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**Convention on the  
Conservation of Migratory  
Species of Wild Animals**

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SEVENTH MEETING OF THE  
CONFERENCE OF THE PARTIES  
Bonn, 18-24 September 2002

**FUTURE OF THE GLOBAL REGISTER OF MIGRATORY SPECIES (GROMS)**  
*(Prepared by the Secretariat)*

**Introduction**

1. In the mid-1990s, the CMS Secretariat became aware that scientific information on migratory species within the CMS definition was scattered and very difficult to collect. With the development of new technologies such as increasingly powerful computers, networks and the Internet, the idea was born to develop a special database that could become the focus for any research on migratory species.
2. The aim was to have this database provide an additional tool for fact finding and decision-making by the CMS bodies and related regional Agreements and Memoranda of Understanding (MoU). It was also intended that the database would be available on the Internet to serve as an additional information tool on migratory species within, *inter alia*, the Clearinghouse Mechanism of the Convention on Biological Diversity (CBD).
3. A research and development project was prepared with the assistance of the former German CMS Scientific Councillor, who at that time supported the Secretariat as Scientific Adviser on secondment from the German Government. The project was approved by the German Federal Ministry of the Environment, Nature Conservation and Nuclear Safety after thorough review and revision and based on the understanding that CMS would maintain the database after its development. It was implemented by the German Federal Agency for Nature Conservation. A scientific institution affiliated with the University of Bonn developed the database and, thereafter, started inputting data. In addition, the project was presented to and acknowledged by the CMS Scientific Council at its eighth meeting.
4. The research and development project is ending now, after an investment of approximately 500,000 EURO by the German Government. The project's penultimate report has been submitted by the German Government to the seventh meeting of the Conference of the Parties (COP) (see UNEP/CMS/Inf. 7.18). In addition, the database has been published both as a CD-ROM and on the Internet ([www.groms.de](http://www.groms.de)), together with a book containing a threat analysis, a print out of the register and an extensive description and user guide to the GROMS information system (Riede, 2001, with summaries in all convention languages and German).

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5. Software tools on CD-ROM enable the user to tailor individual applications. A capacity-building workshop on the software tools will be offered during the COP on 20-21 September 2002 with financial support from the German Government.

6. The CMS Secretariat takes this opportunity to acknowledge the great enthusiasm and investment of energy, time and money by the various contributors, mainly:

- the German Federal Ministry of the Environment and the Federal Agency for Nature Conservation for accepting the project proposal, for providing the funds for the 5-year period and supervising the project scientifically;
- Professor Dr. Joachim von Braun, the Director of the Centre for Development Research (ZEF) and Professor Dr. Clas Naumann, Director of the Alexander Koenig Zoological Research Institute and Museum of Zoology (ZFMK), both institutes affiliated with the University of Bonn; and
- Dr Klaus Riede, the project leader.

***Action requested:***

7. The Conference of the Parties may wish to consider:

- a) acknowledging the development of the Global Register of Migratory Species (GROMS) under the lead of the German Federal Ministry of the Environment and expressing its gratitude for making GROMS available to CMS as an additional tool to *inter alia* promote targeted research and monitoring and more informed decision-making by CMS bodies and Parties;
- b) taking note of the Secretariat's report and agree to its plans to further develop and maintain the database;
- c) urging relevant international governmental and non-governmental organisations to contribute to the continuation of GROMS under the Secretariat in a constructive and cooperative manner and assist in the synergising of GROMS with their own specialised databases taking into consideration the decision of the Conference of Parties on the Information Management Plan;
- d) inviting Parties, organisations of any kind, funding agencies of developed countries and other interested institutions to proactively assist in evaluating, further maintaining and funding GROMS; and
- e) requesting the Scientific Council, in collaboration with key organisations and stakeholders, to advise the relevant bodies in the process to further develop GROMS, to ensure that the necessary scientific information services to support the Convention are fulfilled through the future development of GROMS as an integral component of the Information Management Plan.

## **2. The Need for GROMS**

### *2.1 The complexities of migration required the design of a new information system*

8. Of the approximately 1.5 million scientifically described animal species, at least 5,000 are estimated to be migratory. These are animals that cyclically migrate a minimum of 100 km (ca. 600 mammals, 2,000 birds, 10 reptiles, 1,000 fishes and an unknown number of insects and other invertebrates). This number rises considerably to about 10,000, if small-scale migrants are included which regularly cross national boundaries, thereby falling under the CMS definition of migration. The number would further increase if geographically separate populations and subspecies exhibiting distinct migration patterns would be individually registered. For birds, this would triple the number of taxa (i.e., subspecies and populations). Among migratory fish, scientists and/or fishery managers differentiate geographically separate "stocks", though these are not described taxonomically.

9. Migrants are an important dynamic component of biodiversity. However, their interaction with resident plant and animal species remains fairly unknown. Migrants are often not adequately considered in species assessments because of their status as seasonal visitors. In spite of this they are ecologically important and often occur(ed) in huge numbers. For example, many migrants are essential keystone species within food webs and ecosystems, as predators, prey or both. Migration itself is a phenomenon having attracted humankind for thousands of years, but unsustainable exploitation, habitat destruction and barriers to migration bring more and more species to an unfavourable conservation status or to the brink of extinction.

10. Therefore, any information system reflecting the complexities of migration has to cover the following aspects:

- a) a higher taxonomic resolution at subspecies and/or population level; and
- b) feature movements of migrants.

## 2.2 *The GROMS information system consolidates all available information on migratory species*

11. GROMS is unique because it includes a data model covering the above-mentioned aspects. It has been tailored to store the scattered information on migratory animal species within one database, including maps.

12. An electronic Geographic Information System (GIS) is connected to the database. The GIS allows the database to store the complexities of movements in space and time by time-codes. This includes specific information about migration such as breeding, resting, hibernation areas and migration routes. This information is missing in other databases. GROMS incorporates GIS maps for 700 species, including most CMS Appendix I species, and non-passerine bird maps adapted from “*Handbook of the Birds of the World*” (del Hoyo *et al.*, 1992-2000).

13. Intersection with other GIS-layers is an efficient and professional way to analyse or predict the effects of habitat destruction, population density, land use or pollution on migratory species (Riede, 2001). The impacts of climate change could also be analysed. Examples for GIS analysis using GROMS map sets are presented by Kaps 1999.

14. The backbone of GROMS is a first register of migratory vertebrates, organised according to a biological concept of cyclical migration, which is close to, but not identical with, CMS’s political definition. This first reference list of migratory species includes all CMS species vagrant within border areas. The latest version of GROMS names 3,580 vertebrate species, together with 4,880 additional subspecies and geographically separate populations. However, for many species knowledge about migration is insufficient. Even for many bird species, the details about subspecies that have different migration patterns are not adequately known. GROMS has been prepared to store this information once it is made available through research, because it already contains an extensive list of subspecies names.

15. Besides scientific names and synonyms, the database contains common names (English, French, German and Spanish), threat status according to the IUCN Red List categories and protection status as listed by CMS and its Agreements, and CITES appendices. All information is fully referenced by a literature module with more than 5,000 entries, including a considerable number of full-text digital documents and links to other Web sites.

16. At present, GROMS is a stand-alone, centralised database. Centralisation was a necessary condition to publish all information on CD-ROM. This useful feature enables every user to utilize GROMS even without access to the web or other databases.

17. GROMS is compatible with and provides links to other major species information systems. It thereby can provide other user groups with information about migration. A successful exchange with FishBase is a good example. However, it should be noted that data collection and analysis within a Web-linked environment is still limited without major progress to harmonise data collection and to interlink the

various databases.

18. GROMS liaises with other bio-informatics initiatives. These include FishBase, IUCN Red List 2000 of Threatened Species and the African Mammal Database (Riede, 2001, p. 28). GROMS has already incorporated data extracts from these initiatives. Contacts were established with UNEP-WCMC, BirdLife International (BLI) and Wetlands International. Problems with data harmonisation were discussed (see also Riede, 2001, p. 109).

19. On the World Wide Web, the database is published as a cutting-edge Web-based map server programmed in OPEN-GIS technology. OPEN-GIS is a platform to integrate geographic data from other sources. It maintains integrity and custody with the original data holders.

### 2.3 *Applications of the GROMS information system*

20. The focus of the research and development phase was to create the GROMS information system, while demonstrating the usefulness of integrating a global knowledge base on migratory species and their threats with GIS and other information technologies.

21. Towards the end of the project's research and development period, GROMS, can already be used as a tool for CMS to support its implementation and further development. Some examples are given below.

22. For example, once available in digital format, the GROMS migratory species reference list was cross-checked against the IUCN Red List categories for species threat. GROMS identified at least 95 migratory species as threatened, but not yet protected by CMS listing.

23. GROMS could also be used in similar way to address the considerable knowledge gaps concerning the conservation status of many other migrants. For example, a list of 29 migratory fishes classified as "data deficient" by the IUCN Red List gives testimony to the insufficient state of knowledge and protection of this neglected group of migrants (Riede, 2001, p. 91ff). The information in GROMS could be used to update or amend the data deficient status of many migratory species. Other concordance lists - *e.g.* between CITES and CMS - can easily be generated by GROMS.

24. Moreover, GROMS incorporates a complete listing of more than 500 individual species, which up to now have only been listed in CMS Appendix II as entire higher taxa (*e.g.*, Falconiformes, Recurvirostridae, Scolopacidae, Muscipidae).

25. Another added benefit is that the GROMS GIS-supported maps can be used by any other information system. For example, waterbird distribution maps digitised by GROMS were integrated into the Web-server of the African-Eurasian Waterbird Agreement (AEWA). Further results, including GIS analysis, are summarized within a workflow diagram (Riede, 2001, p. 44, Fig. 4.1).

26. Besides basic information, the database includes detailed citations from the literature. These were used to generate species accounts published on the Internet and in the GROMS book (Riede, 2001).

## **3 Perspectives**

27. GROMS is well-placed to serve as (1) a specialised CMS database; (2) a publicly accessible information platform; (3) a tool for any research work on migratory species; and (4) specialised database for other international instruments and programmes.

### 3.1 *GROMS as a specialised CMS database*

28. GROMS can serve as a special database for defined purposes under CMS. These could include, the CMS Information Management Plan as well as the informational needs of the CMS Agreements and

MoUs, their accompanying action and conservation plans as well as CMS programmes and projects.

29. For GROMS to become the specialised database for Agreements, MoUs, action and conservation plans and projects under CMS, requires an evaluation of their information needs. GROMS will then need to be adapted to the needs of those instruments. The AEWA Technical Committee has established a working group to examine these issues. In addition, the CMS Secretariat will support a pilot project to develop a specialised regional Agreement database.

30. GROMS should fulfil important service functions for CMS and the CMS Scientific Council, thereby facilitating an ever-growing workload. These functions could include:

- **Contributing to the implementation of the CMS Information Management Plan**, as currently developed and thereafter implemented by or with the assistance of UNEP-WCMC. This includes linkage with the UNEP-WCMC species information system;
- **Providing information** to authorities of Parties and non-Parties, scientific and administrative bodies on migratory species-oriented questions related CMS implementation or, more generally;
- **Completing and regularly updating the reference list** of migratory animals, using the best available information to update and refine the records on migratory status for all taxa, including subspecies and populations;
- **Adding** scientifically agreed **common names in other languages**, starting perhaps with the UN languages. This could lead to more harmonised common names for species in multinational languages;
- **Incorporating the CMS Range States list**;
- **Establishing links** to other (existing and upcoming) species and habitat information systems;
- **Servicing CMS inputs into the CBD/CMS Joint Work Programme** (see “*Joint Work Programme of the Convention on Biological Diversity and the Convention on the Conservation of Migratory Species of Wild Animals (2002-2005)*” (UNEP/CMS/Inf. 7.13) and the report of the Secretariat on cooperation with other bodies (UNEP/CMS/Conf.7.11);
- **Capacity building** for main users, focussing on database and GIS applications;
- **Producing information materials** for training, education and raising public awareness, in digital or printed format. Based on GROMS database content, a wide variety of outputs can be generated (including dynamic web content, flyway animation), which can be tailored to the needs of the respective users; and
- **Providing relevant information** on cross-cutting issues, such as the impact of climate change on migration patterns.

### 3.2 *GROMS as a publicly accessible information platform*

31. GROMS can act as a publicly accessible information platform on all kind of migratory species and their habitat. It can provide appropriate baseline information. It can also serve as a meta-database providing links to other databases that can then provide more detailed information on migratory species.

### 3.3 *GROMS as a tool for research work on migratory species*

32. GROMS can serve as a tool for any research work on migratory species, their biology, migratory patterns, distribution, migration routes and special phenomena. GROMS has already identified gaps in

scientific knowledge, concerning migratory behaviour. This should help to stimulate research tasks, fitting into a well-defined framework. Results could then be fed back into GROMS.

33. In addition, GROMS could become an important tool for other research initiatives. GROMS could offer its data administration capacities as a service function to:

- Investigate insufficiently known migration patterns, such as inner-tropical migration, or for certain groups such as bats, tropical fishes or insects;
- Develop cutting-edge Web-based map technology, to embed other geographic data into maps of migratory species, maintaining data integrity and copyright of other data providers (OPEN-GIS). A well-established cooperation with the EXSE-group (Geoinformatics Institute of Bonn University), which specialises in OPEN-GIS, has developed a functional GROMS prototype and is prepared to provide further assistance; and
- Develop a repository for satellite data.

34. At a later stage, GROMS could interact with other scientific sectors, to investigate correlations between changing migration patterns and abundance with changes of land use and climate (*e.g.*, desertification).

#### 3.4 *GROMS as a specialised database for other international instruments and programmes*

35. GROMS can be adopted to serve as a specialised database for treaties, programmes and projects beyond the field of CMS. This could support the cooperation and synergies of CMS and related Agreements with other governmental and non-governmental organisations in the field of biodiversity, as well as that with treaties and organisations in other fields, such as fisheries, agriculture and forestry.

#### 3.5 *Further details*

36. GROMS should be further developed, regularly updated and adapted to the state of the art in information technology. To this end a number of detailed technical issues will need to be resolved during the forthcoming period. These include update and maintenance of GROMS, access and data handling. An analysis of feedback given by users of the published GROMS database will help to solve these problems.

37. For example, it became evident during the development of the migratory species reference list, that definitions and classifications of migration, in particular the CMS-specific criterion of crossing political boundaries, are difficult to integrate within a rigid database scheme. Furthermore, permanent changes in the distribution and migratory patterns of any species, or even geographically separate populations, require permanent updating in close cooperation with experts.

*- Should access to GROMS be regulated?*

38. GROMS functions as (1) an open baseline database and (2) a specialised database for certain purposes. The access to data in GROMS should be regulated in such a way that those data reserved for the special purposes are not accessible to everybody through the Internet or on CD-ROM. Organisations for whom GROMS will serve as the basis for their special purposes should always have the right and the technical possibilities to provide access to their data in a selective manner. The same applies to organisations whose databases are linked with GROMS.

*- How should sensitive data be handled?*

39. Sensitive data will have to be handled carefully as far as it will be incorporated into the data and data management of GROMS. It is understood that this is no problem for metadata. With regard to sensitive data in databases of other organisations these organisations will maintain their own data

management, thereby regulating access. Access should be limited for data that GROMS stores as a servicing database for special purposes or for other organisations, such as CMS Agreements.

#### **4. Next steps for GROMS**

40. The following section proposes a possible scenario to maintain and further develop GROMS.

41. In the next few months all organisations having databases with relevant information on migratory species should be consulted in order to identify possibilities to link GROMS with their databases (see section 2.2). Also, organisations willing to cooperate should be invited to develop a consistent system of interlinkage between their databases and GROMS. The output would be a consolidated GROMS version that should be made available via Web portal for migratory species, thereby fulfilling the original idea of a CMS contribution to the CBD Clearinghouse Mechanism sponsored by the German Government.

##### *4.1 Funding*

42. During this two year period, GROMS would be maintained by CMS with the present project development staff, consisting of 1 full time scientist and 1 assistant (total gross expense: 110,000 EURO).

43. Financing of approximately 40,000 EURO will come from Germany's annual voluntary contribution. Further funds are presently solicited. Parties are invited to add to the German contribution.

44. Expenditures for computers, Web server, office space etc. will not arise, since it has been confirmed that the existing infrastructure from the Zoological Museum Alexander Koenig/University of Bonn can be used free of charge. Modest funds for office supply, administrative expenditures (*e.g.*, computer software, publications) and travel will be financed from voluntary contributions expected from Parties and organisations. Contributions in-kind have been promised by the University of Bonn by tailoring research projects based on the present GROMS data set. During the evaluation phase it should also be examined whether modest fees for the use of GROMS can or should be raised.

##### *4.2 Future Ownership or Lead*

45. An early common understanding of the future ownership and leadership of GROMS is also vital for the future management and fields of application. It should be taken into consideration from the beginning that the World Conservation Monitoring Centre (UNEP/WCMC) has become the scientific tool of the United Nations Environment Programme (UNEP) and is servicing other conventions with data collection and dissemination. This development was not been foreseen when the GROMS project started. WCMC has also been a CMS partner for a number of tasks. For example, it is preparing the CMS Information Management Plan for COP 7. Therefore, WCMC could be considered as a possible candidate to eventually take over GROMS once the service functions of GROMS have been tested and applied. When the area of GROMS application is extended beyond CMS, then at the latest, CMS's tenure as lead organisation would end.

46. The two-year evaluation phase will be used to establish terms of references for the future maintenance and privileged use of GROMS by CMS with special conditions for CMS itself and, *if appropriate*, its Agreements as well as for the cooperating organisations of the core group.

47. Some time after the next 3-year period, maybe with the approval of COP 9, the CMS Secretariat should hand over GROMS to the then most suitable specialised organisation.

#### **5.0 Suggested Actions to be Undertaken**

48. The final report on the GROMS research and development phase will appear in early 2003, in addition to the fairly developed report cited above (Riede, 2001).

49. The CMS Secretariat believes that at this development stage the database should be tested as tool

for CMS and its Agreements, while analysing and evaluating GROMS with respect to:

- its potential as a tool for other international governmental and non-governmental organisations, CMS Parties, scientific institutions on international and national levels, and other users;
- the necessary input in terms of personnel and funds to maintain, further develop and fulfil the needs of users mentioned above; and
- future organisational structure and substantial leadership.

50. To this end, the Secretariat is planning the following actions for the next two years:

- organise the continuation of work on the database, including the necessary networking to maintain and act as mediator for consultation and mediation;
- invite a number of international organisations, together with all national institutions hitherto involved in the development of GROMS, to form a core group to guide the continuation process;
- assess the needs for capacity and organisational structure for future management; and
- develop a management and financial plan for an interim period of 5 years, including the initial period of 2 years.

51. As already described, a major task would be to discuss inter-linkages or integration with the CMS Information Management Plan. This would ensure that the information available through GROMS remains complementary, synchronous and exchangeable with information already provided by other important initiatives and data sources, such as BirdLife International, FishBase, UNEP-WCMC, Wetlands International, IUCN and GBIF.

## ANNEX

Acronym	Full name	Web address (if available)
AEWA	African-Eurasian Waterbird Agreement	<a href="http://www.unep-wcmc.org/AEWA/eng/agree.htm">http://www.unep-wcmc.org/AEWA/eng/agree.htm</a>
BLI	BirdLife International	<a href="http://www.birdlife.org">www.birdlife.org</a>
<u>BMU</u>	<u>(German)Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit)</u>	<a href="http://www.bmu.de">www.bmu.de</a>
<u>BfN</u>	<u>(German) Federal Agency for Nature Conservation (Bundesamt für Naturschutz,)</u>	<a href="http://www.bfn.de">www.bfn.de</a>
CBD	Convention on Biological Diversity	<a href="http://www.biodiv.org">www.biodiv.org</a>
CHM (CBD)	Clearing House Mechanism (Convention on Biological Diversity)	<a href="http://www.biodiv.org/chm/">www.biodiv.org/chm/</a>
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora	<a href="http://www.cites.org">www.cites.org</a>
CMS	Convention on the Conservation of Migratory Species of Wild Animals	<a href="http://www.wcmc.org.uk/cms">www.wcmc.org.uk/cms</a>
EXSE	EXSE - GIS Experimental-Server Geography department, Bonn University	<a href="http://katla.giub.uni-bonn.de/gisfe/gis/exse/exse.html">http://katla.giub.uni-bonn.de/gisfe/gis/exse/exse.html</a>
FishBase	A Global Information System on Fishes	<a href="http://www.fishbase.org">www.fishbase.org</a>
GBIF	Global Biodiversity Information Facility	<a href="http://www.gbif.org">www.gbif.org</a>
GIS	Geographical Information system	
GROMS	Global Register of Migratory Species	<a href="http://www.groms.de">www.groms.de</a>
IUCN	The World Conservation Union	<a href="http://www.iucn.org">www.iucn.org</a>
IUCN Red List 2000	Hilton-Taylor, C. (compiler) 2000. <i>2000 IUCN Red List of Threatened Species</i> . IUCN, Gland, Switzerland and Cambridge, UK. xviii + 61 pp.	<a href="http://www.redlist.org">www.redlist.org</a>
WI	Wetlands International	<a href="http://www.wetlands.org">www.wetlands.org</a>
UNEP-WCMC	World Conservation Monitoring Centre	<a href="http://www.wcmc.org.uk/">www.wcmc.org.uk/</a>
ZADI	German Centre for Documentation and Information in Agriculture	<a href="http://www.zadi.de">www.zadi.de</a>
ZFMK - University of Bonn	Zoological Research Institute and Museum Alexander Koenig, Bonn	<a href="http://www.museumkoenig.uni-bonn.de/">http://www.museumkoenig.uni-bonn.de/</a>
ZEF - University of Bonn	Center for Development Research - (Zentrum für Entwicklungsforschung)	<a href="http://www.zef.de">www.zef.de</a>

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