1998, WCMC proposed to the biodiversity focal point for SPREP the development of pilot project on the Internet for update of protected area descriptions between now and the next South Pacific nature conservation conference in 2000.

WCMC is now making information sheets on individual protected areas for the whole region available on the Internet in such a manner that direct update by appropriate individuals in management authorities using the Internet is encouraged.

This region is good for a pilot project that can then be applied to other regions because of the need for better information sharing, the distances involved which preclude frequent meetings, and the need for regional organisations to promote increased use of the Internet. At present this does not have a sponsorship or charging option, but as a service to a regional environmental programme this is clearly a possibility.

#### **Discussions with IUCN Protected Areas Programme and IUCN World Commission on Protected Areas (WCPA)**

WCMC works very closely with both the IUCN World Commission on Protected Areas and the IUCN Protected Areas Programme in compiling information on protected areas and disseminating it in a variety of formats. At the WCPA Steering Committee (8-12 June 1998), the INFO 2000 project was briefly introduced to Steering Committee members, and discussed in more detail with the Commission Chair and the senior staff officer from the IUCN Protected Areas Programme. All were delighted that the INFO2000 project is able to contribute to increased access to protected areas information and are willing to collaborate in making the information available. The contract that WCMC has with WCPA (worth about £45,000 a year) was amended to take this collaboration into account.

#### **Discussions with European Environment Agency (EEA)**

WCMC and the EEA have a mutual interest in making more information available on the Internet concerning both the compliance of European states with international legislation, and national efforts to meet international conservation objectives. Preliminary discussions on how this can be done in the context of the INFO2000 project have been held with the biodiversity focal point of the *European Environment Agency* and staff of the EEA *European Topic Centre/Nature Conservation* (various correspondence and meeting of 25 June 1998). This collaboration is likely to cover information on internationally designated sites and species covered by international legislation, and may also cover nationally designated protected areas. A result of this collaboration is a joint approach to collecting information on protected areas in Europe, which reduces duplication of effort, and ensures that the use of available resources is efficient.

#### **Discussion with Centre "Leo Apostel" (Brussels, 4 May 1998 and subsequent)**

This meeting with Dr Francis Heylighen covered the possible presentation of the project by UIA to a seminar of the Centre "Leo Apostel" (Free University of Brussels, Belgium). This is in connection with the Centre's work on *Principia Cybernetica* and their possible interest in cybernetic feedback studies. Their initiative has recently (2000) achieved scientific publicity in relationship to the notion of a "global brain", with which the project data is compatible. Discussion on potentials for future collation continues.

#### **infoDev and Development Alternatives (New Delhi and Bangalore, 19-30 October)**

Development Alternatives (DA) is an Indian-based organisation, which designs appropriate technologies and institutions for the creation of sustainable livelihoods. It also has an extensive information network under development. Within the project requirement to secure matching funding for the EU funds provided under the INFO2000 programme, the UIA made a joint application with DA for funding by the World Bank under its *infoDev* (Information for Development) programme. The *infoDev* activity aimed to accelerate the transition of a significant market segment of telephone, fax and basic email users towards fully automated information services during a decade when most would not have this opportunity. It would have increased access and exposure to networked communication services in India and build capacity for its use by NGO groups. Unfortunately, after a 24-month application process, the project was recommended for funding but remains unfunded.

#### **EU-India Economic Cross-Cultural Programme**

Meetings were held with Roberto Carpano, Director of the Programme (Brussels, 8 September 1998) and with Domenico Nicoletti, Enterprise Project Officer (New Delhi, 29 October). Project concepts complementary to INFO2000 activities were discussed. It was intended to submit a proposal, in the first half of 1999 under the second call of this programme, for activities relating to water. The call never eventuated and the programme is back with DGI under review.

#### **Discussions with Monsanto (Brussels, 7 September 1998)**

UIA has had discussions with the coordinator of Environmental Services, Monsanto Europe, concerning possible sponsorship of the product. The discussions and possible collaboration are seen as a model for approaches to other companies.

#### **Discussion with members of Contact Consortium (Rotterdam, 5 July 1998 and subsequent)**

Anthony Judge and Nadia McLaren had discussions with members of the Contact Consortium, notably Gerald de Jong, Beautiful Code B.V. (Rotterdam) with regard to use of *Active Worlds* and *Struct* virtual reality technologies. These discussions continue to evolve between a variety of potential partners, one configuration of which is currently (August 2000) using a UIA database to test a new kind of software.

#### **MyTown (Sydney, 30 December 1998)**

Nadia McLaren initiated discussions with the *MyTown* consortium, based in Melbourne, Australia. *MyTown* is an online empowerment resource for local community development. It is currently in pilot planning phase, under the support of major corporate sponsors. The integrated knowledge system being developed under this project could become part of a disseminated and participative knowledge structure serving sustainable community development. These discussions continued in 1999. The UIA databases are now available through the *MyTown* portal, as soon may be *Ecolynx*.

**Discussions with Danyal Sattar, INAISE (Brussels, 26 February 1999)**

The International Association of Investors in the Social Economy (INAISE) is a global network of socially and environmentally oriented financial institutions. The Brussels office is exploring the use of web databases for the promotion of sustainable development and the social economy through case studies. We discussed possible collaboration but nothing further has developed.

**Meeting with John Galloway, NetMap (Sydney, 5 May 1999 and subsequent)**

NetMap Solutions Pty Ltd is the owner of very sophisticated data mapping software. John Galloway was its creator. The meeting was to follow-up on previous email contacts and an experiment several years previously, which imported UIA data into the NetMap software. Friendly and fruitful discussions were had, with an understanding to explore closer collaboration. NetMap currently has a set of UIA data to test access to it via an application service provider (ASP), which would reduce the cost to users of accessing this facility via the UIA website.

**Meetings with Convention on Biological Diversity and Biodiversity Clearing House Mechanism (Montreal, 7 May 1999)**

Nadia McLaren had a series of courtesy and research meetings with people in the Convention on Biodiversity office in Montreal. Of special significance were discussions with Marc Auer, the Programme Officer at the Clearing-House Mechanism. Under the Convention, the Clearing-House Mechanism is the official place for inter-national information exchange on biodiversity conservation. It was important that it be made aware of our project and we begin consideration how the two resources might work together. Jerry Harrison of WCMC has done the task of informing in the past, when he has met with officers of various agencies concerned with biodiversity conservation. No specific ongoing relationship with the CHM has been defined as yet, but this is an area for future review with both the global CHM and national CHMs.

**Malcolm McCafee, Paideia**

On his initiative, several discussions took place during 1997-2000 regarding the creation of an educational front-end to UIA databases in order to provide a set of courses for a virtual university. A prototype version was implemented on his website.

**George Pór, Community Intelligence Labs, Santa Cruz**

There have been two meetings, one in 1998 and one in 2000, to discuss the implications of visualization of UIA data for current initiatives on knowledge ecology in relationship to knowledge management. Mr Pór is currently presenting this aspect of our work for potential sponsorship by an industry consortium in the USA.

**3.12 Marketing and launch plan**

Deliverable 5052-22

Original delivery 31-10-99

Final delivery 31-03-2000 (deferred from 31-10-99 )

**3.12.1 Pre-existing products**

The two partners providing content to this project -- UIA and WCMC -- are European-based international NGOs with agendas to enable organisations (governments, official bodies, conservation groups, industry and commerce) around the globe to be informed, plan and make fundamental decisions.

For almost 90 years, UIA has been providing information services about international organisations and their activities, as well as facilitating global networks to be more effective. WCMC has for almost 30 years been providing information services on conservation and the sustainable use of the world's living resources as well as helping others develop information systems of their own. Both organisations have established unique and enviable reputations as data clearing houses and for providing *non-campaigning, unbiased, timely and factual information*. In addition, the UIA is particularly interested in capturing biased and possibly unfounded perspectives from constituencies that seek to influence policy and/or allocate resources in the firm belief that these perspectives are factually based.

Both organisations access data from a wide range of expert sources and have extensive networks of contacts and collaborative links throughout the global community. UNEP-WCMC operates on national, regional and international levels; UIA at regional and global levels. Both organisations are committed to the principle of data exchange and act as clearing houses, allowing data providers and users to share data and information. They also serve as knowledge managers and custodians, aggregating and storing information in knowledge structures.

Wherever possible, data managed by WCMC and UIA is placed in the public domain. In giving open access to data, WCMC is more limited by obligations to its data providers (scientific and commercial), particularly as regards ownership; UIA is limited more by contractual obligations to the commercial agent which markets some of its reference products and provides a major income stream to ensure maintenance of the databases.

**3.12.2 Past marketing by UIA and WCMC**

Until the advent of the web, neither UIA nor WCMC themselves 'marketed' their information products in any conventional commercial sense.

**UIA**

In the case of UIA, its reference products are marketed globally by the Munich-based academic publisher K G Saur. UIA independently publicises its book and CD products on the Web, in journals (it's own and others) and at international meetings.

UIA began web-based delivery of information in 1997 and the dynamic delivery of databases in 1998 (as enabled by this project). With no deliberate marketing, it now has over 17,000 registered users and around 75,000 hits per month. This is primarily a consequence of web search engine exploration of the UIA static site (pointing into specific materials in the dynamic site initiated by this project).

**Developments in UIA marketing policy and practice:** K.G. Saur Verlag, publisher/distributor agent of UIA's books and CDs was a member of the Reed Elsevier group during the entire project period. It has

since been sold to the Thompson Publishing Group (owners of Gale Research, a major competitor on some UIA products). Saur will market UIA's international organisations database on line, by subscription, from August 2000 – linked to the databases funded by this project. This organisation data was previously only available in book or CD form. UIA is looking into micro-payment arrangements for small amounts of these data and also online subscription to its international meetings database. All other UIA databases online are still provided free of charge.

### **WCMC**

In the case of WCMC, books and reports were prepared in response to requests, usually co-operatively produced, and marketed by partner organisations (UNEP, IUCN and others). Rather than developing a broad marketing strategy, WCMC has tended to carefully target organisations and processes that can provide information services to support, and work with the organisations concerned to find the resources for the work.

WCMC was one of the first organisations to deliver such information via the Internet, and made available dynamic databases as early as 1994, and its electronic products are freely accessed, hence 'marketed', through user search and access on the Web. Although little to no marketing efforts have been made to date, WCMC has achieved a world position, which is second only to *panda.org* and *greenpeace.org* amongst conservation-related organisations - at a rate of over 2.5 million hits per month. More specifically there are over 200K individual users of the website each month, from around 80 countries.

The work entailed by this programme of activity was to progressively (1) test and revise the marketing plan in response to feedback, taking into account user workshops and online feedback; (2) implement the web component of the marketing strategy as components of the product are brought online; (3) as the product develops, add more conventional marketing components of the marketing plan through the usual operations of the partners (mailings, meetings, journals etc) and (4) prepare for a public launch.

These activities were carried out according to plan, except that the plan has been displaced somewhat. Part (1) is fully achieved; parts (2) and (3) have commenced and are planned to conclude in the late half of 2000 and beginning of 2001; and (4) is still to take place.

***Developments in WCMC marketing policy and practice:*** The three years of the project period have coincided with a major review and transformation of WCMC's organisational status and structure (but not significantly its activities). In late 1998 there was a review of its future given a decline in guaranteed core funding. Just after the end of this project period, on 3 July 2000, WCMC became an office of the United Nations Environment Programme (UNEP).

These changes have also had some effect on the approach to business development and marketing. For one year WCMC had a Head of Business Development who reviewed sponsorship and marketing of WCMC products and services. Significant advances were made in the development of an information service which it was expected that industry would use through a subscription service. At the last minute this had to be scrapped because of changes in the UK law dealing with VAT, and the approach of the Centre to business had to go through some changes.

Coincident with the final phase of the project, WCMC filled a new position of Head of Marketing. Future marketing strategies are (1) web-based (2) database marketing (3) direct response mailers (4) media relations (5) partnership marketing and (6) through commercial sponsorship. Two new recent developments are important:

- BP Amoco/Rio Tinto announced recently at the Biodiversity in Business conference that UNEP-WCMC will become keepers and managers all their global environmental information. This consolidates a relationship, developing over several years, between WCMC and a significant private sector data provider.

- There is already an increase apparent in the work that WCMC is being asked to carry out for the global biodiversity-related treaties. Again this consolidates relationships developed over a number of years.

### 3.12.3 Review of market trends

In 1998, WCMC undertook a study of market trends for environmental information, in order to provide a basis for review of the Centre's programmes. This study confirmed that the market for the provision of environmental information is in high growth because:

- Global and European legislation continues to have a major impact on industry and commerce.
- Awareness and popular support for biodiversity issues have increased dramatically over the last 3-5 years.
- Over the last 12 months alone the environmental consultancy market has seen an increase of 5% and the environmental training market has seen an increase of 20%.
- Due to the demand for natural products, industry is taking its environmental responsibilities seriously.

This was echoed in the opinions of private sector organisations that are among the customers of WCMC:

“The key area where action is necessary is the environment. Although the science is still provisional, the legitimate concerns about the risk of fundamental change in the earth's climate are too serious to be ignored. Precautionary action is justified and necessary .... Those concerns are increased by the growing demand for oil and natural gas, driven by population growth and economic development....” *BP Amoco – December 1998*

“A healthy and diverse environment is a key goal of sustainable development with nature conservation and partnerships an essential part of our long term environmental strategy...so biodiversity (the variety of life) is one of our 10 key sustainable indicators.” *Anglian Water – June 1999*

In 1998, as part of an independent review of WCMC, over 52 representatives were interviewed from 42 organisations that provide or use biodiversity/conservation data or information. Approximately 70% expected information/data demands to increase, and most expected this to be reflected in demands on WCMC services.

As a provider of services, the key strengths of WCMC were seen to be the skill and broad ranging experience of the staff and its global data coverage. For private sector users, the independence and objectivity of WCMC was particularly important. There are, for example, organisations more strongly placed to provide biodiversity/ conservation data on individual topics *eg* species, wetlands, and the same can be expected to be the case for many single countries. But as a source of global information, WCMC currently appeared pre-eminent, although there were competitors. About half of those interviewed said that they were aware of no substitute to WCMC. These organisations relied on WCMC for their own ability to service the needs of conservation/biodiversity protection.

Users of WCMC's databases and associated services had the opportunity to fill out a questionnaire on the WCMC website during October 1998. Of the 57 users that responded, 50% were from academic organisations, such as universities, 12% from local government, 7% from national governments and the remainder fairly evenly spread between conservation organisations, NGOs, individuals, consultancies and “other”. 80% of the respondents cited their use of the information as being either academic or teaching / school related. The majority of visitors were expressly seeking biodiversity / conservation information.

Recently WCMC has gone through a period of change as it has moved from being an independent organisation to a part of the United Nations Environment Programme (UNEP). During the various programme meetings that were necessary for this transfer, and during the launch itself, a number of



prominent individuals commented on the important role of information management and dissemination in ensuring conservation and sustainable use of biological diversity.

Specifically, each of the following is a comment on WCMC's role made in the first half of 2000:

"The global community must improve its ability to identify emerging environmental problems and assess appropriate responses. Formulating effective global, regional and national policies on matters vital to our future requires the ability, and the foresight capability to make accurate, long term projections of global trends." *UNEP Deputy Executive Director*

"The Centre's technical experience and expertise place it in exactly the right position to take the best advantage for securing ever more accurate environmental information, guiding decisions of both governments, inter-governmental organisations and NGOs. For this is the cornerstone of biodiversity conservation: accurate, accessible and useful information." *UK Minister of Environment*

"The accessibility of your work is vital. The results of monitoring ecosystems and habitats need to be widely available. They help to show whether we are using the Earth's living resources sustainably. And that in turn is crucial to reducing poverty and improving the quality of life." *UK Minister of Foreign Affairs*

In the case of the UIA, the most significant recent indicator of market demand for its information services is that on the occasion of the recent sale of its commercial publisher, K G Saur Verlag, by Reed Elsevier to its major competitor Thompson Publishing Group, the inclusion of the UIA contract was one condition of the sale.

These quotes and indications, coupled with increase in project work, the number of queries coming to WCMC and the increase in usage of the WCMC and UIA websites all serve to confirm importance accorded to information and information services that are delivered through this product.

### 3.12.4 Professional outreach

The following meetings have been reported in previous progress reports:

- Meeting with World Bank staff (Washington, 1997-99)
- Global Knowledge '97 Conference *Knowledge for Development in the Information Age* (Toronto, 22-25 June 1997)
- *Online Exhibition* (London, 8-12 December 1997)
- *Bridging the GAP* Conference (London, 3-5 June 1998)
- 6th World Wilderness Congress (Bangalore, 24-29 October 1998)
- 4.6 World Academy of Art and Science (Vancouver, 25-27 October 1998)
- NGO Environmental Health Action Group meeting (Soesterberg, 7-8 February 1999)
- NGO Internet Fiesta (Vienna, 19-20 March 1999)
- Workshop: Integrated Planning at Different Scales: Policy and Practice (Perth, Scotland, 7-9 April 1999)
- Pan-European Eco Conference on Public Participation (Moldova, 17-18 April 1999)
- 4<sup>th</sup> International Expert Seminar on Environmental Management (Surfers Paradise, 19 -25 April 1999)
- Fifth Framework Seminar, East-West Collaboration in Developing Interactive Media Production (Budapest, 8-11 May 1999)
- WHO/NATO Expert Workshop on Environmental Health (Varna, 17-23 May 1999)
- Healthy Planet Forum and 3<sup>rd</sup> Meeting of European Health and Environment Ministers (London, 14-22 June 1998)
- Presentation to KPN Research and Training Divisions (Groningen, 1 July 1999)
- Presentation to Dutch Ministry of Environment (Den Haag, 13 July 1999)
- Foundation for the Future *Threats and Opportunities towards the Year 3000* (Seattle, 25-29 September 1999)
- Workshop on Information in the Policy Process (San Francisco, 10 December 1999)

### 3.12.5 Marketing strategy

A marketing plan was prepared during the Definition Phase. It was reviewed and revised during the process of preparing the proposal for complementary funding from the *infoDev* programme of the World Bank. A copy was handed to the INFO2000 Project Officer at the Team Meeting on 24 April 1998. It is confidential and restricted. A review of the major points is provided below.

8. The ideal information and marketing strategy should be able to reach the target audiences at the lowest cost possible.
9. There are many possibilities for marketing this product, which is transiting through the era of change from authoritative, hardcopy information to dispersed, electronic information. They include opportunities for:
  10. Marketing the product through its responsiveness (interactivity) to its potential market;
  11. Employing the product as the marketing tool;
  12. Employing the medium as a market place.
13. A detailed break down of target markets and audience has been provided in THE Workpackage on User Needs and in 3.12.3: Review of market trends.
14. This product will be of greatest interest and value to selected scientists, researchers, policy-makers and professionals, as well as to scholars, educators and students. Libraries, NGOs and special interest organisations also comprise a significant potential audience.
15. It is not simple to create a marketing formula for this product because the “multimedia content stage” is being reset month by month. The project consortium believes it will need to respond by adapting to market trends and the needs and requirements of the audiences over the course of the next few years, whilst at the same time regularly reviewing the existing need for the product and adapting to the feedback from end users.
16. Because the products and services build on ongoing activities, there is a strong case for progressive and segmented marketing through selective communication of the product.
17. This product is designed primarily for a ‘professional user-group’ (although it is expected that others will benefit incidentally and may become a valuable source of information). Marketing to this group can be done to a large extent by direct marketing to the existing UIA/WCMC client and databases.
18. The “launch” would be a hybrid of announcement and publicity of the *Ecolynx* website at one or more major international events and in other formats and media.
19. The Internet provides multiple avenues for dissemination. An Internet marketing strategy is detailed in Section 3.12.6: Internet marketing strategy.
20. The new information products and services will be publicised by the partners and their regular collaborators through usual channels, including publication catalogues, project partners’ journals, press releases, submitting the *Ecolynx* website to review processes of the print and on-line media concerned with conservation and/or technology issues, on-line announcements, meetings, magazines, regular mailings etc).
21. It is likely that an affordable (sponsored) CD-ROM product will be made available in the future and that this would extend the product into a new, non-online, market, probably through a commercial distributor.

### 3.12.6 Internet marketing strategy

The web marketing outlined below is being progressively implemented. Internet technology makes it possible to reach the target users and media contacts in a simple, effective and direct manner. The primary expense is staff time for completing the various operations.

Note that in implementing this strategy, marketing may be carried out for components of the information services being developed, and not for the whole project. For example, much of the work carried out by WCMC has been modular in nature, targeted to the needs of particular expert and interest groups. Marketing therefore tends to be focused on those specific groups.

Key actions are as follows:

**Prepare common portal website:** Building the interface for the web portal *Ecolynx* commenced in January 2000. The [www.ecolynx.org](http://www.ecolynx.org) domain was registered in April 2000 and has been functional for beta-testing purposes, since this time.

**Prepare partner web sites:** The partner websites have developed their existing project-related content, most of it at this stage at no-cost access. Relevant details on access to further information and further information services are included as appropriate, including sales and subscription information.

**Announce to discussion groups:** Announcements concerning the project and the websites (including components of them) have been prepared and will be submitted to relevant e-mail based discussion groups to attract individuals or organisation representatives likely to be interested in the project and the project partners' activities.

**Register with Internet search engines:** Because of the nature of information search and retrieval on the Internet, project partner websites and relevant components of them are being re-registered with the growing number of search engines in order to have the pages relevant to project properly indexed. Each feature or page, where unique from the rest of the site contents, are being registered individually.

**Provide meta-tags:** The project webpages are being developed and delivered with appropriate meta-information so that web crawlers, spiders and other search engines correctly identify pages of potential interest. This is particularly necessary where information is in databases, because the traditional search engines do not easily locate these.

**Submit sites for web awards:** As with Internet meta-indexes and search engines, it is possible to submit a URL for appraisal by a number of initiatives – essentially more heavily edited guides or meta-indexes – which present awards or certification of a website, based on certain criteria. Appropriate “target” schemes are being identified, for submission to later this year.

**Establish site links:** A special page of hyperlinks to project relevant websites (Internet initiatives, national and international organisations, etc) are being developed and will be maintained. At the same time webpages of other organisations are being identified which might provide a link to the webpages developed by UIA and WCMC.

**Create email discussion groups:** Consideration is still being given to the creation of E-mail discussion groups on specific biodiversity issues and/or world problems, for project users and participants.

### 3.12.7 Professional outreach

Members of the project team participated in a wide range of international meetings during the life of the project, and at a significant number of these meetings discussions related to the work being carried out by the project. At a total of 18 conferences or workshops during the course of the Implementation Phase, the specific purpose was to publicise the project.

WCMC also had meetings with a wide range of user-groups in the context of this and other related projects, in the light of its organisational review, primarily to assess user-needs and to ensure that the services being developed would adequately meet those needs. This included meetings with international agreement secretariats, UN bodies (both regional and global), regional organisations, and specialist networks.

Many other meetings were held with professional user groups, potential partners and sponsors. Notable interactions were with *staff of*: the World Bank, World Conservation Union (IUCN), Clearing-House Mechanism, Convention on Biological Diversity (CBD), Development Alternatives, Centre “Leo

Apostel” (Free University of Brussels), International Association of Investors in the Social Economy (INAISE), MyTown consortium, Contact Consortium, Monsanto, NetMap Solutions, KPN Research, and involvement in **conferences organised by**: the Foundation for the Future, European Environment Agency (EEA), Environment Agency for England and Wales, Netherlands Ministry of Housing, Spatial Planning and the Environment (VROM) / Advisory Council for Research on Nature and the Environment (RMNO) / National Institute for Public Health and the Environment (RIVM), Scottish Environmental Protection Agency (SEPA), Scottish Natural Heritage (SNH), NGO Environmental Health Action Group, The World of NGOs, World Health Organisation (WHO)/North Atlantic Treaty Organisation (NATO), International Council for Local Environmental Initiatives (ICLEI), World Academy of Art and Science, Nautilus Institute for Security and Sustainable Development and the World Affairs Council.

### 3.12.8 Launch

The planned launch has been reframed, as outlined below (see 3.3).

### 3.12.9 Major launch

At the commencement of the project, a formal “final launch” of the product was seen as a coherent end point to the marketing plan. The notion of a “final launch” has been reframed for a number of reasons:

- The product is a distributed service for which the *Ecolynx* website interface is the unique organising interface. However the “product” can be entered by many routes and its content is not necessarily identified to a single source;
- The product builds on the proven “raw materials” of UIA and WCMC databases, currently “marketed” as a myriad of products. *Ecolynx* is another “shopfront” but not a completely new product.
- Segments of the work have been “released” throughout the course of the project, usually in beta versions, but in many cases in complete form;
- Experience of marketing stands at conferences and exhibitions leads to the conclusion that there are more effective modes of introducing this product to its users. Self-looping *PowerPoint* presentations and take-away printed information, probably in the form of postcards, would be the preferred way to inform at conferences.
- Being a web product, the *Ecolynx* interface is most effectively launched on the web.

## 4 Complementary project work

The following list of projects is not exhaustive but illustrative of the types of projects that UIA and WCMC, in particular, are carrying out that are relevant to the aims of the INFO2000 project, and which contribute to its implementation.

### 4.1 WCMC

#### 4.1.1 Global coral disease database

This database accessible on the Internet allows users to (1) select and access records in the Global Coral Disease Database; (2) map observations of different coral diseases over the UNEP-WCMC coral reef maps; (3) download the selected records to their own computer. The work has resulted from a collaboration between UNEP-WCMC and NOAA. The next stage of the project will expand the Global Coral Disease Database with unpublished records of coral disease. Users are encouraged to submit observations for inclusion in the Global Coral Disease Database. <http://www.unep-wcmc.org/marine/coraldis/>

#### 4.1.2 Forest and poverty mapping in South East Asia

The forest and poverty mapping website contains a new internet map server, which has been designed to give users the ability to produce custom-made maps showing forest cover and indicators of poverty and population pressure in South Asian countries. The site provides the user with an overview of the study area. Linkages between poverty, environment and population are discussed. The method for selecting the indicators and indices used in the IMS is described. The IMS can be used to generate user-defined maps at national and sub-national scales. The strengths and weaknesses of the method are discussed in the conclusions and links to related sites are listed. <http://www.wcmc.org.uk/forest/poverty/>

#### 4.1.3 European forests and protected areas: gap analysis

This gap analysis of forest protected areas in Europe was designed to provide information on the distribution and conservation status of European temperate forests, in support of the Pan-European Biological and Landscape Diversity Strategy and in particular WWF's Forest Strategy for Europe. Digital pan-European forest cover maps of potential and current forest cover were compiled together with a digital map of Europe's protected areas. Digital overlays of these data were undertaken and statistics produced indicating the current state of protection of differing forest types, in respect to the location of these forests within legally gazetted areas. Information arising from the project can be found on the WCMC website at: [http://www.unep-wcmc.org/forest/eu\\_gap/](http://www.unep-wcmc.org/forest/eu_gap/)

#### 4.1.4 International Treaties

As has previously been reported, WCMC has a mandate to develop the UN List of National Parks and Protected Areas, and it is WCMC's intention to use its next cycle of information collection and management to collaborate more closely with the secretariats of international agreements and programmes that recognise individual sites, and to make available information on these networks of sites from a single focal point on the web. During recent months WCMC has had discussions with several UN agencies about this new proposal on the UN List, and has received very positive feedback. The UN List project will be carried out over the next two years, and will contribute substantially to the information available on national protected area systems and how they relate to international agreements and programmes. Information on this project will shortly be available on: [http://www.unep-wcmc.org/protected\\_areas/UNList/](http://www.unep-wcmc.org/protected_areas/UNList/).

WCMC is just completing the process of drafting webpages to integrate access to information on these networks of sites, and this will be available shortly. It is then intended that WCMC will work further on these pages with the different secretariats, in order to foster the sort of collaboration described above. The draft webpages will be made available shortly at: [http://www.unep-wcmc.org/protected\\_areas/international/](http://www.unep-wcmc.org/protected_areas/international/)

WCMC is considering carrying out similar work on species agreements and in particular harmonising the lists of species on the appendices of the various agreements. This would be heavily based on the work done during the INFO2000 project, and would provide a valuable service to the agreement secretariats and contracting parties. Proposals for this work are currently being drafted.

## 5 Annexes

### **Annex 1: The contribution of AIDEnvironment to the Implementation Phase of INFO2000: A Summary Report of Activities, Experience and Recommendations, 1998-2000**

The contribution of AIDEnvironment to the Implementation Phase of INFO2000 comprised the following activities:

**Project planning:** A contribution was made to the preparation of a detailed plan for the way in which the partners would implement the project, including attendance at the first team meeting in Brussels on 24 April 1998.

**Project presentation:** Arranged for a presentation of the INFO2000 biodiversity project at the European conference "Bridging the Gap: Needs and Perspectives for Environmental Information", London, 3-5 June 1998.

**Improving the user-friendliness of the biodiversity database:** AIDEnvironment periodically reviewed the user-friendliness of the database from the point of view of professional users and made recommendations for improvement. AIDEnvironment staff also participated in two workshops with UIA representatives in Amsterdam to assess the design, the profile and the interactive capability of the database and the needs of professional users with a view to improving its value.

**Improving the content of the biodiversity database:** Through a rigorous interrogation of the database, recommendations were made for improvements in various respects:

- the main structure of the database
- key international environmental problems which could be addressed by the database
- specific information on selected themes, such as environmental education and wetlands
- existing strategies related to biodiversity conservation: the appropriateness of the indexing of these strategies was reviewed and recommendations for improvements were made; information on a total of 45 additional strategies was compiled for inclusion in the database.

**Impact study of INFO2000:** Participated in a review by consultants to the European Commission (BIPE) of the impact of the INFO2000 programme.

#### **5.0.1 Experience and Recommendations**

Our experience in helping to develop the INFO2000 biodiversity database leads us to conclude that it is a valuable initiative which has considerable potential. The key to its future success is, in our view, to ensure that the features that offer the greatest added value are further developed. These are:

the provision of summary information on biodiversity conservation  
the provision of a portal to a large number of specialised sites  
the provision of continuously updated information and sources.

At the same time, the website must match the attractiveness and accessibility of comparable sites in an environment that is developing at a remarkable rate.

With regard to specific priorities for the further development of the database, AIDEnvironment recommends that the following points be taken into consideration.

First, we feel that the interactive capability of the database as a means to respond to user needs – which may be unique in the INFO2000 programme -- has considerable potential, providing that users can be encouraged to make full use of this facility. This requires primarily a number of technical improvements that would make it simpler and quicker for a user to provide input.

Second, the number of hyperlinks to specialised sites related to biodiversity conservation should be increased. This may go hand-in-hand with the expansion of the number of entries in the database.

Conversely, it is equally important for hyperlinks to the INFO2000 database to be included in other relevant sites. The number of these hyperlinks seems to be extremely limited at present.

Third, the indexing feature should be further refined to ensure that more keywords are recognised. For example, many users will search for information on specific problems or strategies, which should be immediately accessible.

Fourth, the mapping function is an interesting feature and may well have considerable potential for certain kinds of searches. We would certainly like to see this facility further developed.

Finally, although considerable progress has been made by UIA in improving the user-friendliness of the database, we believe that a greater number of users would be encouraged to access the database if further improvements were made, mainly with the aim of ensuring that new users immediately understand the structure of the database, the kind of information available and how to access the required information. Practice in this area has developed considerably since the start of the project and many newer websites are more "state-of-the-art" in this respect. We are, of course, aware of UIA's continuing efforts to improve the database, and some of these improvements may already be in preparation.

### **5.0.2 Comments on the structure of the INFO2000 biodiversity strategies database**

In considering the structure of the INFO2000 strategies database, I am struck by the issue of terminology and its implications for the database. UIA must have enormous experience in dealing with disparities between the terminology used in the sources and the terminology used by users, so I probably can't add anything which you haven't already considered.

I am, however, interested in to what extent the database can cope with these disparities. To give an example, I see various terms used for areas that are identified for some kind of conservation action, such as "protected areas", "conservation zones" or "reserves". Searching the database for information on protected areas does not seem to throw up information on nature reserves or conservation zones. Yet many users will use these terms loosely or will not know which term is used by an unknown source. UIA therefore has to find a way of dealing with these disparities.

I had assumed that you would use your own framework for structuring information on biodiversity, on the basis of which you would establish links between source terminology and user terminology. I don't know whether you have done this. If I was faced with this challenge, I would use the following structure to organise the information relating to strategies:

#### **1. OBJECT**

- a. Ecosystems
- b. Habitats
- c. Species
- d. Genes
- e. Regions
  - i. Biogeographical
  - ii. Climatic
  - iii. Physical
  - iv. Political
- f. Landscapes
- g. Natural resources
- h. Sites

#### **2. AIM**

- a. Conservation/protection
- b. Management
- c. Natural resource use



- d. Restoration

**3. MEANS**

- a. Policy
- b. Law
- c. Economic instruments
- d. Spatial planning
- e. Communication
- f. Research
- g. Training
- h. Methodologies
- i. Etc.

This is not a definitive or complete framework (particularly 3), and each heading could be elaborated to any level of detail (I have given one example to one level of detail), but it provides a way of organising the material from the sources so as to guide the establishment of links between topics and terms. For example, "protected areas", "reserves" and "conservation zones" would all be found under 1(h) and each source linked as appropriate to Aim and Means.

To link this information to the problems database, it would be necessary to add Causes, Environmental Changes and Impacts to the framework.

Such a framework could also be included as a search resource in the database to help users frame their query in such a way that it generates information on the appropriate topics.

I would be very interested to learn which approach you have adopted to deal with these issues.

**Annex 2 : Norwegian School of Management and Marketing (NSM) student assignment**

The following is the instructions issued for the student assignment.

Dear Student,

Here is assignment four.

As I mentioned in the letter we sent you, I must apologize for sending this assignment out so late, but computer problems and communication problems have delayed us.

Because we are sending it out so late, the deadline on completing this assignment is June 8.

It involves using the Web as a resource, and it involves completing a successful communication interaction with a Web site.

We are involved in a multimedia information research project funded by the European Union. Our major partner is the Union of International Associations in Brussels. UIA is building a web site rich in resources and information development opportunities. One of the major reference tools is an interactive encyclopedia which has been compiled from the materials of international organizations and has tens of thousands of profiles of world problems and strategies.

This Web site has been undergoing extensive change and improvement. We are now in the testing stage for the site.

For this assignment, you must visit the site, register as a user, explore the resources, and offer comments. You may offer as many or as few comments as you wish. You may make comments online, using the interactive "comment" feature or offline by an email report, or both.

This is an example of the kind of information resource you will sometimes discover in the last phases of developing a business plan, a market study, or an academic research project.

Here are a few suggestions for exploring the site.

The encyclopedia and reference materials catalogue large amounts of data and a huge number of articles on different issues, problems, and challenges. Examples might be "leadership," "ethics," "recycling logistics," etc. In the future, this resource will give you valuable information for your research projects.

Your assignment is to visit the site, try to learn something useful, and - before you leave -- report your conclusions back to the site itself using the comment feature.

#### WHERE TO GO AND WHAT TO DO

The site is located at

URL: <<http://www.uia.org/data.htm>>

When you get to the site, click on [Search Databases].

You will be asked to register. Register as a NEW USER.

Your User Name should be "nsm" followed by your last name.

If your name is Stoltenberg, your user name will be "nsmstoltenberg"

My name is Friedman, so my user name is "nsmfriedman".

Your password can be the same. My password is 'friedman'. The password is case-sensitive, so note use of capital letters.

Registration is important, since it is how we can register your completion of this assignment.

NB: If you visit the site a second time, you enter as a "Registered User" by giving the same name and password.

Surf around a bit. See what you can learn. See if you can find ways to use this tool. See how easy - or difficult - it is to use.

You can start by entering a keyword in the [Search for] window; then [Submit query]. Explore the links. Try the [Tree structure] [Map]

and other tools or clickable features.

The default database is World Problems. Make a [New search] in other databases. Try the [Comment?] facility.

See what problems you have, if any, using the site. If you identify problems, please report them. If you know a solution to any problems you find, please report them.

If you discover important issues in the database that you feel should be handled a different way to be more valuable or useful, please report.

If you discover holes in the database or missing issues, please note them in your comments. This can be done by identifying the missing issue with one or two words, and giving a short sentence explaining the problem or the strategic implications of the missing issue.

If you see alternate names or headings for material already included, please report. Remember you can use the online comment facility, or simply report as you would normally.

#### HOW TO ENTER YOUR REPORT

When you are in the database, you will find that most entries have a box **CLICKABLE LINK** labelled [Comment?]. You may use this tool for your comments.

Please be sure to sign comments with your user name.

NB: If you want to see how a comment appears before you make one, look at one of the following profiles. Just above the title at the top of the page, click the option [With user comments]: Problem called "Chattle slavery" Strategy called "Capturing environmental value" Human Development called "Trances and mental absorptions"

#### HELP

If you have trouble, you can ask for help by contacting

<[nadia@uia.be](mailto:nadia@uia.be)>

Questions and comments are also welcome there.

#### DEADLINE

You may complete this assignment any time up through June 8.

Because this Web site is rich with multimedia features that require good web access, I suggest you use a computer at school or in a properly wired office.

Ken Friedman, Ph.D.  
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### **Annex 3: European Conventions, Treaties and non-Legal Tools for Biodiversity Conservation**

#### **Convention on Wetlands of International Importance Especially as Waterfowl Habitat, 1971 (Ramsar Convention)**

*Note: not indexed*

#### **Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1973 (CITES)**

*Note: not indexed under CITES*

#### **Benelux Agreement concerning Hunting and the Protection of Birds, 1970**

*Note: not indexed*

##### **Description**

The three Benelux countries are obliged to:

- legally classify game into four categories: large game (such as deer), small game (such as the hare), water game (such as geese) and other game (such as crows);
- consult each other in fixing the opening and closing dates of the hunting season;
- ensure that the extent of areas where hunting with shotguns is permitted is greater than certain specified minimum areas;
- consult each other on the types of authorised hunting attributes and methods;
- limit the period during which game may be traded in accordance with the requirements of the Agreement;
- protect non-game bird species, including prohibiting possession with intent to sell, selling, purchasing and supplying;
- ensure that trade in non-game bird species is prohibited.

Each Party is responsible for instituting the necessary measures to implement the Agreement and for monitoring and enforcing the provisions of the Agreement on its own territory.

##### **Organization**

Benelux Economic Union  
Rue de la Regence 39  
1000 Brussels  
Belgium  
Tel.: +32-2-5193890  
Fax: +32-2-5193894  
E-mail: mfdemeeus@benelux.be  
[no website]

**Convention Concerning the Protection of the World Cultural and Natural Heritage, 1972 (World Heritage Convention)**

*Note: not indexed*

**Description**

The Convention provides a framework for the identification and protection of natural and cultural areas which are of outstanding interest and to ensure the protection of the listed sites through closer cooperation among nations. Parties to the Convention are required to identify areas as natural or cultural heritage, which includes cultural landscapes. The World Heritage Committee decides whether a natural heritage site is to be included in the World Heritage List. Sites included in the List which are threatened by serious and specific dangers qualify for the List of World Heritage in Danger. Both Lists provide a mechanism for giving international recognition to some of the most outstanding natural habitats in the world. Articles 4 and 5 set out the obligations on parties to protect and conserve natural heritage situated on their territory. Areas that constitute the habitat of threatened species of animals and plants of outstanding universal science or conservation value can also be considered as natural heritage and qualify for listing.

**Implementation**

- A World Heritage Fund is established which may be used to protect sites on the Lists.
- The World Heritage Committee decides whether an example of natural heritage is to be included in the List (on the basis of "Operational Guidelines").
- State of conservation reports are presented to the World Heritage Committee and its bureau bi-annually in cooperation with the advisory bodies to the Convention, IUCN and the International Council on Monuments and Sites.
- Monitoring is to be carried out of the condition and conservation status of World Heritage properties. Reports are public.
- The World Heritage Centre (the secretariat of the Convention) has designed a comprehensive monitoring methodology.
- Assistance may be asked by the states to conserve their listed heritage.
- The World Heritage List: this may contain the most important and significant natural habitats where threatened species of animals or plants of outstanding universal value from the point of view of science or conservation still survive.
- The List of World Heritage in Danger: sites threatened by specific and proven dangers (Article 11(4)), for which conservation actions are urgent.

The World Heritage List included in January 1999 582 sites, of which 117 were natural heritage areas and 20 were both cultural and natural heritage areas.

**Organization**

UNESCO World Heritage Centre  
7, place de Fontenoy  
75352 Paris  
07 SP  
France  
Tel.: +33-1-45681889  
Fax: +33-1-45685570

E-mail: wh-info@unesco.org

Web: www.unesco.org/whc/

### **Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1974 (Helsinki Convention)**

*Note: Baltic Sea and Helsinki Convention not indexed, link to "International agreements on the marine environment" not accessible*

#### **Description**

The Parties to the Convention are committed to:

- prevent and control pollution from various sources including pollution from land-based sources, disposal of wastes at sea by ships, or through dumping and from sea-bed activities;
- counteract the introduction of hazardous substances into the Baltic Sea as specified by Annex 1;
- take measures and cooperate according to Annex 6 in order to eliminate or minimise pollution of the Baltic Sea area by oil or other harmful substances.

The Parties have agreed upon several monitoring programmes through which data on airborne pollution, radioactive substances and several determinants of the marine environment are collected. The commitments imposed on the Parties are normally discharge limit values and operational requirements. In the 1974 text, no specific provisions on nature conservation were included. The objectives of the 1992 Helsinki Convention are extended with the prevention and elimination of pollution in order "to promote the ecological restoration of the Baltic Sea and the preservation of its ecological balance". The Parties shall apply the precautionary principle, taking preventive measures assuming that substances introduced may create hazards in the marine environment to, *inter alia*, living resources and marine ecosystems. Also the Parties are obliged to apply the polluter-pays principle. In the 1992 Convention the objective of the 1974 Convention is supplemented with a requirement to preserve the ecological balance. The contracting Parties are also individually and jointly obliged to take all appropriate measures with respect to the Baltic Sea area and the coastal ecosystems influenced by the Baltic Sea to conserve natural habitats and biodiversity and to protect ecological processes. These measures are to be taken so as to ensure the sustainable use of natural resources within the Baltic Sea Area. It is recommended that the Parties should aim to adopt subsequent instruments containing appropriate guidelines and criteria.

#### **Implementation**

The Parties are controlled by means of obligatory reporting according to a unified procedure, as well as by regular pollution-load compilation projects and emission inventories. The governing body is the Helsinki Commission (HELCOM) with representatives of the EU and the following countries: Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden. HELCOM takes decisions unanimously. The decisions are most often take the form of recommendations to be implemented through appropriate national legislation. The implementation of these recommendations is under permanent review by HELCOM. By December 1997 63 protected areas had been established under the Convention. However, many of these areas have not been officially recognised by the countries concerned.

#### **Organization**

The Helsinki Commission

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00160 Helsinki

Finland

Tel.: +358-9-6220220

Fax: +358-9-6220239

E-mail: helcom@helcom.fi

Web: www.helcom.fi

## **Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean, 1976 (Barcelona Convention)**

*Note: not indexed*

### **Description**

The Convention is an effort to prevent, abate and combat pollution and to protect and enhance the marine environment. The original Convention was modified by amendments adopted on 10 June 1995. The amended text has not yet entered into force. To fulfil the goal of the Convention, a complex legal and institutional structure has been set up, including the adoption of the following protocols:

- Protocol for the Prevention of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft, Barcelona, 1976, replaced by the Protocol for the Prevention and Elimination of Pollution of the Mediterranean Sea by Dumping from Ships and Aircraft or Incineration at Sea;
- Protocol concerning Cooperation in Combating Pollution of the Mediterranean Sea by Oil and Other Harmful Substances in Cases of Emergency, Barcelona, 1976 (in force 1978);
- Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources, Athens, 1980, replaced by the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources and Activities (not yet in force);
- Protocol concerning Specially Protected Areas in the Mediterranean, Geneva, 1982, replaced by the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean, Barcelona, 1995 (the "Barcelona Protocol", not yet in force);
- Protocol for the Protection of the Mediterranean Sea against Pollution resulting from Exploration and Exploitation of the Continental Shelf and the Seabed and its Sub-Oil, Madrid, 1994 (not yet in force);
- Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal 1996 (not yet in force).

The objectives of the Geneva Protocol concerning Specially Protected Areas of Mediterranean Importance (SPAs) are the preservation of:

- representative types of coastal and marine ecosystems of adequate size in order to ensure their long-term viability and to maintain their biodiversity;
- habitats which are in danger of disappearing in their natural area of distribution in the Mediterranean or which have a reduced natural area of distribution;
- habitats critical to the survival, reproduction and recovery of endangered, threatened or endemic species of flora and fauna;
- sites of particular importance because of their scientific, aesthetic, cultural or educational interest.

Sites to be included in the list of specially protected areas should:

- be of importance for conserving the components of biological diversity in the Mediterranean;
- contain ecosystems specific to the Mediterranean area or the habitats of endangered species;
- be of special interest at the scientific, aesthetic, cultural or educational levels.

The more recent Barcelona Protocol extends the obligations under the Geneva Protocol. Article 16 states that Parties shall adopt:

- common criteria for the choice of protected marine and coastal areas that could be included in the list of specially protected areas of Mediterranean importance;
- common criteria for the inclusion of additional species;
- guidelines for the establishment and management of SPAs.

Also, a new list is to be drawn up of SPAs that:

- are of importance for conserving the components of biological diversity in the Mediterranean;
- contain ecosystems specific to the Mediterranean area of the habitats of endangered species;
- are of special scientific, aesthetic, cultural or educational interest.

### **Implementation**

The Parties are obliged to report on measures taken to implement the Convention and its related Protocols. The Secretariat is formed by the UNEP/Coordinating Unit for the Mediterranean Action Plan in Athens. By March 1998, 216 SPAs had been established under the Geneva Protocol. Also action plans for the conservation of marine turtles, monk seals and cetaceans have been approved by the Parties.

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### **Convention for the Protection of the Rhine against Chemical Pollution, 1976**

*Note: Convention and "Rhine" not indexed*

### **Description**

The Rhine states are obliged to take appropriate measures to:

- eliminate pollution of the surface waters of the Rhine basin by dangerous substances in the families and groups of substances appearing in Annex I;
- reduce the pollution of the Rhine by dangerous substances in the families and groups of substances appearing in Annex II.

Under the Convention, emission standards and limit values are established for:

- the maximum permissible concentration of polluting substances in discharges;
- the maximum permissible quantity of a polluting substance in discharges during one or more specific periods.

The limit values applicable to Annex I substances are laid down mainly on the basis of toxicity, persistence and bioaccumulation (taking into account the best available technical means).

The Parties are required to establish a national inventory of discharges into the surface waters of the Rhine basin containing the substances listed in Annex I, which are subject to emission standards (that may not exceed the limit values proposed by the International Commission for the Protection of the Rhine against Pollution). In the case of existing discharges, the authorisation must fix a time limit within which the conditions laid down in the authorisation must be met. The Commission shall propose to the Parties these time limits. The Parties have to take all legislative and administrative measures to ensure that the storage and deposit of Annex I and II substances is so carried out as to entail no danger of pollution to the Rhine. If necessary, the Commission may propose to the Parties appropriate measures for protecting groundwater in order to prevent pollution of the Rhine by Annex I and II substances.

The discharge of any Annex II substance likely to affect the quality of Rhine water must be regulated by the national authorities with a view to strict limitation. The governments must strive to establish national programmes for the reduction of the pollution of the Rhine by Annex II substances. The national programmes must lay down deadlines for their implementation.

### **Implementation**

The Parties agreed the black list of substances with considerable delay. The five countries and the EU also agreed the Rhine Action Programme that aims to reduce the concentrations of hazardous chemical substances and nutrients in the Rhine. The Programme's specific aims are to reduce emissions of a large



number of substances by between 50 and 70 per cent between 1958 and 1995 and to restore the Rhine to its natural state so that some fish species can return to its waters. Although the programme regulates some substances, it leaves out many others. Its approach is more pragmatic than the Convention. A reduction of 50 per cent for most substances was achieved by 1995; for some substances a greater reduction will be possible. The Ministers Conference on the protection of the Rhine against pollution that was held on 30 November 1989 in Brussels, extended the scope of the Rhine Action Plan to include the protection of the North Sea.

The Parties notify the Commission the contents of their inventories of discharges, which have to be updated at intervals not exceeding three years. Each government is also required to establish monitoring stations along the Rhine in order to determine concentrations of the substances and they should inform the Commission of the monitoring results at least once a year.

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### **EU Directive 79/409/EEC on the Conservation of Wild Birds, 1979 (Birds Directive)**

*Note: information in database very brief*

#### **Description**

The Directive requires the protection of all species of wild birds and their eggs, nests and habitats that are native to the European territory of the EU member states. It also regulates the exploitation of these birds. Member states shall take measures to preserve, maintain or re-establish a sufficient diversity and area of habitats for all species of birds referred to in Annex I (which lists 175 species). The categories of species are:

- species in danger of extinction;
- species vulnerable to specific changes in their habitat;
- species considered rare because of small populations or restricted local distribution;
- other species requiring particular attention for reasons of the specific nature of their habitat.

Member states should classify the most suitable territories in number and size as Special Protection Areas (SPAs) for the conservation of these species, taking into account their protection requirements in the geographical sea and land area. Member states should also take similar measures for regularly occurring migratory species not listed in Annex I, taking into account their protection requirements in the geographical sea and land area, as regards their breeding, moulting and wintering areas and staging posts along their migration routes. Member states should pay particular attention to the protection of wetlands and to wetlands of international importance.

The Directive requires the member states to notify the European Commission within 24 months after adoption of the Directive of:

- the SPAs which they have designated under Article 4;
- the areas which they have designated or intend to designate as wetlands of international importance;
- the areas other than wetlands already designated according to national legislation.

In general, the Directive requires member states to prohibit the deliberate killing or capture of all species of wild birds naturally occurring in their European territories, the damaging of nests or eggs, the

taking or keeping of eggs, the keeping of birds and the deliberate disturbance of birds, particularly during the breeding season. However, there are a few exceptions to these requirements, namely regarding the hunting of species listed in Annex II and regarding the sale, transport for sale, keeping for sale and offering for sale of live or dead birds listed in Annex III.

For the protection, conservation and restoration of biotopes and habitats, the following measures should be taken:

- the creation of protected areas;
- upkeep and management in accordance with the ecological needs of habitats inside and outside the protected zones;
- the restoration of destroyed biotopes;
- the creation of biotopes.

The Directive imposes legal obligations on member states to maintain populations of naturally occurring wild birds at levels corresponding to ecological requirements, to preserve a sufficient diversity and area of habitats for their conservation, to regulate trade in birds (including their parts and products), to limit hunting to species able to sustain such exploitation and to prohibit certain methods of capture and killing. Exceptions are only allowed in limited circumstances. Since 1994, compensatory measures have also been required.

### **Implementation**

The Directive is legally binding on the EU member states. They are obliged to send the European Commission all information necessary for it to perform a coordinating role in ensuring that the SPAs (established for Annex I species) and the areas for regularly occurring migratory species form a coherent whole. Member states shall bring into force the laws, regulations and administrative provisions necessary to comply with the Directive within two years of its notification and shall notify the Commission accordingly. They should also draw up a report on the implementation of the national measures taken under the Directive every three years.

### **Organization**

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### **Convention on the Conservation of European Wildlife and Natural Habitats, 1979 (Bern Convention)**

*Note: Convention and "Emerald Network" not indexed*

### **Description**

The aim of the Convention is to conserve wild flora and fauna and their natural habitats, especially those species and habitats whose conservation requires the cooperation of several states. Particular emphasis is given to endangered and vulnerable species, including endangered and vulnerable migratory species. In order to achieve these objectives, the Convention provides for the conservation of wildlife and wildlife habitats in general and for the special protection of species listed in Appendix I (strictly protected plants), Appendix II (strictly protected animals) and Appendix III (protected animals) of the Convention. In Recommendation 16 on Areas of Special Conservation Interest (ASCIs) the Standing Committee recommended Parties "to take steps to designate Areas of Special Conservation Interest to

ensure that the necessary and appropriate conservation measures are taken for each area situated within their territory or under their responsibility where that area fits one or several of the following conditions". A further Recommendation regarding the conservation of natural areas outside protected areas proper was adopted in 1991 by the Standing Committee.

In order to assure coherence between ASCIs to be designated under the Bern Convention and the Special Areas of Conservation (SACs) designated under the Habitats Directive, the Standing Committee adopted in January 1996 Resolution 3 concerning the setting up of a Pan-European Ecological Network. It resolved to:

- set up the Emerald Network, which would include the ASCIs designated under the Convention;
- set up a group of experts to carry out the necessary activities related to the building up of the network;
- invite European states which have observer status in the Standing Committee to participate in the network;
- encourage the Parties and observer states to designate ASCIs and notify them to the Secretariat.

The member states of the EU satisfy the habitat requirements of the Bern Convention through the implementation of the Habitats Directive. The SPAs and SACs classified under the Birds Directive and the Habitats Directive will automatically become part of the Emerald Network.

### **Implementation**

A Standing Committee has been set up with responsibility for the application of the Convention. Any Party may be represented on the Standing Committee by one or more delegates, as well as observer states and NGOs. Designation of ASCIs started in 1999. The states are required to notify the secretariat of the ASCIs for validation by the secretariat and incorporation into the Emerald Network.

### **Organization**

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### **Convention on the Conservation of Migratory Species of Wild Animals, 1979 (Bonn Convention)**

*Note: information in database very brief, omits specific agreements*

### **Description**

The Convention aims to conserve those species of wild animals that migrate across or beyond national boundaries by developing and implementing cooperative agreements, prohibiting the taking of endangered species, conserving their habitats and controlling adverse impacts. Appendix I lists migratory species that are in danger of extinction throughout all or a significant part of their range. Parties which are range states are to prohibit the taking of such species (with limited scope for derogation), must try to conserve and, where feasible, restore their habitats, prevent or minimise impediments to their migration, and prevent, reduce or control influences that endanger them. Appendix II lists migratory species that have an unfavourable conservation status and which require international agreements for their conservation and management or would benefit from international cooperation. Parties are encouraged to take action to conclude agreements where this would benefit the Appendix II species concerned, and also to conclude agreements for any population or geographically separate part of the population of species or lower taxon of any wild animal, members of which periodically cross

national boundaries. Specific agreements are concluded for the conservation of specific species between the relevant range states. In general, the geographic scope of such agreements is restricted to the migration area of the species concerned (the "Agreement Area").

The following agreements have been adopted to conserve specific groups of species:

- Agreement on the Conservation of Seals in the Wadden Sea, 1990
- Agreement on the Conservation of Bats in Europe, 1991
- Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS), 1992
- Memorandum of Understanding concerning Conservation Measures for the Siberian Crane (*Grus leucogeranus*), 1993
- Memorandum of Understanding concerning Conservation Measures for the Slender-Billed Curlew (*Numenius tenuirostris*), 1994
- Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA), 1995
- Agreement on the Conservation of Cetaceans of the Black Sea, the Mediterranean Sea and the Contiguous Atlantic Area (ACCOBAMS), 1996.

### **Implementation**

The decision-making body of the Convention is the Conference of the Parties, convened by the secretariat at intervals of no more than three years, unless the Conference decides otherwise. The Conference reviews the implementation of the Convention. The secretariat is provided by the UNEP and is located in Bonn in premises made available by the government of the Federal Republic of Germany. Parties to the Convention must inform the Conference of the Parties of the measures they are taking to implement the Convention and are also required to inform the secretariat of those species in the Appendices for which they consider themselves to be a range state. The Convention established a Scientific Council to provide advice on scientific matters. A Standing Committee was created by resolution of the First Meeting of the Conference of the Parties to fulfill various functions, such as providing policy and administrative guidance between meetings for the parties.

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### **Benelux Agreement concerning Nature Conservation and Landscape Protection, 1982**

*Note: not indexed*

### **Description**

The Agreement aims to harmonise certain aspects of the conservation, management and restoration of the natural environment and the landscape. The three Benelux countries are obliged to:

- harmonise relevant policies and instruments;
- consult each other and exchange information where this is necessary in order to coordinate relevant policies;
- organize coordinated information and education campaigns;
- exchange scientific data and carry out cooperative research where appropriate;
- coordinate implementing actions under other relevant international agreements.

With regard to the effective protection of transboundary nature reserves and valuable landscapes, the Parties are obliged to:

- develop a vision for protecting such areas, including areas that are important for migratory species;
- draw up a "protection statute" which can be granted to such areas under the auspices of the Agreement;
- draw up coordinated management programmes and consult periodically on their implementation
- consult each other on activities that might damage such areas.

### **Implementation**

Each Party is responsible for instituting the necessary measures to implement the Agreement and for monitoring and enforcing the provisions of the Agreement on its own territory.

### **Organization**

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### **Convention on the Law of the Sea, 1982**

*Note: information in database very brief*

### **Description**

The Convention defines the boundaries of each part of the sea and the continental shelf and the legal regime applicable therein, the rights and conditions of passage for shipping through other states' waters, jurisdiction over ships on the high seas and exceptions to the freedom of the high seas and the legal and management regime for the exploitation of mineral resources on the deep-sea bed and ocean floor beyond national jurisdiction. The Parties are obliged to:

- keep under surveillance the effects of any activities which they permit or in which they engage, in order to determine whether these activities are likely to pollute the marine environment;
- follow up their commitment by actively enforcing national and applicable international standards with regard to all sources of pollution under their jurisdiction;
- adopt measures for the conservation of living resources of marine pollution and cooperate in taking such measures for high-seas fisheries.

### **Implementation**

It is left to the Parties to devise the ways and means of individually or jointly pursuing systematic and ad-hoc monitoring programmes, taking into account similar programmes already established by other treaties and organizations. Many of the provisions of the Convention are codifications of customary law and therefore applicable to all states, irrespective of signature or ratification. The process of realisation of the Convention through many years worked as a catalyst encouraging an integrated approach to the sea. The General Assembly of the United Nations decided in Resolution 49/28 that it would evaluate the implementation of the Convention and review other developments relating to ocean affairs and the law of the sea on an annual basis. The secretariat is formed by the Division for Ocean Affairs and Law of the Sea at the Office of Legal Affairs of the United Nations in New York, USA.

### **Organization**

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## **Ministerial Declarations of the International Conferences on the Protection of the North Sea**

*Note: not indexed*

### **Description**

Since The Hague Declaration in 1990, substantial further progress has been made in converting the political initiatives launched by the Bremen, London and The Hague Declarations into provisions of international and European Union law. These new and comprehensive requirements have transformed the approach to the protection of the North Sea in many fields by establishing or substantially extending legally binding frameworks, such as the OSPAR Convention. A marked feature of these frameworks is their wide scope, requiring thorough reviews of the relevant aspects of the environment and the development of comprehensive programmes.

The objectives at the second Conference (London, 1987) consisted of agreement on a number of measures to protect the North Sea environment, such as:

- to adopt the principle of precautionary action for safeguarding the marine ecosystem of the North Sea by the use of the best available technology and other appropriate measures;
- to achieve a substantial reduction (about 50 per cent) in total inputs of substances that are persistent, toxic and liable to bio-accumulation;
- phase out dumping in the North Sea of industrial wastes that are hazardous for the marine environment by 31 December 1989.

One Annex contains a joint statement of the Wadden Sea states, which intend to cooperate with the other North Sea states to further reduce pollution of the North Sea from whatever source with the aim of conserving and protecting the Wadden Sea area. The Wadden Sea states are of the opinion that actions in this respect should be based on the precautionary principle and that emissions of all pollutants should be limited at source. The commitments entered into at the Second North Sea Conference have also been endorsed by Switzerland.

At the Third North Sea Conference (The Hague, 1990) the main tasks were to assess whether the targets and the time frames set with respect to the policies and measures adopted at the Second Conference would be met, and to decide, on the basis of the assessment and new developments, which further initiatives needed to be taken.

Because of the signing of the OSPAR Convention in 1992 and the progress in EU environmental legislation, the ministers agreed at the Fourth Conference that "the protection of species and habitats in coastal and offshore areas" was one of the priority issues to be addressed. At the Conference the ministers considered that cooperation in protecting the North Sea should be continued, but the 1992 OSPAR Convention had to be taken into account because it includes the North Sea in its coverage and provides for many of the matters which are essential to the protection of the North Sea. Also the ministers stressed the importance of the involvement of Norway and Switzerland in North Sea issues. The EU member states, in support of the EU Birds and Habitat Directives, agreed to collaborate on the full implementation of Natura 2000 in the coastal waters of the North Sea and to cooperate in the management and monitoring of the effectiveness of the network. The measures will be taken in partnership with Norway.

### **Implementation**

The national governments and international organizations involved prepare national progress reports. The Paris Commission assesses the relative contribution of point sources and diffuse sources as inputs of the most dangerous substances to the North Sea and examines the appropriateness of different

methods of control. In order to prepare the Third North Sea Conference, national governments and international organizations involved in the protection of the North Sea environment prepared reports describing the progress in the implementation of the agreements of the Second North Sea Conference.

### **Organization**

Secretariat of the Fifth International Conference on the Protection of the North Sea  
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### **Convention concerning the Protection of the Alps, 1991**

*Note: not indexed*

#### **Description**

The Convention aims to protect the Alps environmentally, economically and culturally. The Parties are obliged to pursue a comprehensive policy for the preservation and protection of the Alps by applying the principle of prevention, the polluter-pays principle, through cooperation and through the prudent and sustainable use of resources. In order to achieve the objectives the Parties shall take appropriate measures, including:

- regional planning;
- soil conservation;
- conservation of nature and the countryside; the objective is to protect, conserve and where necessary rehabilitate the natural environment and the countryside so that ecosystems are able to function, animal and plants species (including their habitats) are preserved, nature's capacity for regeneration and sustained productivity is maintained and the variety, uniqueness and beauty of nature and the countryside as a whole are preserved on a permanent basis.

The Convention is supplemented by five protocols on tourism, traffic, regional planning, protection of nature and mountain landscapes, and mountain farming and forestry. These protocols should be integrated by the Parties into their national and regional policies.

#### **Implementation**

A conference standing committee consisting of delegates of the Parties is to be set up as an executive body.

### **Ministerial Declarations of the Trilateral Governmental Wadden Sea Conferences** **Status**

*Note: not indexed*

#### **Description**

The trilateral Wadden Sea cooperation is based on the Joint Declaration on the Protection of the Wadden Sea, which was signed at the Third Trilateral Governmental Wadden Sea Conference in Copenhagen in 1982. In the Declaration, the three countries declared their intention to consult each other in order to coordinate their activities for implementing the obligations resulting from international legal instruments in the field of nature protection (in particular the Ramsar, Bonn and Bern Conventions and the EU Birds Directive and other relevant EU Directives) with regard to the comprehensive protection of the Wadden Sea region as a whole including its flora and fauna. The objective of the

meetings is the harmonisation of national instruments, management initiatives and objectives in a common, comprehensive management approach to the protection of the Wadden Sea.

The Ministerial Declaration of the Sixth Conference (Esbjerg, Denmark, 1991) established a guiding principle for the trilateral Wadden Sea cooperation, common management principles and common objectives for the human use of the area. The guiding principle is to achieve, as far as possible, a natural and sustainable ecosystem in which natural processes proceed in an undisturbed way. The main aims include safeguarding and optimising the conditions for flora and fauna. Specifically, the countries agreed on:

- the restoration of the Wadden Sea and the reintroduction of species;
- species protection;
- environmental impact assessment;
- cooperation with respect to international fora.

A basic element in the elaboration of the guiding principle is the maintenance of the full range of habitat types that contribute to a natural and dynamic Wadden Sea. Each of these habitat types requires a certain environmental quality (natural dynamics, absence of anthropogenic disturbance, absence of pollution) which is to be achieved through the proper management of the area. The physical, biological, chemical and geomorphological quality of the habitats is to be specified by means of ecological targets, which are to be elaborated by the trilateral Eco-Target Group.

The Assessment Report, prepared for the Seventh Conference (Leeuwarden, Netherlands, 1994), summarised the progress made with respect to the implementation of the Esbjerg Declaration. It was based on the national implementation reports and the Quality Status Report of the Wadden Sea and identified some major issues of concern regarding the quality of the Wadden Sea ecosystem, such as:

- the negative impact of fisheries on natural assets (food availability for birds, eelgrass, natural mussel beds and benthic communities);
- the damage to and loss of biotopes and the disturbance of wildlife and birds by tourism and recreation;
- the considerable decrease in the area of natural salt marshes;
- the loss of brackish habitats and related ecological conditions;
- the serious eutrophication caused by high inputs of nutrients;
- the risk to ecosystems posed by the emissions of micropollutants;
- the effects on sedimentation and erosion processes of a rise in sea level.

On the basis of the evaluation in the Assessment Report, the ministers agreed *inter alia*:

- that the common trilateral conservation policy should be directed towards achieving the full scale of habitat types which belong to a natural and dynamic Wadden Sea, taking into account the existing protection regimes;
- that each of the habitat types requires a certain quality, which can be reached by proper conservation and management;
- that, with regard to the targets for the quality of water and sediment, cooperation should be improved in relevant international frameworks in order to realise the targets for reducing environmental pollution;
- for the establishment of a management plan, to assess the present state of the habitats in each country's zone, to propose relevant measures to realise the targets and to enhance the sustainable use of the area as defined in the Convention on Biological Diversity;
- that important parts of the area should be nominated as a Special Area of Conservation under the EU Habitats Directive as part of Natura 2000;
- that, in line with Section 35 of the Esbjerg Declaration, the Wadden Sea or parts thereof should be nominated as a World Heritage Site by 1997;
- to consider how the parts of the Wadden Sea that have been designated as Man and Biosphere Reserves can be integrated in the trilateral Wadden Sea cooperation.

The Eighth Conference (Stade, Germany, 1997) for the first time succeeded in harmonising the interests of environmental protection and nature conservation with those of Wadden Sea users in the form of concrete measures, actions and projects. The Wadden Sea Plan was adopted at the Conference. Its



implementation should not conflict with the relevant legal provisions on shipping, the management of shipping routes, harbour management, disaster prevention and other aspects of internal and external security. The Plan includes targets for joint protection measures covering the various sub-regions of the Wadden Sea: salt flats, dunes, estuaries, tidal zones, offshore zones, rural regions, countryside and culture, water and sediments, and birds and marine mammals. It also specifies the measures and actions to be taken, as well as outlining farther-reaching trilateral projects.

To broaden and intensify the protection of plants and animals, the countries have agreed to develop a Red List of marine and coastal species and biotopes in the Wadden Sea area. Germany is the lead country in the development of a common Red List. A number of trilateral meetings have been held with the aim of developing a common set of criteria for the selection of Red-List species. The list will contain endangered marine and coastal species and biotopes and, as far as possible, the causative factors. The critical values of habitats that are given high priority under the guiding principle include the following:

- natural water movements and the attendant geomorphological and pedological processes;
- the natural quality of water, soil and air;
- the natural fauna and flora;
- essential natural functions of the Wadden Sea areas, including particularly feeding, breeding and resting areas for birds and marine mammals.

Species that are especially valued include birds, marine mammals (especially seals) and the flora and fauna of the areas outside dikes and adjacent dune systems.

### **Implementation**

The Wadden Sea Secretariat coordinates trilateral actions that have been decided on by the Conferences. For the Ninth Conference a report will be prepared to identify valuable Wadden Sea elements, including marginal strips of land alongside water bodies and estuaries

### **Organization**

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## **Convention on the Protection and Use of Transboundary Watercourses and International Lakes, 1992**

*Note: not indexed*

### **Description**

The Parties to the Convention are obliged to take appropriate measures to:

- prevent, control and reduce pollution of waters causing or likely to cause transboundary impact;
- ensure that transboundary waters are used on the basis of respect for ecologically sound and rational water management, conservation of water resources and environmental protection;
- ensure that transboundary waters are used in a reasonable and equitable way;
- ensure conservation and, where necessary, restoration of ecosystems.

The Parties are to be guided by the precautionary principle, the polluter-pays principle and sustainable water-resource management. The Parties should also apply environmental impact assessment and the ecosystem approach in water management.

### **Implementation**

The Parties bordering a transboundary water body shall establish and implement joint programmes for monitoring the condition of the water and exchange available data on the environmental condition of the water. The Parties shall report periodically on the implementation of the Convention. At the meeting of

the Parties the policies for and the methodological approaches to the protection and use of transboundary waters shall be reviewed.

**Organization**

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**Convention on the Protection of the Black Sea Against Pollution, 1992 (Bucharest Convention)**

*Note: not indexed*

**Description**

The aim of the Convention is to promote progress in the protection of the marine environment of the Black Sea and in the conservation of its living resources. The Convention establishes common legislative instruments for controlling marine pollution. To provide a more appropriate common policy framework, the governments have decided to formulate and adopt an environmental policy declaration for the Black Sea. This document, called the Odessa Declaration and adopted in April 1993, provides a clear indication of the principles, approaches, goals and common priorities for regional action. To develop national and regional capacities in implementing the Bucharest Convention and the Odessa Declaration and for a new fisheries policy, the Black Sea Environmental Programme has been developed. There are three Protocols to the Convention:

- Protocol on Protection of the Black Sea Marine Environment against Pollution from Land-Based Sources;
- Protocol on Cooperation in Combating Pollution of the Black Sea Marine Environment by Oil and Other Harmful Substances in Emergency Situations;
- Protocol on the Protection of the Black Sea Marine Environment against Pollution by Dumping (not yet in force).

**Implementation**

The Convention provides the basis for the establishment of a Black Sea Commission and Secretariat in Istanbul, Turkey.

**Organization**

Black Sea Commission  
Web: [www.unep.org/unep/program/natres/water/regseas/blacksea](http://www.unep.org/unep/program/natres/water/regseas/blacksea)

**Convention for the Protection of the Marine Environment of the North-East Atlantic, 1992 (OSPAR)**

*Note: not indexed*

**Description**

The Convention's main concern is the prevention and elimination of pollution of the marine environment and each of its compartments, that is water, sediments and biota. Its two principal objectives are:

- to safeguard human health, to conserve marine ecosystems and, where practicable, restore marine areas which have been adversely affected;

- to take all possible steps to prevent and eliminate pollution and enact the measures necessary to protect the sea against the adverse effects of human activities.

The Convention lays down general principles and a framework for considering various sources of marine pollution. It does not include a list of species or ecosystems that have to be protected, but the Parties are obliged to take the necessary measures to protect the maritime area against the adverse effects of human activities; species and habitat protection could be the objects of these measures. The Parties shall take, individually or jointly, all possible steps to prevent and eliminate pollution:

- from land-based sources, in particular as provided for in Annex I;
- by dumping or incineration of wastes or other matter, in particular as provided for in Annex II;
- from offshore sources, in particular as provided for in Annex III.

The Parties shall, in particular, as provided for in Annex IV:

- undertake and publish at regular intervals joint assessments of the quality status of the marine environment and of its development, for the marine area or for regions or sub-regions thereof;
- include in such assessments both an evaluation of the effectiveness of the measures taken and planned for the protection of the marine environment and the identification of priorities for action.

The Parties shall further apply:

- the precautionary principle: preventive measures are taken when there is reason to believe that substances or energy introduced into the marine environment may create hazards to harm living resources and marine ecosystems, even when there is no conclusive evidence of a causal relationship between inputs and their effects;
- the polluter-pays principle: the costs of pollution prevention, control and reduction shall be borne by the polluter.

The Parties are to apply the measures they adopt in such a way as to prevent an increase of pollution of the sea outside the maritime area or in other parts of the environment.

### **Mechanism**

In implementing the Convention, the Parties shall adopt programmes and measures containing time limits for their completion, which take full account of the use of the best available technology and best environmental practice designed to prevent and eliminate pollution to the fullest extent. An Action Plan, which has to be reviewed and updated each year, sets out the practical actions to be taken towards the achievement of the objectives of the Convention. The 1992 Action Plan specified 27 activities, including the collection of qualitative and quantitative information on the quality of the marine environment. A Commission, with representatives of each of the Parties, has been established as the governing body and meets at regular intervals. The Parties shall report to the Commission on:

- the legal, regulatory or other measures taken;
- the effectiveness of the measures;
- problems encountered in implementation.

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### **EU Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, 1992 (Habitats Directive)**

*Note: not indexed*

**Description**

The aim of the Directive is to contribute towards ensuring biodiversity through the conservation of natural habitats and of wild fauna and flora. The implementing measures are to be designed to maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest. The Directive requires the EU member states to identify, designate and conserve areas that are necessary to maintain or restore habitats and species of Community interest at a favourable conservation status. The habitats and species are listed in several Annexes:

- Annex I lists natural habitat types of Community interest whose conservation requires the designation of Special Areas of Conservation (SACs), and includes priority natural habitat types;
- Annex II lists animal and plant species of Community interest whose conservation requires the designation of SACs, and includes priority species;
- Annex IV lists animal and plant species of Community interest and in need of strict protection, and is to guide member states in the selection of sites that are potentially of Community importance;
- Annex V lists animal and plant species of Community interest whose taking in the wild and exploitation may be subject to management measures.

These Annexes list 253 habitat types, 200 animal species and 434 plant species as being of Community interest. A limited number of priority habitat types and priority species are also distinguished. The areas selected (SACs), together with the Special Protection Areas designated under the Birds Directive will make up "Natura 2000" – "a coherent European ecological network". Each member state shall contribute to the creation of Natura 2000 in proportion to the representation within its territory of the natural habitat types and the habitats of species. For these areas member states shall establish the necessary conservation measures.

**Implementation**

The process of selecting sites begins with the submission of lists of potential sites by member states to the Commission, with a deadline of June 1995. It proceeds to the adoption of a list of "Sites of Community Importance" (SCIs) by biogeographical region, by June 1998 and is completed with the designation of SCIs as SACs in individual Member States by 2004. Member states shall bring into force the laws, regulations and administrative provisions necessary to comply with the Directive within two years of its notification. Every six years from 2000 member states shall draw up a report on the implementation of the measures taken under this Directive. Parallel with their proposals for sites eligible for designation as SACs, member states shall send to the Commission their estimates relating to Community co-financing which they consider necessary to allow them to meet the obligations. In addition to proposals by member states for the designation of SACs, there is also a procedure to allow the "designation in exceptional cases of a site which has not been proposed by a Member State but which the Community considers essential for either the maintenance or the survival of a priority habitat type or a priority species".

**Organization**

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**Convention on Cooperation for the Protection and Sustainable Use of the Danube River, 1994**

*Note: not indexed*

**Description**

The Convention sets out to establish a framework for joint activities and exchange of information (on bi- and multilateral agreements, legal regulations etc.), to protect the marine environment, to prevent and control pollution in the Danube and to ensure sustainable use of the water resources of countries through which the Danube flows. Under the Convention, all countries should adopt the same monitoring systems and methods of assessing environmental impact. The Convention also addresses the question of liability for cross-border pollution, lays down rules for the protection of wetland habitats and establishes guidelines for conserving areas of ecological importance or of great aesthetic value.

The signatories have agreed to cooperate on fundamental water management issues by taking "all appropriate legal, administrative and technical measures to at least maintain and improve the current environmental and water quality conditions of the Danube River and of the waters in its catchment area and to prevent and reduce as far as possible adverse impacts and changes occurring or likely to be caused". The Parties should evaluate the importance of different biotopes for the riverine ecology and propose measures for improving the aquatic and litoral ecological conditions.

### **Implementation**

The Danube countries have agreed to cooperate in implementing the Convention before it formally comes into force and the Strategic Action Plan will be an important tool to do this. They have also agreed to establish an interim international secretariat. When the Convention enters into force, responsibility for the water-related parts of the Environmental Programme will be transferred to the international commission and its secretariat. In the meantime the interim secretariat and the Environmental Programme Coordination Unit will work closely together. The International Commission for the Protection of the Danube River has been established to provide a framework for regional cooperation under the Convention. The Parties shall report to the commission on progress. The task of coordinating the various implementing activities lies with the Programme Management Task Force.

### **European Diploma of Protected Areas**

*Note: not indexed*

#### **Description**

The European Diploma is an award by the Council of Europe, instituted in 1965, formally adopted in 1973, revised regulations adopted in 1991 and 1998. The award is granted to recognise that a site is of European interest from the natural-heritage standpoint and that the area is properly protected. The Diploma can be awarded to national parks, nature reserves, natural areas and other sites or features. The Diploma is valid for five years and may be renewed for further five-year periods, subject to prior appraisals for each period.

#### **Implementation**

To date, a total of 56 sites have been recognised in 21 countries.

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### **Man and the Biosphere Programme**

*Note: Programme and "UNESCO" not indexed*

### **Description**

The biosphere reserve concept was initiated in 1974 by the UNESCO Man and the Biosphere Programme (MAB) to reconcile the conservation of natural and semi-natural areas with local land-use needs. Biosphere reserves consist of a strictly protected "core area" that is surrounded by a "buffer zone" and then a "transition area". Land use in a buffer zone is limited to activities that are compatible with the protection of the core area, such as certain forms of research, education, training, recreation and tourism. Appropriate economic activities are permitted in the transition area, where sustainable resource management practices can be developed. But in reality the zonation is much more complex.

MAB is concerned with the conservation and monitoring of biodiversity and ecosystem processes, the sustainable management of natural resources at the ecosystem and landscape levels and the integration of the socio-cultural and ethical dimensions into land development. The general criteria for an area to qualify for designation as a Biosphere Reserve include the following:

- it should constitute a mosaic of ecological systems representative of major biogeographical regions, including a gradation of human interventions;
- it should be of significance for the conservation of biodiversity;
- it should provide an opportunity to explore and demonstrate approaches to sustainable development on a regional scale;
- it should be able to provide all three functions of a Biosphere Reserve;
- it should provide these functions through appropriate zonation, namely one or more legally protected core areas, buffer zones and transition areas;
- provisions should be made for mechanisms to manage human activities in the buffer zones, a management policy or plan for the area as a Biosphere Reserve, a designated authority or mechanism to implement this policy or plan and programmes for research, monitoring, education and training.

### **Implementation**

The network of Biosphere Reserves consisted by December 1997 of 352 reserves in 87 countries. Most biosphere reserves are located in existing national parks and forest reserves and in practice often have limited capability of addressing overall rural development issues at the bioregional scale. The overall MAB programme is guided by the MAB International Coordinating Council that consists of 34 member states elected by the UNESCO General Conference. Programme activities are conducted in more than a hundred countries under the direction of their MAB National Committees or focal points.

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### **Mediterranean Action Plan, 1975**

*Note: not indexed*

### **Description**

The Mediterranean Action Plan (MAP) is intended to assist the Mediterranean governments in formulating national policies relating to the development and protection of the Mediterranean area and

to improve their ability to identify various options for alternative patterns of development, to make choices and to allocate resources. The plan consists of three components:

- the framework convention with related protocols and technical annexes (the legal component);
- a coordinated programme for research, monitoring and exchange of information and the assessment of the state of pollution and of protection measures (the assessment/scientific/technical component, or "Med-Pol");
- integrated planning of the development and management of the resources of the Mediterranean Basin (the management/socio-economic component, or the "Blue Plan").

All three components of MAP are interdependent and provide a framework for comprehensive action to promote both the protection and the continued development of the Mediterranean region.

In general, MAP has stimulated a collective awareness of the Mediterranean as a common heritage. Through Med-Pol emission standards and environmental quality objectives for coastal waters and marine organisms are being agreed. Between 1985 and 1989, a large number of common quality objectives for the Mediterranean were adopted by the contracting parties to the Barcelona Convention. However, in themselves the Specially Protected Areas of Mediterranean Importance under the Barcelona Convention are not enough to safeguard critical species, so action plans coordinated by MAP through the Regional Activity Centre for Specially Protected Areas, were adopted for the monk seal in 1987, for marine turtles in 1989 and for cetaceans in 1991.

### **Implementation**

MAP recently entered Phase II with a new Action Plan. Inspired by Agenda 21, the plan focuses on the pressing environmental needs that have to be addressed in the region. Rather than fixing priorities and schedules for a series of actions, the plan aims to secure sustainable development, to protect the marine environment and its coastal zones, to protect nature and landscapes and to strengthen the solidarity between Mediterranean states in managing their common heritage and resources for the benefit of present and future generations. Until 1980 MAP was supported almost entirely by UNEP. Since then UNEP has sought to transfer more responsibility to the parties themselves.

### **Implementation**

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### **European Network of Biogenetic Reserves**

*Note: not indexed*

### **Description**

The European Network of Biogenetic Reserves was established by the Council of Europe in 1976 as a means to promote the conservation of representative examples of the natural habitats that are especially valuable for nature conservation in Europe. In 1992 the Committee of Ministers of the Council of Europe decided to enlarge the Network to European non-member states. The main objective of the Network is to promote the creation of protected areas. Biogenetic reserves conserve habitats or ecosystems on land or freshwater bodies or at sea. Each biogenetic reserve should fulfil two objectives:

- to contribute to guaranteeing the biological balance and conservation of representative examples of Europe's natural heritage
- to act as a "living laboratory" for research into the operation and evolution of natural ecosystems and to educate the public on the environment.

A Biogenetic Reserve must aim to conserve natural and near-natural habitats or ecosystems, whether on land, water or sea. In some cases minimum human intervention may be necessary to guarantee the maintenance of such a habitat or ecosystem.

Resolutions adopted in 1979, 1981, 1986 and 1992 identify specific biotopes and species that should be given priority for inclusion in the Network. The biotopes are heathlands, maquis, wetlands, typical examples of the European natural vegetation map, dry grasslands, dunes, halophytic vegetation, flood plains, peatlands, coastal and marine ecosystems, aquatic freshwater ecosystems, ancient natural and semi-natural forest,. The species identified are mammals, amphibians, reptiles, birds, freshwater fish, butterflies, dragonflies hymenoptera, saproxylic invertebrates and vascular plants.

### **Implementation**

The Council of Europe mandates experts to compile inventories of sites in the member states that meet the conservation priorities. These inventories are based largely on existing national and international inventories. The lists of sites obtained in this way form the basis for proposals for new Biogenetic Reserves to the respective member states. If sites already enjoy adequate protected status, they can be directly included in the Network following a proposal from the respective country. National governments are also allowed to propose for inclusion in the Network any site that is of European value for nature conservation and that meets the criteria for biogenetic reserves, without necessarily being one of the biotopes or habitats of species recognised as having priority. Selection is based on two criteria relating to natural value and protection status, namely:

- the value for nature conservation (the degree to which the area harbours typical, unique, rare and/or endangered ecosystems or species);
- the protection status of the area, which must be strict.

To date a total of 344 Biogenetic Reserves have been designated in 22 countries.

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### **CORINE**

*Note: not indexed*

### **Description**

The Coordination of Information on the Environment Programme (CORINE) was adopted by the EU in 1985. The original four-year programme was extended in 1990 for a further two years. It comprised several sub-projects: CORINE-Air, CORINE-Land-Cover, CORINE-Biotopes, CORINE-Soils, CORINE-Erosion. Only CORINE-Air and CORINE-Land-Cover, and partially CORINE-Biotopes are being continued, under the responsibility of the European Environment Agency. CORINE-Biotopes was updated by a few western European countries from 1990, while the further work is being carried out by several PHARE countries. The objective of CORINE was to assemble basic information on the state of the Community environment and to improve its consistency, while assessing comparability and availability of data and methods of analysing data. The biotopes database includes detailed information on sites of Community importance on the basis of four criteria:

- the presence of vulnerable species;



- the presence of vulnerable habitats;
- the richness of the site for a taxonomic group;
- the richness of the site as a vegetation unit.

The aim was to include sites that contain one per cent or more of the Community population of a vulnerable species or which are among the 100 most important sites in the EU for such species. The database includes sites that are formally protected in the member states on biological, landscape, geological, geomorphological or archaeological grounds sites that are protected but through other mechanisms than legal instruments, such as private nature reserves, as well as non-protected sites which have been recognised of interest for nature conservation at European level.

### **Implementation**

By 1990 a database describing some 6000 sites of Community importance for nature conservation had been created. Each site is described on the basis of standard attributes: name, location, area, altitude, habitat type, habitat cover, designation, the reason for inclusion, the presence of human activities, the presence of important species, the species numbers and a site description. However, the information is not complete for all biotopes. Compilation of data on the areas has suffered from the fact, in the absence of a European overview, it was difficult for member states to interpret the notion of "the 100 most important sites in the EU". Furthermore, since all EU member states have been involved since 1992 in implementing the Habitats Directive, far more precise inventories of sites have been undertaken in this framework and incorporated into the Natura 2000 database. Updating the CORINE-Biotopes database in these countries is therefore no longer a priority. However, for the PHARE countries, CORINE-Biotopes provides sound information for inventories preliminary to the Emerald Network process. The European Environment Agency has produced a CD-ROM which includes the present status of the CORINE-Biotopes database as well as the CORINE-Land-Cover database.

The Agency's Multi-Annual Work Programme for the period 1994-1999 is structured as follows:

- dissemination and pooling of existing information and know-how;
- periodical reports on the state of the environment;
- guidelines for reports/assessments/data processing of special interest at European level;
- media-oriented monitoring; assessment of the state and trends of the environment;
- source-oriented monitoring; assessment of pressures;
- integrated environmental assessment – problems areas and sectors;
- scenarios for environmental improvement;
- instruments and challenges for environmental policy development and implementation.

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### **Nicosia Charter, 1990**

*Note: not indexed*

### **Description**

The Charter was adopted by the governments of 15 Mediterranean countries, the EU, the World Bank, the European Investment Bank and UNEP in Cyprus, April 1990. The contracting parties agreed to identify vulnerable areas in the Mediterranean Basin and to develop by 1995 conservation plans for

seriously threatened biotopes. The EU will, together with the World Bank, the European Investment Bank (EIB) and UNEP, commit financial and material resources to achieve by 2025 an environment in the Mediterranean Basin that is compatible with the requirements of sustainable development. The Charter commits the EU, the financial institutions and the countries to undertake five new tasks, to take eight priority actions, to provide the necessary finance, to mobilise technical assistance and to raise public awareness.

New tasks under the Charter include granting executive powers to environmental institutes, integrating environmental strategies into development programmes, establishing legal and regulatory frameworks to enforce regulations and to ensure that development plans include environmental commitments, assessing the environmental impact of development programmes, and adopting financial incentives and disincentives to improve integrated management of the Mediterranean environment.

The priority actions agreed under the Charter cover all aspects of environmental concern, from identifying and protecting vulnerable coastal zones, nature conservation, waste management, reforestation, disposal of solid and toxic wastes, permanent monitoring of the ecosystem and maritime traffic, energy and water saving and a range of programmes to share information between all countries. The contracting parties have pledged to achieve sustainable environment in the Mediterranean region by 2025. However, this will largely depend on the cooperation of both the national governments and the various sectors in the countries that will be involved in implementing the various measures.

### **Implementation**

A long-term strategy and action plan are to be drawn up to specify how the objectives of the Charter will be achieved. Progress will be reviewed every two years. The EU, the World Bank and the EIB have committed approximately \$1500 million to implementing the Charter.

### **Environmental Programme for the Mediterranean Mediterranean Environmental Technical Assistance Programme**

*Note: neither programme indexed*

### **Description**

The Mediterranean Environmental Technical Assistance Programme (METAP) was launched by the World Bank in 1990 as the main operational instrument for supporting the Environmental Programme for the Mediterranean. In 1988 the World Bank initiated the Environmental Programme for the Mediterranean to address the environmental policy, institutional and investment-related needs of the Mediterranean countries. The Programme aims to identify suitable investment projects and institution-strengthening activities and to prepare specific policy measures based on the key environmental priorities of the region.

METAP, funded initially by UNDP and the EU, is designed as the main operational instrument for translating the priorities of the Programme into policy recommendations, institution-strengthening measures and investment packages. METAP I (1990-1992) aimed to assist countries in drawing up environmental policies and mobilising funds to carry out projects in various spheres, such as water resource management, toxic waste disposal, marine pollution control and coastal planning. METAP II (1993-1995) was devoted to increasing investment in environmental matters; in 1995 it supported about 100 technical assistance activities. METAP III (1996-2000) aims to strengthen environmental management capacity, especially in relation to renewable natural resources, and to combat pollution in critical zones.

### **Implementation**

METAP's activities are closely coordinated with the regional operations of the World Bank and the EIB. Through its support for project preparation, METAP contributes to the strengthening of the environmental components of the lending programmes of both financial institutions. It also links with

UNEP/MAP activities that contribute to the overall development of the Environmental Programme of the Mediterranean.

**Organization**

Mediterranean Environmental Technical Assistance Programme  
Web: [www.metap.org/wb.htm](http://www.metap.org/wb.htm)

**European Conservation Strategy, 1990**

*Note: not indexed*

**Description**

The Strategy is based on the principles of the reports *Our Common Future* (1987), the *World Conservation Strategy* (1980), the UN Economic Commission for Europe's *Strategy for Environmental Protection and Rational Use of Natural Resources in ECE Member Countries* (1988) and UNEP's *Environmental Perspective to the Year 2000 and Beyond* (1988). It was adopted at the Sixth European Ministerial Conference on the Environment, Brussels, 11-12 October 1990.

The objectives of the Strategy are the promotion of a culture that respects nature for what it is, to base economic, social and cultural development on a rational and sustainable use of natural resources, making Europeans aware of and involve them in environmental and conservation issues, and achieving sustainable development and conservation. Four principles to meet these objectives are specified:

- safeguarding of species, ecosystems and essential natural processes should be an obligation for all people;
- the acceptance by all European states of the principle of sustainable development;
- economic and social development within a healthy environment;
- the shared responsibility of all sections of society, institutions and authorities for the conservation of the environment.

**Implementation**

The member states of the Council of Europe should apply the objectives and principles of the Strategy as appended to the Recommendations in all their policies. Specifically, national conservation strategies should be drawn up. The Strategy also included recommendations for developing sustainable policies in different sectors (air, inland waters, lakes and rivers, seas, soil, wildlife and biotopes, landscape conservation and agriculture).

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**Arctic Environmental Protection Strategy, 1991**

*Note: not indexed*

**Description**

The Arctic Environmental Protection Strategy (AEPS) – an outcome of the Alta Declaration on the Protection of the Arctic Environment – was developed by the eight Arctic governments (Canada, Denmark/Greenland, Finland, Iceland, Norway, the Russian Federation, Sweden and the United States of America) in consultation with indigenous peoples in the Arctic region. It was agreed in Rovaniemi, Finland, in June 1991.

The Strategy aims to protect the Arctic environment and to strengthen further joint efforts to develop, implement and improve protection programmes. The working priorities, based on the recommendation of the Senior Arctic Affairs Officials to the Fourth Ministerial Conference on the AEPS are:

- the conservation, monitoring and assessment of threats to Arctic flora, fauna and their habitats;
- the further development and implementation of the Circumpolar Protected Areas Network Strategy and Action Plan (CPAN).

Sustainable development, including environmental protection strategies, scientific advice and traditional knowledge, is to be an overriding objective for all activities carried out by the Arctic Council.

### **Implementation**

The main implementation mechanism of the Strategy is the Programme on the Conservation of Arctic Flora and Fauna (CAFF). The majority of CAFF's activities are directed at species and habitat conservation and at integrating indigenous people. CAFF's major area of work in habitat conservation to date is the Circumpolar Protected Area Network Project (CPAN), which has produced seven reports, and a number of animal and plant habitat mapping projects. The CAFF Programme carries out a variety of work on rare and endangered species and on shared species of special conservation concern and has developed lists for each. CAFF has also prepared overviews of national species classification and recovery schemes. CPAN will help to implement the goals of the AEPS by aiming to establish, within the context of an overall Arctic conservation strategy, an adequate and well-managed network of protected areas that has a high probability of maintaining the dynamic biological diversity of the Arctic region in perpetuity.

In 1996 CAFF set up a Biodiversity Task Force to develop a long-term Cooperative Strategy for the Conservation of Biodiversity in the Arctic Region. A framework for this Action Plan has been published. The main objectives are:

- to support and implement measures for the conservation of Arctic genetic resources, species and their habitats;
- to establish protected areas in the Arctic region where they contribute to the conservation of ecosystems, habitats and species;
- to manage activities outside protected areas in order to maintain the ecological integrity of the protected areas and to ensure the conservation of biodiversity;
- to enhance the integration of biodiversity conservation and sustainable use objectives into sectoral and cross-sectoral plans and policies;
- to enhance efforts to monitor Arctic biodiversity, paying attention to species, populations, habitats and ecosystems which are of greatest ecological, cultural, social, economic or scientific value.

The implementation of the AEPS is closely allied with CAFF, the Programme for the Protection of the Arctic Marine Environment, the Environmental Impact Assessment Group and the Arctic Monitoring and Assessment Programme.

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## **Environment Programme for the Danube River Basin**

*Note: not indexed*

### **Description**

The Programme was agreed in September 1991 in Sofia by 11 riparian states in Central and Eastern Europe. It is a multilateral initiative to protect the Danube watershed. Under the Programme a Strategic Action Plan for the period 1995-2005 was prepared, setting out strategies for dealing with the environment-related problems in the Danube basin. The Plan sets targets to be met within ten years and defines a series of actions to meet them with the aim of achieving four objectives:

- to reduce the negative impacts of activities in the Danube basin and the Black Sea;
- to maintain and improve the availability and quality of water in the Danube basin;
- to control hazards from accidental spills;
- to develop cooperation in the field of regional water management.

The Action Plan is addressed to the officials of national, regional and local governments who share responsibility for implementing the Convention on Cooperation for the Protection and Sustainable Use of the Danube River and the national environmental action programmes prepared under the Environmental Action Programme for Central and Eastern Europe. The Plan also recognises industry, agriculture, NGOs and the public as important actors. The regional strategies set out in the Action Plan are intended to support national decision-making on water management and on the restoration and protection of vulnerable and valuable areas in the Danube Basin.

### **Implementation**

Each country is to designate a national authority to coordinate its activities in implementation of the Action Plan. The Danube Programme Coordination Unit and the future international secretariat of the Danube River Protection Convention play important roles in coordinating national and international activities.

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## **Mediterranean Landscape Charter, 1993 (Charter of Seville)**

*Note: not indexed*

### **Description**

The Charter was adopted at the Third Conference on Mediterranean Regions, held in Taormina, Italy, on 5-7 April 1993, by the regions of Andalusia, Languedoc-Roussillon and Tuscany. The objectives of the Charter are:

- the conservation of landscapes with a particular historic or natural value that are representative of Mediterranean civilisation;
- ensuring that human actions are conducive to the creation of landscapes of the highest possible quality;
- ensuring that all development projects take account of the landscape elements that have natural, cultural or historic value;

- ensuring that schemes involving major transport, urban development, tourist or industrial infrastructures take due account of landscape prevention or make provision for rehabilitation;
- ensuring that all measures entailing the use or sale of public property preserve the most important landscape areas that have historic, cultural and natural value;
- maintaining footpaths, farm tracks and other rural rights of way as a means of access to the landscape and to avoid the proliferation of roads for motor vehicle traffic;
- ensuring a fair balance between the landscapes subject to restrictions and the neighbouring areas where their development benefits from their proximity to these zones.

The Charter also envisages several actions that should be implemented, such as:

- the promotion of closer collaboration between the various sectors concerned with national and regional spatial planning, environmental management and heritage protection;
- encouraging the inclusion of the landscape dimension in impact studies, action programmes, spatial planning procedures, heritage protection and environmental management;
- insisting that projects that do not require impact studies should take account of the landscape dimension;
- promoting work on identifying landscapes and analysing their value to society;
- fostering awareness by the European public of the need for landscape protection and the problems resulting from the transformation and exploitation of the landscape.

### **Implementation**

Joint pilot projects should be undertaken to implement the objectives and actions. It has also been agreed to consider the possibility of creating a Mediterranean landscape institute.

### **Agenda 21**

*Note: not indexed as "Agenda 21", only via "agenda"*

#### **Description**

Agenda 21 is a non-binding international programme, produced during the UN Conference on Environment and Development (UNCED), Rio de Janeiro, June 1992. It comprises an agreed programme of work for the period 1993-2000, based on the 27 principles of the Declaration of Rio de Janeiro, and contains 40 chapters of actions grouped into four sections:

- the social and economic dimensions;
- the environmental dimensions;
- strengthening of the role of major groups;
- resources and instruments.

Those chapters of special relevance to the conservation of biological and landscape diversity are 11 (combating deforestation), 12 (managing fragile ecosystems: combating desertification and drought), 13 (managing fragile ecosystems: sustainable mountain development), 14 (promoting sustainable agriculture and rural development), 15 (conservation of biological diversity), 17 (protection of the oceans, all kinds of seas, including enclosed and semi-enclosed seas, and coastal areas and their protection, rational use and development of their living resources), 18 (protection of the quality and supply of freshwater resources: application of integrated approaches to the development, management and use of water resources) and 32 (strengthening the role of farmers). Although Agenda 21 has no binding force, it is an important framework for further action on the basis of new environmental priorities and approaches. Governments should implement Agenda 21 in national policies and through regional and local cooperation. Regional economic commissions should also use Agenda 21 as a framework for their activities.

#### **Implementation**

The Secretary-General of the UN should report, on the basis of information from national parties, on the policy improvements, coordination systems and procedures for implementation of programmes.

Information should be delivered by countries, international organizations., donor agencies and NGOs. Effective cooperation between the UN and the multilateral financial organizations should ensure that concrete actions are undertaken and that the necessary measures are financed. Generally, implementation should be financed by national governments and the private sector. Every country should analyse (preferably at least by 1994) the needs for enlarging the capacity to develop a national sustainable development strategy.

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**Towards Sustainability: the Fifth EU Environmental Action Programme**

*Note: not indexed*

**Description**

Towards Sustainability is a strategic environmental policy programme for the period 1993-2000 endorsed by the EU member states. The programme lays out the environmental objectives of the EU to the year 2000 and long-term goals beyond 2000. The priority environmental themes of the programme are climate change, acidification and air quality, protection of nature and biodiversity, management of water resources, the urban environment, coastal zones and waste management. The target groups are: industry, energy, transport, agriculture and tourism.

A review of the programme was carried out by the European Commission in 1995. Using this evaluation as a basis, the Commission submitted a proposal to the Council of Ministers and the European Parliament for a revised programme. The proposal gives priority to actions to:

- integrate the environment into other policies;
- broaden the range of instruments;
- improve implementation and enforcement of legislation;
- raise awareness;
- strengthen international cooperation.

Elements of the Programme that relate to biodiversity include:

- Recommendations to give priority to actions on the field of sustainable management of soil, water, natural areas and coastal zones.
- Chapter 5.3 on the protection of nature and biodiversity states that the "Community strategy will be aimed at the maintenance of European biodiversity primarily through sustainable land management in and around habitats of Community and wider importance. An interrelated network of habitats, based on the concept of Natura 2000, should be created through the restoration and maintenance of habitats themselves and of corridors between them". The Programme emphasises the important role of the EU Birds and Habitats Directives, the LIFE Programme and CITES.

**Implementation**

The Programme provides a strategic framework for the formulation of specific policy proposals by the European Commission.

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## MedWet

*Note: not indexed*

### Description

MedWet is an initiative of the Mediterranean countries endorsed by the Kushiro Conference of the Contracting Parties to the Ramsar Convention in June 1993. Efforts for a strong collaboration in favour of Mediterranean wetlands started in 1991, when the MedWet initiative was launched with the support and involvement of the Ramsar Convention. MedWet was conceived as a long-term effort by governments and NGOs to strengthen the ecological and cultural unity of the Mediterranean region.

Since its initiation, two major projects involving more than ten Mediterranean countries have been completed. The projects have helped to develop methodological tools for wetland conservation and management, to stimulate concrete actions at pilot sites and to develop policy guidelines in cooperation with national NGOs and experts. The Ramsar Bureau played a key role in the projects. Two further projects started at 1998: MedWet3 and MedWet4 ("the Evian Project") that involve actions at about twenty wetland sites in ten countries. All projects are designed to implement the Mediterranean Wetland Strategy, which was prepared by the MedWet partners and endorsed by the Conference on Mediterranean Wetlands (Venice, June 1996). The Strategy "to stop and reverse the loss and degradation of Mediterranean wetlands as a contribution to the conservation of biodiversity and sustainable development in the region". Its general objectives are:

- to obtain the widest possible acceptance for the Mediterranean Wetland Strategy and commitments to its implementation;
- to achieve the wise use of Mediterranean wetlands, including restoration or rehabilitation of lost and degraded wetlands;
- to increase knowledge and raise awareness of wetland functions and values throughout the Mediterranean;
- to reinforce the capacity of institutions and organizations in the Mediterranean to secure conservation and wise use of wetlands;
- to ensure that all wetlands in the Mediterranean with a protected status are managed effectively;
- to confer legal protection on the major Mediterranean wetlands and strengthen relevant legal frameworks;
- to strengthen international cooperation for wetlands in the the Mediterranean, including technical and financial assistance;
- to strengthen collaboration among governmental, non-governmental organizations and the private sector for wetland conservation and wise use in the Mediterranean.

### Implementation

In October 1996 the Ramsar Standing Committee endorsed the establishment of a Mediterranean Wetlands Committee (MedCom). At present, all Mediterranean countries are members of MedWet/Com plus Bulgaria, Jordan, the Former Yugoslavian Republic of Macedonia, Portugal, the Palestinian Authority, the European Commission, the Conventions of Ramsar, Barcelona and Bern and six international NGOs and wetland centres. A MedWet Team has been established comprising a Ramsar-appointed MedWet coordinator and three secretariat units: at the Greek Biotop Wetland Centre, the Station Biologique de la Tour du Valat (France) and SEHUMED (University of Valencia, Spain).

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## **Environmental Action Programme for Central and Eastern Europe**

*Note: not indexed*

### **Description**

The Programme was agreed by the UN/ECE governments and the European Commission at the Lucerne "Environment for Europe" conference on 28-30 April 1993. It builds on the efforts of the countries in Central and Eastern Europe to address regional environmental problems. The objectives of the Programme are:

- to establish a consensus within and between countries of East and West on the priority environmental problems;
- to devise an appropriate mix of policies, secure the necessary investments and involve the relevant institutional actors to deal with the problems.

CEE countries, in collaboration with the Council of Europe and the IUCN, have proposed a range of projects concerning the conservation of areas harbouring exceptional levels of biodiversity. Complementary work includes the extension of the CORINE biotopes database to CEE countries, the work in CEE for the State of the Environment Report, and the completion of the IUCN ecosystem surveys. With regard to protected areas, the basic premise of the Programme is that investments should focus on improving the management of existing protected areas.

### **Implementation**

Unlike the geographically focused programmes, the Environmental Action Programme focuses on building effective processes to deal with the region's environmental problems rather than devising specific control measures. The Programme is to be reviewed and updated periodically and adapted to country-specific circumstances.

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## **Black Sea Environmental Programme**

*Note: not indexed*

### **Description**

The Black Sea Environmental Programme is an initiative of the Global Environment Facility. The primary activity to be carried out under the Programme is the preparation of a Strategic Action Plan for the Rehabilitation and Protection of the Black Sea, which was agreed by the governments of the six Black Sea states (Bulgaria, Georgia, Romania, the Russian Federation, Turkey and the Ukraine) in Turkey on 30-31 October 1996. In the Plan, the governments of the Black Sea states, together with the wider international community, commit themselves to a pragmatic programme of actions based upon common objectives and targets for restoring and protecting the Black Sea environment. Its overall aims are to enable the population of the Black Sea region to enjoy a healthy living environment, and to attain a biologically diverse Black Sea ecosystem with viable natural populations of higher organisms and which will support livelihoods based on sustainable activities such as fishing, aquaculture and tourism. Cooperative action is based on sustainable development and the precautionary principle.

The central element of the Plan focuses is the "Transboundary Diagnostic Analysis", a comprehensive scientific assessment of the environmental problems facing the Black Sea, their underlying causes and the steps which can be taken to remedy them. It includes the results of pilot surveys of pollution, inventories of land-based sources of pollution, studies of fisheries and Black Sea biodiversity and habitats, studies of socio-economic activities, coastal-zone management, the economies of the six Black Sea states, environmental legislation and the emerging role of public participation. It also examines the costs of the actions proposed and the most appropriate timescale for completing them. Hereafter the Programme will be directed at supporting the Black Sea governments and NGOs in implementing the Plan, especially through the creation of National Black Sea Action Plans and a Black Sea Environment Fund.

With regard to habitats and landscapes, the Programme recommends that the Black Sea states should receive assistance in legal, management and socio-economic capacity-building. National nature conservation legislation should be based on international recommendations and IUCN criteria, so that protected areas should be classified into six national categories according to their primary management objectives. Legislation also should be passed to facilitate the integration of the sites into regional and global networks, such as Biosphere Reserves, World Heritage Sites, Ramsar Sites and regional transboundary protected areas. One of the more concrete actions regarding biological diversity protection is that a regional Black Sea Red Data Book, identifying and describing endangered species, will be prepared and published by December 1998.

### **Implementation**

The Strategic Action Plan was to be elaborated into national action plans by the Black Sea states by October 1997. From 1997, the programme staff are to hand over their tasks to staff from the Istanbul Commission of the Bucharest Convention. The Commission was to be operational by January 1997 with financial and technical support provided by the Black Sea states, but this has not yet been achieved. The Istanbul Commission should establish a body to provide support for implementing the necessary actions. The Secretariat of the Commission should report annually to the Commission on the progress made in implementing the Plan. The Commission should then decide on any further measures that may be necessary to secure implementation.

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### **Danube Delta Biodiversity Project**

*Note: not indexed*

### **Description**

The Danube Delta Biodiversity Project was launched in 1993 by the World Bank and the Ministry of Water, Forestry and Environmental Protection of Romania. The project is concerned with the Danube Delta Biosphere Reserve (549,000 ha), which is designated as a Biosphere Reserve, a Ramsar site and a World Heritage site. The overall objective of the project is to support the local organizations in their efforts to develop both the conservation of biodiversity and the integrated management of the Danube delta ecosystem. It is a five-year project that is financed by the Global Environment Facility (GEF) and closely related to two regional GEF projects: the Environmental Programme for the Danube River Basin and the Black Sea Environmental Programme. The project is intended to support the conservation

activities of the Danube Delta Reserve Authority (DDRA) and the work of other organizations. Its main aims are:

- to help put in place the institutional and technical capacity required for DDRA to operate effectively and for effective environmental monitoring;
- to support an initial pilot programme to restore wetland conditions in abandoned polders and a longer term programme of wetland restoration and the rehabilitation of degraded habitats;
- to improve the availability of information for policy-makers.

### **Implementation**

The project is divided into two sub-projects, for the Romanian and Ukrainian parts of the Delta respectively. The Romanian government has initiated and implemented a National Monitoring Plan, which consists of various DDRA monitoring activities, including biodiversity and natural resource exploitation. A list of endangered species will also be drawn up.

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### **Environmental Programme for Europe**

*Note: not indexed*

### **Description**

The Environmental Programme for Europe is a non-binding programme, endorsed by the UN/ECE governments and the European Commission at the "Environment for Europe" conference in Sofia in 1995. The Programme sets out long-term environmental policy priorities at the pan-European level to serve as a framework for the coordination of national and international efforts to improve environmental conditions throughout Europe and to promote convergence of environmental quality and policies. It includes:

- key policy actions;
- other recommendations;
- a separate background document giving further information on policy in each of the areas covered by the Programme.

The Programme contains many policy actions and other recommendations, such as for "Sustainable Management of Natural Resources", "Sustainable Agriculture, Forestry and Fisheries" and "Biological and Landscape Diversity". Regarding the latter, the implementation of the Pan-European Biological and Landscape Diversity Strategy and its integration with other policy actions of the Programme is recommended. The Programme also supports the implementation of the Convention on Biological Diversity, other relevant legally binding instruments in the region and the Arctic Environment Protection Strategy.

### **Implementation**

Following the call of the Environment Ministers participating in the Sofia conference for the implementation of the Programme, it is for the UN/ECE countries and the other relevant actors to take the appropriate action. The conference further suggested that the European Environment Agency should use the Programme to guide its work on building on the *Dobris Assessment* and that all European countries should participate in this work. The UN/ECE is invited to assess and report on progress in implementing the Programme at the next pan-European ministerial conference.

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## **EU Biodiversity Strategy**

*Note: not indexed*

### **Description**

The EU Biodiversity Strategy is intended to fulfil the EU's obligations under the Convention on Biological Diversity and is an element of the EU's Fifth Environmental Action Programme. The Strategy aims to contribute to reversing present trends in biodiversity losses and to placing species and ecosystems in a satisfactory conservation status both within and beyond the territory of the EU. This involves in the first place the integration of environmental concerns into other sectoral policies. The Strategy identifies what needs to be done with specific reference to four major themes of relevance for EU policy:

- the conservation and sustainable use of biological diversity;
- the sharing of benefits arising out of the utilisation of genetic resources;
- research, identification, monitoring and the exchange of information;
- education, training and awareness.

The Strategy highlights special objectives in eight policy areas: conservation of natural resources, agriculture, fisheries, regional policies and spatial planning, forestry, energy and transport, tourism, and development and economic cooperation.

### **Implementation**

Achieving the Strategy's objectives will be secured through the development and implementation of sectoral and cross-sectoral action plans and other measures for the identified policy areas. Each action plan should set out clear tasks, targets and mechanisms to assess performance and to evaluate progress in the implementation of the Strategy. Indicators will be identified in order to enable an *ex ante* and *ex post* evaluation of the implementation of the action plans. These indicators will focus on the species and ecosystems likely to be affected by sectoral policies.

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## **Important Bird Areas in Europe**

*Note: not indexed*

### **Description**

The Important Bird Area (IBA) initiative aims to promote the conservation of sites that are of major importance for the conservation of Europe's avifauna. The aim has been to identify sites of importance for four groups of birds:

- regularly occurring migratory species which concentrate at and are dependent on particular sites either when breeding, on migration, or during the winter;
- globally threatened species (that is, species at risk of total extinction);
- species and subspecies threatened throughout all or large parts of their range in Europe but not globally;
- species that have relatively small total world ranges but with important populations in Europe.

An inventory of IBAs was published in 1989. The inventory of sites has five functions:

- to guide national conservation strategies and protected-area programmes;
- to inform decision-makers of the existence of these vital habitats and thereby to enable them to oppose land-use proposals which would be incompatible with their conservation;
- to provide an indication of the sites that are currently threatened and/or inadequately protected in order to assist the lobbying activities of national and international conservation bodies;
- to serve the conservation activities of international governmental organizations;
- to promote the implementation of global agreements.

The inventory describes 2444 IBAs, country by country, and with information for each site on the site name, its coordinates, the surface area, the international protection status, the national protection status, a site description and its ornithological importance. A large proportion of the sites listed in the inventory are not just important because of their bird species, but have their own intrinsic value as ecosystems with a great variety of other animal and plant species.

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### **Caring for the Earth: A Strategy for Sustainable Living**

*Note: not indexed*

#### **Description**

The Strategy, published in 1991, is a follow-up to the World Conservation Strategy. It formulates principles for sustainable living and the actions to put the principles into practice with the aim of integrating conservation and development and is composed of three parts:

- *Part I: the principles for sustainable living.* The principles are respect and care for the community of life, improving the quality of human life, conserving the Earth's carrying capacity, changing personal attitudes and practices, enabling communities to care for their own environments, providing a national framework for integrating development and conservation, and forging a global alliance. More substance is given to the principles in the following eight chapters.
- *Part II: additional actions for sustainable living.* These describe corresponding actions that are required in relation to the main areas of human activity and some of the major components of the biosphere. The chapters deal with energy, business, industry and commerce, human settlements, farms and rangelands, freshwater, and oceans and coastal areas.
- *Part III: guidelines for implementation and follow-up.*

For conserving biological diversity every country should:

- establish a comprehensive national system of protected areas (with different categories), which is the core of other programmes that seek to maintain the diversity of ecosystems, species and wild genetic resources; for the diversity of species the protected-area system should ensure that protected areas are linked to other areas by corridors of suitable habitats along which species can disperse (Action 4.9);
- improve conservation of wild plants and animals (Action 4.10);
- improve knowledge and understanding of species and ecosystems (Action 4.11);
- use a combination of *in situ* and *ex situ* conservation to maintain species and genetic resources (Action 4.11);
- harvest wild resources sustainably (Action 4.13);
- support management of wild renewable resources by local communities, and increase incentives to conserve biodiversity (Action 4.14).

The Strategy distinguishes 10 categories of protected areas, each providing distinctive benefits (Annex 4).

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### **Global Biodiversity Strategy**

*Note: not indexed*

#### **Description**

The Strategy is a 1992 follow-up to several previous initiatives, including the World Conservation Strategy and Caring for the Earth. It is built around 85 specific proposals for actions directed at governments, international institutions, non-governmental organizations and the private sector. In order to stimulate action, five of the actions are identified as catalytic actions that can be undertaken quickly and at low cost to set off a cascade of subsequent actions by various sectors and institutions, namely:

- adoption of the Convention on Biological Diversity;
- designation by the UN General Assembly of 1994-2003 as the International Biodiversity Decade;
- creation of an International Panel on Biodiversity Conservation;
- creation of an Early Warning Network for identifying immediate threats to biodiversity;
- integration of biodiversity conservation into national planning.

The Strategy calls on all nations and people to initiate and sustain a Decade of Action in order to conserve the world's biodiversity for the benefit of present and future generations.

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## **Baltic Sea Action Plan**

*Note: not indexed*

### **Description**

The Coalition Clean Baltic – a network for cooperation and coordination between NGOs in the Baltic Sea region – produced the Baltic Sea Action Plan in cooperation with WWF as a contribution to the work on environmental protection and nature conservation in the Baltic Sea region. The plan was presented by CCB and WWF at a Baltic NGO conference in Helsinki and also to the Baltic Environment Ministers at their meeting in 1992. The Plan lists the proposals for action which the cooperating organizations believe should be adopted by the Baltic governments, either individually or jointly, within the HELCOM framework. It calls for ecological sustainability as a guideline for planning future investments and industrial activities. Specific recommendations include:

- that all Baltic states should sign and ratify the international agreements aimed at the protection of the Baltic Sea area and that all international agreements should be legally binding on the signatory states;
- environmental impact assessments should be an obligatory part of decision-making procedures;
- policies should be based on the precautionary principle and preventive action;
- the development of environmental education and the distribution of environmental information to all educational fields and at all levels;
- environmental NGOs should be supported in establishing Environmental Education Centres in the Baltic Sea area.

The Plan includes actions for the protection of threatened biotopes and endangered species of flora and fauna. The key issue is to assure that no further species and habitats will become endangered by human activities, for example by the establishment of an international network of protected coastal and marine areas in the Baltic Sea and support for the immediate ratification by the Baltic states of the Bonn, Bern and Ramsar Conventions.

## **Green Danube Programme**

*Note: not indexed*

### **Description**

The biodiversity and natural heritage values of the Danube basin have become significantly degraded through pollution, canalisation, dam construction, the draining of wetlands and the loss of natural dynamics. In the early 1980s the governments of the Danube region recognised some of these problems. In 1985 the Bucharest Declaration on Water Management of the Danube was signed in which the countries agreed to protect the Danube and its tributaries from pollution, and in 1991 the Environment Programme for the Danube River Basin was agreed. The Green Danube Programme was developed by WWF in 1992 as a further contribution to resolving the environmental problems in the Danube basin. Since 1992, the Danube Delta Biodiversity Project has been launched and nine countries have agreed the Convention on Cooperation for the Protection and Sustainable Use of the Danube River. The Programme's objectives are:

- to halt the increasing destruction of the Danube and to ensure the protection of the most valuable remaining floodplain areas;
- to conserve the basin's biodiversity;
- to reduce water pollution;
- to secure the safe supply of drinking water for 20 million people;
- to ensure the protection and sustainable management of the ancient floodplain forests.

The Programme is composed of five major projects which are intended to serve as examples of restoration of wetland habitat, namely the Isar estuary, the central Danube multilateral park, the



Gemenc-Beda protected areas, the Bulgarian islands and the Danube Delta. The projects are carried out in cooperation with governments, WWF national and regional offices and local partner organizations.

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### **Parks for Life: Action for Protected Areas in Europe**

*Note: not indexed*

#### **Description**

*Parks for Life*, published in 1994 by the IUCN Commission on National Parks and Protected Areas (now renamed the World Commission on Protected Areas), is a framework for action for protected areas in Europe. The initiative was partly a response to the call of the 1992 World Parks Congress in Caracas for regional plans to link global aims to national and local action. It is also a follow-up to the decisions of the Earth Summit and Caring for the Earth. The aim of *Parks for Life* is to ensure an adequate, effective and well-managed network of protected areas in Europe and to conserve the landscape and biodiversity of the continent. Although Europe has many protected areas, the range of areas still has gaps and deficiencies. The plan consists of a series of actions focusing on four themes:

- placing Europe's protected areas in their wider context (Part I);
- addressing priorities at the European, sub-regional and national;
- strengthening the planning and management of Europe's protected areas (Part III);
- creating the climate for success (Part IV).

The plan calls for an effective legal framework, under which protected areas can be established and managed. The priority is put on strengthening national and sub-national legislation, supplemented by international agreements on nature conservation and protected areas. It stresses the need for adherence to the Ramsar, the World Heritage, the Bern and the Alpine Conventions and the Convention on Biological Diversity and for the development of a Convention for the Conservation of Rural Landscapes of Europe. The plan includes three kinds of actions:

- endorsements: support from the plan for important initiatives already underway, recognising the great diversity of conservation initiatives and activities in Europe;
- recommendations: advice to governments and other parties on the policies and actions needed to improve the status of protected areas;
- priority projects: 30 high-profile, international projects designed to fill the gaps and enhance the prospects for protected areas in Europe that are catalytic in nature, designed to encourage shifts in policy and to lever the substantially greater sums needed to implement the plan in full.

For managing protected areas, the plan proposes that appropriate funding should be made available through government budgets, the development of novel approaches, increasing EU support, using the EU LIFE Programme to support member states in establishing Natura 2000 and improving the environmental provisions in the EU Structural Funds and Cohesion Fund. The plan calls on all IUCN members in Europe to respond to the recommendations and to join in implementing the priority projects. There is a role for international bodies, governments and non-governmental organizations.

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## **Large Carnivore Initiative**

*Note: not indexed*

### **Description**

The initiative was developed by WWF together with partner organizations and experts in 17 European countries and adopted at a meeting in Abruzzo National Park, Italy, in June 1995. The objective of the initiative is to maintain and restore viable populations of the five remaining European large carnivore species, namely the brown bear (*Ursus arctos*), the Iberian lynx (*Lynx pardinus*), the Eurasian lynx (*Lynx lynx*), the wolf (*Canis lupus*) and the wolverine (*Gulo gulo*). Due to the combination of the importance of large carnivores in maintaining natural ecological systems and their substantial habitat requirements, the conservation of these species is seen as essential for the work of maintaining and restoring biodiversity. The initiative aims to support and build on various existing initiatives and projects across Europe, disseminate valuable experience and knowledge from different countries and develop new tools to promote the coexistence of human societies with the five large carnivores. The proposed actions focus on four needs:

- the conservation of large carnivore populations and their habitats;
- the integration of large carnivore conservation into rural development;
- support for large carnivore conservation through appropriate legislation, policies and economic instruments;
- improved information and public awareness.

A Large Carnivore Coordination Group has been established by WWF that includes representatives from governments, international and national non-governmental organizations, scientists and other experts. The tasks of this group include ensuring an effective exchange of information within Europe and developing specific conservation actions. The initiative explicitly recognises the need to develop a European-wide network of core areas, corridors and buffer zones for large carnivores. In many cases, large carnivores could act as umbrella species whereby their conservation would also serve to conserve many other species dependent on the same habitats.

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**Important Plant Areas in Europe**

*Note: not indexed*

**Description**

Plantlife and the French Ministry of Environment organized the conference "Planta Europa", the first European conference on the conservation of wild plants, in Hyères, France, on 2-8 September 1995. Planta Europa has since developed into a network with the mission of conserving the wild plants of Europe and their habitats. The flagship project of the network is the identification of Important Plant Areas (IPAs) in Europe. IPAs are "natural or semi-natural sites exhibiting exceptional botanical richness and/or supporting an outstanding assemblage of rare, threatened and/or endemic plant species and/or vegetation of high botanical value". Planta Europa aims to produce a country-by-country list of IPAs in Europe on the basis of common criteria. IUCN will cooperate with Planta Europa in this work.

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**Pan-European Biological and Landscape Diversity Strategy**

*Note: not indexed; add "Pan-European Ecological Network" to index (it is the most important element of the Strategy); add under "References": Bennett, G Guidelines for the Development of the Pan-European Ecological Network (1999)*