



CONVENTION ON BIOLOGICAL DIVERSITY

Distr.
GENERAL

UNEP/CBD/SBSTTA/10/INF/7
15 December 2004

ENGLISH ONLY

SUBSIDIARY BODY ON SCIENTIFIC, TECHNICAL AND TECHNOLOGICAL ADVICE

Tenth meeting

Bangkok, 7-11 February 2005

Item 5.4 of the provisional agenda*

REPORT OF THE AD HOC TECHNICAL EXPERT GROUP ON INDICATORS FOR ASSESSING PROGRESS TOWARDS THE 2010 BIODIVERSITY TARGET

INTRODUCTION

A. *Background*

1. In paragraph 6 of its decision VII/30, the Conference of the Parties to the Convention on Biological Diversity requested the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), with the assistance of an ad hoc technical expert group, to:

(a) Review the use of the indicators listed in annex I, column B, to the decision, *inter alia*, by reviewing a draft of the Second Global Biodiversity Outlook;

(b) Identify or develop indicators listed in annex I, column C, to the decision, ensuring that the full set of indicators is limited in number;

and report on the results to the Conference of the Parties at its eighth meeting.

2. In developing goals and sub-targets to facilitate coherence among the programmes of work, and to provide a flexible framework for national targets, the Conference of the Parties also requested SBSTTA to identify indicators for the sub-targets, where possible, by association with the indicators provided in annex I to decision VII/30 (para.12 (b)).

3. Accordingly, the purpose of the meeting of the Ad Hoc Technical Expert Group (AHTEG) is to assist the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) in identifying or developing indicators for assessing progress at the global level towards the 2010 target, and communicating effectively trends in biodiversity related to the three objectives of the Convention.

4. In paragraph 3 of decision VII/30, the Conference of the Parties requested that a balanced set of indicators be identified in accordance with principles for choosing indicators identified by the Expert Group on Indicators and Monitoring (see UNEP/CBD/SBSTTA/9/10). To facilitate the work of the

* UNEP/CBD/SBSTTA/10/1.

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AHTEG, the Conference of the Parties gave specific guidance on the characteristics of the indicators to be identified or developed:

- (a) The indicators should not be used to evaluate the level of implementation of the Convention in individual Parties or regions;
- (b) The same indicators may be used at the global, regional, national and local levels;
- (c) The indicators should relate to one or more of the various programmes of work of the Convention;
- (d) The indicators should take into consideration relevant Millennium Development Goals and indicators developed by other relevant international processes;
- (e) Existing data sets should be used.

5. The Conference of the Parties agreed that the Global Biodiversity Outlook (GBO) should be one of the means for reporting on the indicators for assessing progress towards the 2010 target. Accordingly, the Conference of the Parties requested SBSTTA to evaluate information on the changes in trends and status of biodiversity, particularly the current rate of biodiversity loss at the global level, *inter alia*, by reviewing a draft of the second Global Biodiversity Outlook (decision VII/30, para 5).

6. Furthermore, the Conference of the Parties requested the Ad Hoc Open-ended Working Group on Access and Benefit-sharing and the Ad Hoc Open-ended Inter-Sessional Working Group on Article 8(j) and Related Provisions of the Convention on Biological Diversity, respectively, to explore the need and possible options for indicators for access to genetic resources and in particular for the fair and equitable sharing of benefits arising from the utilization of genetic resources, and associated innovations, knowledge and practices of indigenous and local communities, and for the protection of innovations, knowledge and practices of indigenous and local communities.

7. The meeting of the Ad Hoc Technical Expert Group was held from 19 to 22 October 2004 at the premises of the Secretariat in Montreal, Canada with financial support from the Governments of the Netherlands, the United Kingdom of Great Britain and Northern Ireland, and the United States of America.

8. The members of the expert group were selected by the Executive Secretary in consultation with the Bureau of SBSTTA from nominations provided by national focal points of the Convention. The experts were selected based on their competence in the relevant field of expertise, with due regard to geographical representation and to the special conditions of the least developed countries and small island developing states. Representatives of relevant international organizations were also invited.

B. Attendance

9. The meeting was attended by (i) Government-nominated experts from Australia, Barbados, Brazil, Canada, Cuba, Czech Republic, Denmark, European Commission, France, Ghana, the Netherlands, Pakistan, Singapore, Slovenia, Thailand, Togo, Tunisia, United Kingdom, USA, and Zambia and (ii) experts from the Food and Agriculture Organization of the United Nations (FAO), UNEP - GEMS/Water Programme, UNEP - World Conservation Monitoring Centre (UNEP-WCMC), Convention on Wetlands (Ramsar), International Plant Genetic Resources Institute (IPGRI) on behalf of the Consultative Group on International Agricultural Research, International Nitrogen Initiative (by teleconference), BirdLife International, Conservation International, IUCN - The World Conservation Union (WCPA and SSC), World Wide Fund for Nature (WWF-International), World Wildlife Fund (WWF-US) on behalf of the NASA-NGO Conservation Working Group, International Union of Forest Research Organizations (IUFRO), Environment Liaison Centre International (ELCI), Smithsonian Institution, University of British Columbia (UBC), Université de Québec à Montréal (UQAM); (iii) a representative of the SBSTTA Bureau. The Convention on the Conservation of Migratory Species of Wild Animals (CMS) and the DAC Network on Development Co-operation and Environment

(DAC/ENVIRONET) of the Organisation for Economic Co-operation and Development (OECD) were represented by the experts from UNEP-WCMC and Canada, respectively.

10. A list of participants is attached as annex I.

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ITEM 1. OPENING OF THE MEETING

1. The meeting was opened by Mr. Hamdallah Zedan, Executive Secretary of the Convention on Biological Diversity (CBD) at 9:30 a.m., on Tuesday 19 October 2004. In his statement, he welcomed the participants and mentioned the importance and timeliness of this ad hoc technical expert group (AHTEG) meeting. He also highlighted the role of indicators in informing governments and the general public about progress made to achieve the 2010 biodiversity target. He paid tribute to the Governments of The Netherlands, the United Kingdom of Great Britain and Northern Ireland, and the United States of America for generously sponsoring this meeting as well as all other Governments and organizations that supported participants.
2. Mr. Ben ten Brink, on behalf of The Netherlands, emphasized the importance of biodiversity indicators for guiding policies effectively towards sustainable development, and stated that the move from designing indicators to implementing indicators is a major organizational challenge due to the many times larger number of individuals, institutions and budgets involved. He considered that a bottom-up approach on the implementation of the global indicators ensures high quality and global commitment.
3. Mr. Andrew Stott, on behalf of the United Kingdom of Great Britain and Northern Ireland, highlighted the importance of achieving a widely accepted and unambiguous set of indicators to measure progress towards the 2010 target and urged that the need for rapid progress should not go at the expense of scientific credibility.
4. Mr. Richard Guldin, on behalf of the United States of America, thanked the Secretariat for the thorough preparation of the meeting.

ITEM 2. ORGANIZATIONAL MATTERS

2.1. Election of Chairperson

5. After the participants had introduced themselves, Ms Teresita Borges Hernandez from Cuba and Mr Gordon McInnes from the European Community were elected as Co-chairs of the meeting.

2.2. Adoption of the agenda

6. The Group adopted the following agenda on the basis of the provisional agenda proposed in document UNEP/CBD/AHTEG-2010-Ind/1/1 and agreed that the agenda as well as the organization of work (item 2.3 below) should be kept flexible while addressing the full breadth of its mandate:
 1. Opening of the meeting.
 2. Organizational matters:
 - 2.1. Election of the Chairperson;
 - 2.2. Adoption of the agenda;
 - 2.3. Organization of work.
 3. Indicators for assessing progress at the global level towards the 2010 target and for effectively communicating trends in biodiversity related to the three objectives of the Convention:
 - 3.1 Review of the use of the indicators for immediate testing, as contained in annex I, column B, of decision VII/30;

- 3.2 Identification or development of indicators on the basis of the possible indicators in annex I, column C, of decision VII/30;
- 3.3 Review of an outline of the Second Global Biodiversity Outlook.
4. Identification of indicators for the sub-targets established in decision VII/30.
5. Other matters.
6. Adoption of the report.
7. Closure of the meeting.

2.3. Organization of work

7. The Secretariat (David Cooper and Robert Höft) gave a brief presentation on the adoption of the 2010 biodiversity target as the mandate of the Strategic Plan of the Convention; described the framework for evaluating progress towards the 2010 target contained in decision VII/30; outlined the collaborative process involving many partner organizations, which contributed to the preparations of the meeting and laid out the mandate for the AHTEG; and gave a general overview of available documents and made a proposal for the organization of work.

8. The AHTEG agreed to consider all issues first in plenary and to establish working groups for more detailed work on the indicators in specific focal areas. In the Plenary on Tuesday 19 October 2004, the participants agreed to establish three working groups (WG) as follows:

WG	Focal area	Indicator for immediate testing
WG 1 Chair: Richard Guldin	Status and trends of the components of biological diversity	Trends in extent of selected biomes, ecosystems and habitats (INF/1) Trends in abundance and distribution of selected species (INF/2) Coverage of protected areas (INF/3)
	Sustainable use	N/A
WG 2 Chair: N/A	Threats to biodiversity	Nitrogen deposition (INF/4)
	Ecosystem integrity and ecosystem goods and services	Marine trophic index (INF/5) Water quality in aquatic ecosystems (INF/6)
WG 3 Chair: Tariq Nazir	Status of traditional knowledge, innovations and practices	Status and trends of linguistic diversity and numbers of speakers of indigenous languages (INF/7)
	Status of access and benefit-sharing	N/A
	Status of resource transfers	Official development assistance provided in support of the Convention (OECD-DAC-Statistics Committee) (INF/8)

9. In the Plenary on Wednesday 20 October, the participants agreed to establish two working groups as follows:

WG	Focal area	Possible indicators for development
WG 1 Chair: Richard Guldin	Status and trends of the components of biological diversity	Outstanding issues from the discussions on column B indicators Change in status of threatened species (Red List indicator under development) Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socioeconomic importance
WG 2 Chairs: Gordana Beltram, Teresita Borges Hernandez	Sustainable use	Area of forest, agricultural and aquaculture ecosystems under sustainable management Proportion of products derived from sustainable sources
	Threats to biodiversity	Numbers and cost of alien invasions
	Ecosystem integrity and ecosystem goods and services	Application of the trophic index to freshwater and possibly other ecosystems Connectivity/fragmentation of ecosystems Incidence of human-induced ecosystem failure Health and well-being of people living in biodiversity-based-resource dependent communities Biodiversity used in food and medicine

10. The group met in plenary seven times and in working groups three times.

ITEM 3. INDICATORS FOR ASSESSING PROGRESS AT THE GLOBAL LEVEL TOWARDS THE 2010 TARGET AND FOR EFFECTIVELY COMMUNICATING TRENDS IN BIODIVERSITY RELATED TO THE THREE OBJECTIVES OF THE CONVENTION

3.1. *Review of the use of the indicators for immediate testing, as contained in annex I, column B, of decision VII/30*

11. The Secretariat (Robert Höft) introduced the background document UNEP/CBD/AHTEG-2010-IND/1/2 and related information documents (UNEP/CBD/AHTEG-2010-IND/1/INF/1, INF/2, INF/3, INF/4, INF/5, INF/6, INF/7, INF/8 and INF/11).

12. Following a plenary discussion the three working groups considered the indicators for immediate testing and use (see para 8 above).

13. The working groups came together in plenary on Wednesday (20 October 2004) morning and reported on their observations and discussed their conclusions and recommendations.

14. The main observations and conclusions are summarized in Annex II to this document. Appendix 1 contains a table summarizing the status assigned by the Group to each indicator and work to be done. Appendix 2 lists possible sources for the application of the indicator on trends in selected biomes, ecosystems and habitats to the thematic programmes of work of the CBD. A criterion for identifying habitat/ecosystem datasets appropriate for assessing against the 2010 target are laid out in Appendix 3. In Appendix 4, different classification schemes of major global land cover maps are provided. Important satellite land cover products of potential relevance to the CBD are listed in Appendix 5.

3.2. *Identification or development of indicators on the basis of the possible indicators in decision VII/30 annex I, column C*

15. Following the plenary discussion the possible indicators for development were considered in two working groups (see para 9 above).

16. The working groups came together in plenary on Thursday morning to report on their observations and discuss their conclusions and recommendations.

17. The main observations and conclusions are also included in Annex II to this document.

3.3. Review of an outline of the second Global Biodiversity Outlook

18. At the plenary meeting on Thursday afternoon, the Secretariat (Bob Kakuyo) introduced the background document UNEP/CBD/AHTEG-2010-IND/1/4 containing a draft outline of the Global Biodiversity Outlook (GBO). He also introduced the production plan and time table for this document.

19. The comments made on the draft outline of the GBO are contained in Annex III to this report.

ITEM 4. IDENTIFICATION OF INDICATORS FOR THE SUB-TARGETS ESTABLISHED IN DECISION VII/30

20. The Secretariat (Robert Höft) introduced the document on the Identification of indicators for the sub-targets established in decision VII/30 contained in document UNEP/CBD/AHTEG-2010-IND/1/5. He provided some background to the request to associate, where possible, the indicators identified in annex 1 to this decision to the goals and sub-targets contained in annex 2 to the decision.

21. Following discussion in plenary it was agreed to prepare a table, which shows the association of relevant indicators to the sub-targets and identifies gaps. This table is contained in Annex IV to this document.

ITEM 5. OTHER MATTERS

22. No other matters were discussed.

ITEM 6. ADOPTION OF THE REPORT

23. At the plenary meeting on 22 October 2004, the AHTEG agreed that the report submitted by the Co-Chairs for adoption captured the content of the rich and wide-ranging discussions. The Group adopted its report with the understanding that further editing for structure, balance and presentation (but not content) was needed. The Group therefore agreed that:

(a) The Secretariat would prepare and circulate to participants for their comments the substantive document on the review of the use of the indicators adopted in decision VII/30 prior to its submission to SBSTTA 10; and

(b) The Secretariat, in collaboration with relevant partners, would revise the INF documents on the basis of the recommendations provided in Annex II to this document.

ITEM 7. CLOSURE OF THE MEETING

24. Following the customary exchange of courtesies, the AHTEG meeting was closed at 4 p.m on Friday, 22 October 2004 by Gordon McInnes, one of the Co-chairs.

Annex I

LIST OF PARTICIPANTS

Countries:

**EXPERTS NOMINATED BY CBD
PARTIES AND OTHER GOVERNMENTS**

Australia

Dr. Annemarie Watt
Director
Natural Resource Management Policy
Department of the Environment and Heritage
GPO Box 787
Canberra ACT 2601
Australia
Tel.: +612 6274 2540
Fax: +612 6274 2505
E-Mail: annemarie.watt@deh.gov.au
Web: <http://environment.gov.au> <http://deh.gov.au>

Barbados

Ms. Amrikha Singh
Environmental Officer
Ministry of Housing, Land and Environment
First Floor, S.P. Musson Building
Hincks Street
Bridgetown
Barbados
Tel.: 246 467 5704 (PBX 467-5700)
Fax: 246 437 8859
E-Mail: singha@gob.bb envirobdos@gob.bb

Brazil

Dr. Braulio Ferreira de Souza Dias
Coordinator for Biodiversity Conservation
Ministry of the Environment
Esplanada dos Ministerios Bloco B, sala 704
Brasilia DF70068-900
Brazil
Tel.: +55 61 325-4185/317-1115
Fax: +55 61 325 7967
E-Mail: braulio.dias@mma.gov.br,
mariza.militao@mma.gov.br
Web: <http://mma.gov.br/biodiversidade>

Canada

Dr. Risa Smith
Senior Science Advisor
Knowledge Integration Directorate
Environment Canada
PO Box 9335, Stn Prov. Govt.
Victoria, British Columbia
V8W 9M1
Canada
Tel.: 250 356 0929
Fax: 250 387 8894
E-Mail: risa.smith@ec.gc.ca

Cuba

Dr.. Teresita Borges Hernandez
Ministerio de Ciencia, Tecnologia y Medio Ambiente
Capitolio Nacional,
Prado y San José, CP 10200
Havana
Cuba
Tel.: +53 7 867 0598
Fax: +53 7 867 0615
E-Mail: borges@citma.cu,
teresita.borges@infomed.sld.cu

Czech Republic

Mr. David Vačkář
Agency for Nature Conservation and Landscape
Protection
Kalisnicka 4-6
CZ-13023 Prague 3
Czech Republic
Tel.: +420 2 83069212
Fax: +420 2 6970012
E-Mail: david_vackar@nature.cz

Denmark

Ms. Ulla Pinborg
Danish Forest and Nature Agency
Haraldsgade 53
Copenhagen DK 2100
Denmark
Tel.: +45-39472821 direct +45-39472000 reception
Fax: + 45 39 27 98 99
E-Mail: upi@sns.dk

European Community

Mr. Gordon McInnes
Deputy Director
European Environmental Agency
Kongens Nytorv 6
Copenhagen D-1050
Denmark
Tel.: 45 33 367 100
Fax: 45 33 367 199
E-Mail: Gordon.McInnes@eea.eu.int
Web: www.eea.eu.int

France

Mr. Denis Couvet
Professeur
Écologie et Gestion de la Biodiversité
Museum National d'Histoire Naturelle
55 rue Buffon
Paris 75005
France
Tel.: 33 1 4079 3070
Fax: 33 1 4079 3835
E-Mail: couvet@mnhn.fr

Ghana

Dr. Patrick Kwabena Ofori-Danson
Department of Oceanography and Fisheries
University of Ghana
P.O. Box LG71
Legon
Ghana
Tel.: +233 21 502255 #3269 cell: 233-027 7402704
Fax: +233 21 512 837
E-Mail: ofdan@ug.edu.gh

Netherlands

Mr. Ben Ten Brink
Co-ordinator Biodiversity
Netherlands Environmental
Assessments Agency at RIVM
PO Box 1
BA Bilthoven 3720
Netherlands
Tel.: +3130 274 22 10
Fax: +3130 274 44 19
E-Mail: ben.ten.brink@rivm.nl

Pakistan

Mr. Tariq Nazir
Section Officer
Ministry of Environment
House No. 16/2-E
Islamabad G.10/2
Pakistan
Tel.: 92 51 920 9884 92 51 221 2242 (H)
Fax: 92 51 920 2211
E-Mail: saadta@isb.comsats.net.pk

Singapore

Dr. Lena Chan
Assistant Director (Biodiversity Centre)
National Parks Board
Singapore Botanic Gardens
National Parks Board
1 Chuny Road
Singapore 259569
Singapore
Tel.: +65 6471 9931 / 6471 9944
Fax: +65 6467 1912
E-Mail: lena_chan@nparks.gov.sg,
nbrc_nparks@pacific.net.sg

Slovenia

Dr. Gordana Beltram
Advisor to the Government
Ministry of the Environment, Spatial Planning and
Energy
Dunajska 48, p.p. 653
Ljubljana SI 1000
Slovenia
Tel.: 3861/309.45.66 +386/51336775(cell)
Fax: 3861/309.45.93
E-Mail: gordana.beltram@gov.si

Thailand

Dr. Vanida Khumnirdpetch
Animal Scientist
Department of Livestock Development
Ministry of Agriculture and Cooperatives
Phayathai
Bangkok 10400
Thailand
Tel.: +66 2653 4451
Fax: +66 2653 4922
E-Mail: vanidak@yahoo.com

Togo

Mr. Okoumassou Kotchikpa
 Chef
 Division Aménagement et Protection Faunique
 Ministère de l'Environnement
 et des Ressources Forestières
 B.P. 355 Lomé
 Togo
 Tel.: 228 221 4029
 Fax: 228 221 4029
 E-Mail: okoumdfc@hotmail.com

Tunisia

Mr. Nabil Hamada
 Sous-Directeur de la Conservation de la Nature
 Direction de la Conservation de la Nature
 et du Milieu Rural
 Ministère de l'Agriculture, de l'Environnement et des
 Ressources Hydrauliques
 Tunisia
 Tel.: +216 71 704 000
 Fax: +216 71 706 395
 E-Mail: hamadan_az@yahoo.fr

**United Kingdom of Great Britain and Northern
Ireland**

Dr. Andrew Stott
 Natural Resources and Rural Affairs Science Unit
 Department for Environment, Food and Rural Affairs
 1/09 Temple Quay House
 Temple Quay
 Bristol BS1 6EB
 United Kingdom
 Tel.: +(44) 117 372 8445
 Fax: +(44) 117 372 8182
 E-Mail: andrew.stott@defra.gsi.gov.uk

United States of America

Dr. Richard Guldin
 Director
 Science Policy, Planning, Inventory and Information
 USDA Forest Service R & D
 1601 North Kent Street, 4th Floor
 Arlington VA 22209
 United States of America
 Tel.: 703.605.4177 703.201.7829 (cell)
 Fax: 703.605.5131
 E-Mail: rguldin@fs.fed.us

Zambia

Mr. Davy Siame
 Chief Natural Resources Management Officer
 Dept. of Environment and Natural Resources
 Ministry of Tourism, Environment and Natural
 Resources
 PO Box 34011
 Kwacha House, Cairo Road
 Lusaka
 Zambia
 Tel.: + 260 1 2294 11/16
 Fax: +260 1 222 189
 E-Mail: siamedavy@yahoo.co.uk
 Web: <http://www.menr.gov.zm>

**EXPERTS NOMINATED BY UNITED
NATIONS AND SPECIALIZED AGENCIES****Food and Agriculture Organization of the United
Nations (FAO)**

Ms. Linda Collette
 Senior Officer, (Crop and Crop Biodiversity)
 Agriculture Department
 Food and Agriculture Organization
 of the United Nations (FAO)
 Viale delle Terme di Caracalla
 Rome 00100
 Italy
 Tel.: +39 06 570 52089
 Fax: +36-06-570-56347
 E-Mail: linda.collette@fao.org
 Web: <http://www.fao.org>

UNEP GEMS / Water Programme

Dr. Richard Denis Robarts
 Director
 UNEP GEMS / Water Programme Office
 c/o Environment Canada
 11 Innovation Boulevard
 Saskatoon Saskatchewan S7N 3H5
 Canada
 Tel.: 306 975-6047
 Fax: 306 975-5143
 E-Mail: richard.robarts@ec.gc.ca

UNEP-World Conservation Monitoring Centre

Mr. Jeremy Harrison
Also representing the Convention on Migratory Species
219 Huntington Road
Cambridge CB3 0DL
United Kingdom of Great Britain and Northern Ireland
Tel.: +44 1223 277 314
Fax: +44 1223 277 136
E-Mail: jerry.harrison@unep-wcmc.org
Web: <http://www.unep-wcmc.org>

INTER-GOVERNMENTAL ORGANIZATIONS

International Plant Genetic Resources Institute (IPGRI)

Dr. Toby Hodgkin
International Plant Genetic Resources Institute (IPGRI)
Via dei Tre Denari 472/a
Maccarese, Rome 00057
Italy
Tel.: 39 06 611 82 12
Fax: 39 06 619 79 661
E-Mail: t.hodgkin@cgiar.org
Web: www.cgiar.org

International Union of Forest Research Organizations

Mr. Alexander Mosseler
Scientist
International Union of Forest Research Organizations
P.O.Box 4000
Frederickton E3B 5P7 NB
Canada
Tel.: 506 452 1540
Fax: 506 452 3525
E-Mail: amossele@fcmr.forestry.ca

IUCN - The World Conservation Union

Ms. Janice Chanson
CI-CABS-IUCN/SSC
Biodiversity Assessment Initiative
C/o Conservation International
1919 M ST. N.W.
Suite 600
Washington DC 20036
United States of America
Tel.: +1 202 912 1548

Fax: + 1 202 912 0772
E-Mail: j.chanson@conservation.org

Mr. Tom Hammond
Senior Program Advisor
IUCN (The World Conservation Union)
555 Blvd. René Lévesque Ouest
Bureau 500
Montreal QC H2Z 1B1
Canada
Tel.: 1-514-287-9704, ext. 361
Fax: 1-514-287-9687
E-Mail: tom.hammond@iucn.org
Web: <http://www.iucn.ca>

Ramsar Convention on Wetlands

Dr. Nick Davidson
Deputy Secretary General
Ramsar Convention on Wetlands
Rue Mauverney 28
Gland CH-1196
Switzerland
Tel.: +41 22 999 0171
Fax: +41 22 999 0169
E-Mail: davidson@ramsar.org
Web: <http://www.ramsar.org>

NON-GOVERNMENTAL ORGANIZATIONS

Environment Liaison Center International/ NGO CBD Alliance

Ms. Maria del Rosario Ortiz Quijano
5129 rue de Lanaudière
Montreal QC H2J 3R2
Canada
Tel.: +514 522-3966
E-Mail: rosa.ortiz@sympatico.ca

BirdLife International

Ms. Alison Stattersfield
BirdLife International
Wellbrook Court
Girton Road
Cambridge CB3 0NA
United Kingdom of Great Britain and Northern Ireland
Tel.: +44 1223 277 318
Fax: +44 1223 277 200
E-Mail: alison.stattersfield@birdlife.org
Web: <http://www.birdlife.net>

Conservation International

Mr. Marc Steininger
Center for Applied Biodiversity Science
Conservation International
1919 M. Street N.W. Suite 600
Washington DC 20036
United States of America
Tel.: 202-912-1205
Fax: 202-912-0773
E-Mail: msteininger@conservation.org
Web: <http://www.conservation.org>

Smithsonian Institution

Dr. Leonard Hirsch
Senior Policy Advisor
International Relations Liaison
Smithsonian Institution
National Museum of Natural History
MRC 105, Box 37012
Washington DC 20560-7012
United Kingdom of Great Britain and Northern
Ireland
Tel.: +1 (202) 357 4788
Fax: +1 (202) 786 2557
E-Mail: lhirsch@si.edu

WWF International

Mr. Rolf Hogan
WWF International
Avenue du Mont-Blanc 27
Gland CH-1196
Switzerland
Tel.: +(41 22) 364 0661
Fax: +(41 22) 364 0661
E-Mail: hogan@freesurf.ch
Web: <http://panda.org>

NASA-NGO Conservation Working Group

Ms Holly Strand
Senior Conservation Specialist
Conservation Science Program
WWF US
1250 24th Street
Washington, D.C NW 20037
United States of America
Tel.: 1 202 778 9532
E-Mail: holly.strand@wwfus.org
Web: www.worldwildlife.org

EDUCATION/UNIVERSITY

Observatoire de l'Écopolitique Internationale

Prof. Philippe Le Prestre
Directeur
Observatoire de l'Écopolitique Internationale
Université du Québec à Montréal - Institut des
Sciences de l'Environnement
C.P. 8988 - Succursale Centre Ville
Montreal H3C 3P8 Quebec
Canada
Tel.: 514 987 3000 poste 7909
Fax: 514 987 4718
E-Mail: philippe.le_prestre@uqam.ca,
oei@er.uqam.ca
Web: www.er.uqam.ca/nobel.oei

University of British Columbia

Dr. Maria Lourdes Palomares
Research fellow, The Sea Around Us Project
Fisheries Centre
University of British Columbia
Lower Mall Research Station
2259 Lower Mall
Vancouver V6T 1Z4
Canada
Tel.: +1 (604) 822-0218
Fax: +1 (604) 822-8934
E-Mail: m.palomares@fisheries.ubc.ca

SBSTTA Bureau

Mr. Christian Prip
Senior International Advisor
Danish Forest and Nature Agency
SBSTTA Bureau
Højbro plads 4
Copenhagen DK-1220
Denmark
Tel.: +45 33 92 7600
Fax: +45 33 32 2227
E-Mail: chp@mim.dk

Expert contacted by teleconference

Dr James N. Galloway
International Nitrogen Initiative
Environmental Sciences Department
University of Virginia
Clark Hall
291 McCormack Road
P.O. Box 400123
Charlottesville, VA 22904-4123, USA
Tel. : + 1 434 9241303
Fax : + 1 434 9822137
E-mail jng@virginia.edu

Observer

Dr. Dana Roth
Coordinator, Convention on Biological Diversity
Bureau of Oceans and International Environmental
and Scientific Affairs
2201 C Street NW
Room 4333
Washington DC 20520
United States of America
Tel.: +1(202) 736 7428
Fax: +1(202) 736 7351
E-Mail: rothds@state.gov

CBD Secretariat

Mr Hamdallah Zedan
Mr. Kalemani Jo Mulongoy
Mr Olivier Jalbert
Mr Arthur Nogueira
Mr David Cooper
Mr Robert Höft
Mr Bob Kakuyo
Mr David Coates
Ms Marjo Vierros
Mr Manuel Guariguata
Mr Sarat Gidda
Ms Lucie Rogo
Mr David Ainsworth
Ms Alexandra Baillie
Mr Marcos Silva
Mr John Scott
Ms Paola Deda
Mr Lijie Cai

Secretariat of the Convention on Biological Diversity
393, rue St-Jacques - Suite 300
Montreal, Quebec - H2Y 1N9
tel: 514-288-2220
fax: 514-288-6588
e-mail: secretariat@biodiv.org

Annex II

**OBSERVATIONS AND RECOMMENDATIONS ON INDICATORS
(ITEMS 3.1 AND 3.2 OF THE AGENDA)**

I. GENERAL OBSERVATIONS AND RECOMMENDATIONS

1. The Group made the following general observations:

(a) The work on the indicators for assessing progress towards the 2010 biodiversity target required ***significant coordination efforts and financial resources***.

(b) It is important to consider the ***suitability of the indicator and the availability of suitable data sets separately***. Indicators for which there are currently no suitable global data sets should not be discarded but efforts should be made to generate/collect relevant information. In the interim, such an indicator can be used in a qualitative way (storylines on the basis of examples where data exist).

(c) As a general rule, to yield data relevant for assessing against the 2010 target (i.e. assessing change in a rate of change), a dataset needs to provide a ***minimum of three datapoints***, so as to provide a minimum of two trend (rate of change) estimates (see also Appendix 3 to Annex 2 of this document).

(d) In many cases different indicators provide ***complementary information*** relevant to the focal area. The complementarities between the indicators should be highlighted.

(e) Indicators have been defined based on available data and are not necessarily the best possible indicators. The ***limitations of each indicator must be clarified*** in the final analyses and presentations.

(f) The ***presentation and communication of key messages*** derived from the indicators is as important as the science behind each indicator. The ecological complexity of indicators must be balanced with the need to use them to communicate with policy-makers. Colour-coded maps are powerful tools to underpin a message. Wherever geo-referenced information is available it would be useful to produce maps for reporting the spatial variation in both qualitative as well as quantitative data. Maps also provide a distinct benefit to policy makers and readers because they enable parties interested in conditions in particular biogeographic regions to evaluate qualitative and quantitative trends for the locale of interest.

2. The Group recommended that the background documents (INF documents) prepared for discussion by the AHTEG should be revised in collaboration with relevant partners. This should include:

(a) Identification of what exactly should be delivered for each indicator in the short term (for GBO-2) and long term (after GBO-2), considering issues of both extent and quality.

(b) Consideration of recommendations made on form of indicators (such as consistency in presentation of graphs, and noting calls for indicators to be presented using maps wherever possible, and potentially also by biome/ecoregion).

(c) Clarification not only of the indicators themselves, but the messages that the indicators are delivering including how what is demonstrated relates to achievement of the target.

(d) Identification of how each of the indicators can be compared with and complement information provided by other indicators (and hence what analysis and datasets will be required).

(e) Indication of the data sources for developing and delivering the indicators.

Advice on the revision of background papers specific to each indicator are given in section II of this annex.

3. The Group recommended that *SBSTTA identifies possible coordinators for each indicator* (see para 4 below and appendix 1 to this annex) and encourages Parties, other governments and relevant organizations to *collect and share information relevant to each indicator, inter alia* by contributing such information to relevant databases.

4. The Group identified the following steps required for the implementation of the indicators:

(a) Clarification of the mechanism for *coordinating the programme* for development and delivery of the indicators, including:

(i) Clearly setting out the roles of the CBD Secretariat, UNEP-WCMC (noting Decision VII/30), and other international organizations.

(ii) Establish a time schedule with key milestones for reporting.

(iii) Identifying specific contact points for identified activities.

(b) Identification who would be responsible for *delivery of each indicator* (noting that more than one organization may be involved), and working with them to confirm:

(i) That they are willing to collaborate on delivery of the indicator.

(ii) That they can deliver the indicator required, in an appropriate format to an appropriate timetable (noting that this may require additional resources yet to be raised).

(iii) That they can deliver the information on which the analyses are based to complement information generated by other indicators (noting that they may also play a role in this further analysis, or may themselves carry the analysis out).

(iv) Identification of specific contact points.

(c) Development of an *overall delivery plan* for the indicators, data and analyses to ensure the availability of the indicators for the draft GBO that will be delivered to SBSTTA 11, and agreement with the organizations responsible for its delivery.

(d) Development of *individual delivery plans* for each indicator, working with those responsible for their development.

(e) Preparation of a *project concept* incorporating both a costed workplan and associated information, as a basis for raising resources for indicator development and delivery, and publication of at least the first Global Biodiversity Outlook, and invitation to Parties and institutions to contribute financial and in-kind support for this work.

(f) Development and agreement of a *long term information strategy* and delivery plan to ensure that the indicators, data and analyses are periodically available over the coming years to support policy intervention and communication with respect to the 2010 target. In future years this should include increased information arising from national reports and voluntary reports submitted by Parties.

(g) *Delivery of indicators and datasets* by identified organizations in accordance with the agreed delivery plan, and their use in the GBO-2 and related products.

II. SPECIFIC OBSERVATIONS AND RECOMMENDATIONS ON EACH INDICATOR

A. Status and trends of the components of biological diversity

1. Trends in extent of selected biomes, ecosystems and habitats

5. For purposes of global assessment, the medium-term aim should be the complete coverage of all major types of biomes/ecosystems, even if data quality varies. Where available, “wall-to-wall” data ^{1/} should be used. If these are not available, or as an alternative, extensive (i.e. a lot, or good representational spread) sampling data should be used.
6. The indicator should be presented both in global figures (i.e. total) as well as disaggregated by major divisions, such as vegetation types or biogeographic regions, to assist interpretation and presentation of storylines. The same divisions should be used for the spatial presentation of the other indicators.
7. Data sources include global remote sensing data and national land cover maps and statistics. For some biome/ecosystem types, the identified datasets will yield sufficient datapoints to give trend information relevant to the 2010 target assessment (see appendix 3 for further information on minimum data requirements). For others appropriate global datasets are yet to be identified or need to be acquired.
8. Based on current and short-term future availability of trend information, the Group recommended the following major ecosystem types for immediate indicator implementation:
 - (a) Forests (including different forest types, notably mangroves)
 - (b) Peatlands (probably for certain geographic areas only by 2010)
 - (c) Coral reefs
 - (d) Croplands
 - (e) Grasslands/savannahs
 - (f) Polar/ice
9. Efforts should also be made to apply the indicator to the following ecosystem types to ensure coverage of all thematic areas recognized by the Convention:
 - (a) Inland wetlands
 - (b) Tidal flats/estuaries
 - (c) Seagrass beds
 - (d) Dry and sub-humid lands
 - (e) Urban
10. The Group identified UNEP-WCMC in collaboration with FAO, the NASA-NGO Conservation Working Group and other relevant partners to coordinate work on these specific ecosystems (see appendix 1 below).
11. Identified datasets relevant to these habitats are shown in grey tint in the table contained in appendix 2 to this document. ^{2/} Appendix 3 lists general rules for the minimum requirements of datasets appropriate for assessing progress towards the 2010 target. Appendix 4 compares different land-class classifications in relation to the thematic programmes of work under the Convention on Biological

^{1/} Wall-to-wall data refers to complete geo-spatial coverage of an area with data. The most common type of wall-to-wall data is multi-spectral data obtained from remotely sensed imagery.

^{2/} The periodicity of each of these datasets against the minimum needs for 2010 target assessment has not yet been fully checked

Diversity. Important satellite data and derived products concerning land-cover and land-cover change elements of possible indicators are listed in appendix 5.

2. *Trends in abundance and distribution of selected species*

12. The Group recommended using several composite indices, which provide information on the change in different components (species or biogeographic populations) of biodiversity, in particular the Living Planet Index (LPI) and various Species Assemblage Trend Indices (STI) and identified UNEP-WCMC in collaboration with relevant partners as coordinator for this work (see appendix 1 to this annex).

13. In addition to the LPI and STI, the Group recognized that the Red List Index (RLI, see discussion below) and Natural Capital Index (NCI) as supplementary approaches.

14. Trends in abundance of a selected set of species provide a good picture of the basic process of biodiversity loss, in which the abundance of many species decrease and the abundance of a few species increases as a result of human activities (homogenization process). Composite indicators/indices, such as the LPI and STI provide an overview of the process of biodiversity loss, and thereby facilitate communication, which is especially relevant for policy makers. Data on each of these indices are available though scattered and criteria need to be developed for which species/populations are included in the calculation to minimize taxonomic and geographic biases.

15. With regard to the revision of the background on this indicator the Group recommended that the focus should be on the LPI and STI as complementary indices informing the indicator and made the following specific observations:

(a) The LPI provides information on the overall change in the ecosystem. Therefore it should be based on a significantly wider set of species from more species groups and a better spatial coverage in order to enlarge its **representativeness**.

(b) In contrast with data on water, air and soil quality, data on species trends are in most cases owned by non-governmental organisations, and moreover scattered over a multitude of NGOs, experts and research institutes. To achieve sufficient accuracy and representativeness of LPI and STI on the various spatial scales, both **national and international data sources** have to be exploited, processed and implemented.

(c) Both LPI and STI should be **scalable** and presented at various **spatial levels**. It concerns the global level, the realms and the major ecosystem types per realm, corresponding with the indicator on ecosystem extent. These also cover the CBD themes/programmes of work (e.g. forest species, inland water species). Disaggregation, (e.g. by ecosystem type or geographical regions such as mountains and islands) needs to be done in a consistent way. Ensure that datasets are shared wherever possible.

(d) LPI trends are currently based on differing time series of species. In the future, a **common baseline** should be used (with abundance extrapolated back to this point) to show trends over this longer time period in order to determine human impact in general. A common baseline also ensures consistency of information within and between ecosystems and as a result would facilitate communication to policymakers and the public.

(e) Currently, LPI, STI and RLI are the result of different data-gathering processes and different analyses. They are complementary in the way that they provide information on the overall change in the ecosystem, the trends in specific biodiversity components (species groups) and trends in extinction risk, respectively. There is an urgent need to strengthen collaboration and coordination between these three approaches, and to share all available population trend data so that **common, up-to-date sources** are used.

(f) The **sources of data** in LPI and STI should be well documented.

(g) Techniques of how to deal with invasive and opportunistic species should be explored to **avoid masking** of the process of biodiversity loss (see above) ^{3/} Species could be coded as invasive or non-invasive species in order to filter out invasive species from the indicator.

(h) Both LPI and STI are generic indicators in nature for they can be applied to all ecosystems, biodiversity components and are scalable. Combination of the LPI with other indicators, both from columns B and C of annex 1 to decision VII/30, should be explored. Specifically, a combination of LPI with the ecosystem extent indicator illustrating changes in, respectively, the **quality of the ecosystem** and the **quantity** (extent) (e.g. as shown by the NCI), and also with indicators on responses and use providing information on **management effectiveness** and the **sustainability of use**.

3. Coverage of protected areas

16. The Group recommended that protected area coverage should be presented as a global total (time series on number of sites and area under protection) and that this information should also be presented by IUCN Management Category and by major ecosystem type as differentiated in the indicator on Trends in extent of selected biomes, ecosystems and habitats. Overlays should be created with maps showing areas important for biodiversity. Future work should also seek to reflect management effectiveness for each site. This work should be coordinated by UNEP-WCMC and IUCN-WCPA (see appendix 1 to this annex).

17. Protected area indicator(s) should be presented spatially wherever possible, potentially using maps in combination with graphs and/or tables. Protected area indicator(s) should be correlated with other indicators wherever possible, noting that this needs some consistency in, for example, dealing with biomes/habitats/ecoregions.

18. This indicator should be clearly linked to targets and directions already agreed in the programme of work on protected areas (decision VII/28). This includes, for example the need to provide information on delivery of the 2012 target on marine and coastal protected areas.

19. The indicator should be related to areas important for biodiversity, for example as in comparison with ranges of both threatened and non-threatened species (noting the work on Rodrigues and co-workers ^{4/} or the Global Amphibian Assessment, ^{5/} for example), also against key biodiversity areas (noting the ongoing work on Important Plant Areas and Important Bird Areas, for example). It should also allow an analysis of the extent to which global networks such as that of World Heritage sites, Biosphere Reserves and Ramsar sites and regional networks such as Natura 2000 cover biodiversity. Further consideration needs to be given to how these can be delivered as a time-related indicator through liaison between the CBD Secretariat, UNEP-WCMC, IUCN, BirdLife International and CI/CABS and other relevant partners.

20. Management effectiveness is a key issue, and should in the future be linked to the World Database on Protected Areas (WDPA) and the indicators being delivered. This could be done on the basis of the framework being developed by the IUCN-World Commission on Protected Areas (IUCN-WCPA) and others, but could also relate to information on existing management plans or protected area budgets. This aspect of the indicator needs further consideration through liaison between the CBD Secretariat, UNEP-WCMC and IUCN-WCPA (and through them the organizations they are working with on this issue including the WWF/World Bank Forest Alliance).

^{3/} Significant increase in the abundance of some species may be a signal of the homogenization process.

^{4/} Rodrigues, A.S.L., et al. 2003. Global Gap Analysis: Towards a representative network of protected areas. *Advances in Applied Biodiversity Science*, No.5. Centre for Applied Biodiversity Science, Washington, D.C. and Rodrigues, A.S.L., et al. 2004. Effectiveness of the global protected areas network in representing species diversity. *ature* 428, 8 April 2004.

^{5/} <http://www.globalamphibians.org/>

21. It was noted that within the European Union it may be possible to use the Natura 2000 network to look at the effectiveness of sites in protecting biodiversity features, as the important biodiversity features of each site are known and their status is being reviewed over time.

22. More explanation needs to be included with the indicator to help countries understand how the information relates to what they are doing in protecting/designating their own national estate, linking this to actions in the CBD programme of work on protected areas (Decision VII/28) wherever possible. This should cover *inter alia*:

(a) Need to find ways to actively demonstrate that protected areas are a valuable tool in helping to achieve the 2010 target.

(b) Need to address issues such as differences in legal system between countries and the ways in which they designate and protect sites and habitats, noting in some cases that a specific habitat type is protected in law wherever it exists without identifying specific sites, and also noting that not all legally designated areas are protected areas.

(c) Shortcomings in the data, for example the fact that private protected areas will be inadequately included as there are not no consistent datasets for many parts of the world.

(d) Multiple overlapping designations.

(e) How the database deals with date changes, given that areas of protected areas and even their national designations and IUCN categories change over time.

23. Indigenous groups have identified some information that should be linked to the protected areas data with respect to their interests, and presented as part of the indicator. This is already addressed within the final section of document UNEP/CBD/AHTEG-2010-Ind/1/INF/3 and should be considered further with IUCN and UNEP-WCMC as the World Database on Protected Areas is developed further so that this information is available in the future. Protected areas managed by indigenous and local communities should also be identified separately.

24. There are other systems of land/habitat protection that do not meet the definition of a protected area, or are not reported through IUCN/UNEP-WCMC. This might include, for example, forestry reserves in many countries, private land conservation, and/or habitats or other areas identified under legislative mechanisms. There is merit in reporting on all areas of land or sea managed for biodiversity conservation, so in the future ways should be found to deliver indicators using all of this information. In particular:

(a) If the areas do fall within the definition of protected areas they should be included in reports as such, whatever the management regime.

(b) In the future, information on other sites areas actively managed for their biodiversity values but not meeting the definition of a protected area should be presented in conjunction with protected areas data to indicate the overall conservation effort (noting that it may be difficult to express this data spatially over time).

4. *Change in status of threatened species*

25. The Group noted that the methodology and application of the Red List Index has been published in the scientific literature. ^{6/} Its further development is supported by the on-going Red List Programme, which is coordinated by the Red List Consortium (IUCN, BirdLife International, Conservation International and NatureServe). Data come from the IUCN Red List of Threatened Species. The Group considered the indicator ready for immediate testing and use and recommended its upgrading to column B (see appendix 1 to this annex).

^{6/} Butchart, S.H.M., Stattersfield, A.J., Bennun, L.A., Shutes, S.M., Akçakaya, H.R., Baillie, J.E.M., Stuart, S.N., Hilton-Taylor, C., Mace, G.M. 2004. Measuring Global Trends in the Status of Biodiversity: Red List Indices for Birds. PLOS Biology 2 (12), December 2004. accessible at: <http://www.plosbiology.org/plosone/?request=get-document&doi=10.1371/journal.pbio.0020383>

26. The Red List Index (RLI) complements indicators in trends in abundance and distribution of selected species, providing global information on the projected extinction risk of completely assessed groups (as shown by genuine changes in the numbers of species in different IUCN Red List categories).

27. The group recommended that further work on the presentation of the RLI should be done to make the results more easily understood by policy-makers and the general public, noting that some of this work would be appropriate for the presentation of all CBD indicators. In particular, difficulties relate to the fact that this indicator measures a change in rate (as opposed to state). It should be clear what the trend means across the different taxonomic groups (e.g. the trend is equivalent to 10% of the world's birds moving into a worse category of threat) and how to interpret the indicator in relation to the 2010 target.

28. Additional analyses should be explored, for example, presentation of the results in terms of: (i) trends in the overall numbers of globally threatened species in combination with their threat status (adjusted to take account of genuine changes only); and (ii) trends in genuine changes divided into three classes (worse, better, the same).

29. The Group noted that the RLI can only currently be applied to birds and amphibians. However, the group recognizes that the Red List Programme has a programme of work already in place to extend coverage of the indicator. For example, by 2010, Red List Indices will also be available for all the world's mammals and potentially a number of other groups, including some plant and marine groups, and there are plans to develop a sampled indicator that will be more representative of all biodiversity. The group therefore urges the Red List Consortium to continue this work and to report on its progress to the CBD.

5. *Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socio-economic importance*

30. The Group noted that, although there is no global database at present (and no consistent system of recording information at country level) that would provide information on the amount of crop and useful plant diversity in production systems, various potential indicators have been identified (FAO GDEV report contained in UNEP/CBD/AHTEG-2010-Ind/1/INF/10) and could be applied and gradually developed further. Information on livestock and selected fish genetic resources is also available.

31. The most obvious indicators for which data are available relate to the quantity of *ex situ* material conserved and include:

- (c) Global numbers of taxa conserved;
- (d) Global numbers of accessions maintained;
- (e) Number of collections and conservation facilities.

32. Information is also available, or can be obtained, on the quality of *ex situ* material conserved. Estimators of quality include:

- (a) Maintenance conditions;
- (b) Safety duplication;
- (c) Regeneration status;
- (d) Viability.

33. There have also been various attempts to estimate the proportion of total diversity of a crop that is conserved. ^{7/} These have been informed estimates by experts. The Global Plant Conservation Strategy has a target of conserving 70% of diversity of important useful plant species. The figure of 70% was chosen because it seems to be the point of inflection of the curve relating numbers of conserved

^{7/} See Cary Fowler, C., T. Hodgkin. 2004. Plant Genetic Resources for Food and Agriculture: Assessing Global Availability. Annual Review of Environment and Resources Vol. 29 (November 2004).

accessions to total diversity (i.e. the point at which your next investigations/collections start giving you less new diversity).

34. More qualitative indicators of *in situ* maintenance efforts are available using as a baseline reports from countries to SOW1 ^{8/} and the report on on-farm management of crop genetic diversity: paper submitted by the International Plant Genetic Resources Institute (UNEP/CBD/SBSTTA/7/INF/7). The Group noted that there are clearly significant developments in this area, which could be recorded through a fairly simple survey process.

35. With regard to crop diversity, the FAO Commission on Genetic Resources for Food and Agriculture has suggested to develop higher order indicators, based on the indicators for implementation of the Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture. ^{9/}

36. With regard to livestock, the FAO World Watch List for domestic animal diversity provides information on the current state and recent trends of over 5,000 breeds representing 35 species. ^{10/}

37. For aquatic species, data are available particularly for salmonids (salmon and trout), and increasingly for carps and tilapia. For salmon, much work has been done on the impacts of the cultivated strains on wild stocks (either through stocking activities or the escape of farmed fish). Similar concerns are stimulating related research for carps and tilapia (two groups particularly important for aquaculture in developing countries). This information base is being enhanced through increasing interest in the genetic improvement of cultivated stocks, which often requires investigating and sourcing pure stocks from the wild. FAO has access to data for these species and the World Fish Centre is a lead agency for the conservation of wild, and the improvement of domesticated, carp and tilapia, including being instrumental in promoting regional initiatives in these fields. Although data exist, there is likely a need to collate the data at the regional or global levels.

38. The Group recognized that most of the approaches have problems in being rather complex, not sufficiently representative of the global status, or involving too many measures. A major problem is that the analytical work needed to combine different measures into one or two simple and understandable indicators has yet to be done.

39. Nevertheless, the Group considered the available information and methodologies sufficient to start testing and using the indicator and recommended its upgrading from column C to column B. The Group identified FAO and IPGRI to coordinate these efforts (see appendix 1 to this annex).

B. Sustainable use

6. Area of forest, agricultural and aquaculture ecosystems under sustainable management

40. The Group felt that making progress on indicators of sustainable use is a priority and that the Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity (annex II to decision VII/12) provide the framework for the development of the indicators on sustainable use.

41. The Group considered indicators of unsustainable management as particularly effective in attracting public attention and noted the links with other indicators:

(a) The indicators on species trends and on threatened species provides information on the outcome of sustainable/unsustainable land use;

^{8/} FAO. 1997. First Report on the State of the World's Plant Genetic Resources for Food and Agriculture. FAO, Rome.

^{9/} FAO. 2002. Report of the Ninth Regular Session of the Commission on Genetic Resources for Food and Agriculture, para.19.

^{10/} [http://dad.fao.org/cgi-dad/\\$cgi_dad.dll/Reference?Eng#World%20Watch%20List%20for%20Domestic%20Animal%20Diversity](http://dad.fao.org/cgi-dad/$cgi_dad.dll/Reference?Eng#World%20Watch%20List%20for%20Domestic%20Animal%20Diversity)

(b) The marine trophic index provides information on the outcome of sustainable/unsustainable marine fisheries;

(c) Indicators on ecosystem extent and ecosystem failure provide information on the outcome of sustainable/unsustainable ecosystem management.

42. While more outcome-oriented indicators are being developed an indicator of the area under certified production provides information about market demand and a measure of the degree of awareness about the sustainable production. To this effect, a broad range of third party certification systems should be examined with respect to their compatibility with the Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity. The Group made a number of qualifications on the use of certification as an indicator of sustainable use:

(a) Some certification schemes emphasize sustained production rather than ecological sustainability. Sustainability should encompass economic, social and ecological sustainability;

(b) Certification schemes may not cover public land or all sustainably managed land;

(c) The use of data obtained from various certification organizations for this indicator should not imply an endorsement of the respective certification schemes;

(d) While many certification schemes recognize a specific area, which follows the criteria for sustainable production, the products stemming from this production qualify under the indicator on products derived from sustainable sources.

43. The Group recommended the use of an indicator on Area of selected sectors (forests, agriculture, aquaculture...) in production certification systems and the upgrading of this indicator to begin immediate testing and identified UNEP-WCMC to coordinate this work (see appendix 1 to this annex).

7. Proportion of products derived from sustainable sources

44. Although the Group noted the linkages between this indicator and the indicator on area under sustainable management, including through certification schemes, it was agreed that not enough data exist at relevant geographical scales to start using this indicator. For the development of this indicator the links between trade and biodiversity loss could be developed.

45. The Group concluded that this indicator should remain in column C and that Secretariat should coordinate efforts to identify possible options for its development (see appendix 1 to this annex).

46. The AHTEG noted that no indicators are currently assigned to Target 4.2 in Annex IV “Unsustainable consumption, of biological resources, or that impacts upon biodiversity, reduced”, and suggested that the appropriateness of indicators of the “Ecological footprint” be examined.

C. Threats to biodiversity

8. Nitrogen deposition

47. The Group concluded that data on global anthropogenic nitrogen production are available and accurate for fertilizer production and fossil-fuel use. Data on cultivation-induced biological nitrogen fixation are estimates with an error margin of $\pm 20\%$. The model on the global atmospheric deposition of reactive nitrogen is highly accurate regarding the pattern but less accurate on the quantities deposited. Different models on nitrogen loading in major water basins and on nitrogen flux to coasts show a high degree of agreement. The International Nitrogen Initiative, in collaboration with UNEP-WCMC, was identified as a coordinator for this indicator (see appendix 1 to this annex).

48. The Group felt that, in revising the background document, the policy relevance of the data on global anthropogenic nitrogen production should be better explained and the link between nitrogen deposition and biodiversity should be further elaborated. The link between nitrogen deposition and the trophic indices should be also highlighted.

49. Spatial overlays of nitrogen deposition and sensitive sites (particularly sites with low nutrient status and high biodiversity and coastal areas) should be made to analyse the specific threat to vulnerable sites. A more detailed map on one aspect of anthropogenic production of reactive nitrogen, such as flux in coastal areas, would be helpful for further illustration.

50. The possibility of an indicator on nitrogen use efficiency in agricultural production should be explored to illustrate trade-offs between sustained production and sustaining biodiversity.

9. *Number and costs of invasive alien species*

51. The Group recognized invasive alien species as a major driver of change and considered this indicator is a high priority. The Group noted that considerable information is available on numbers of invasive alien species and area affected and that less consistent data can be obtained on costs, although economic calculations on the costs of alien invasions are available for some countries.

52. Because there is no systematic way in which either the occurrence of alien invasive species (number, area affected, ecosystems impacted etc.) is quantified, the challenge may lie in pulling together the existing information in a cohesive way. The Group noted the link of this indicator to the indicator on species trends, which should recognize the explosion of the number of individual taxa in an area as a loss of ecosystem quality.

53. The Group concluded that, while the methodology for this indicator requires further development, the existence of data warrants its immediate testing and use and recommended that this indicator be moved from column C to column B and that work on the indicator should be coordinated by GISP (see appendix 1 below).

D. *Ecosystem integrity and ecosystem goods and services*

10. *Marine trophic index*

54. The Group concluded that the marine trophic index (MTI) is both an ecosystem integrity and a sustainable use indicator. Both data and methodology are available. However, it was felt that the concept of the MTI may be difficult to understand by the general public and by decision makers. This could be addressed *inter alia* by:

(a) Presenting the declining quantity of fish in the higher trophic levels separately from and in addition to the data on lower trophic levels, recognizing that (i) the higher trophic levels provide a better measure of the effects of fisheries, but there will be a lag time in response due to high trophic level species being long-lived and (ii) the lower trophic levels makes the indicator more sensitive to environmental variations, such as nutrient input, but the lag time for response would be shorter, as short-lived species react faster to fishing and environmental pressure;

(b) Including a trend line of the percentage of fisheries below a certain trophic level and a measure for marine dead zones (trophic level 1), which should be overlaid with information on nitrogen deposition (loads);

(c) Using maps to demonstrate changes in the trophic index.

55. The Group identified the *Sea Around Us* Project of the Fisheries Centre of the University of British Columbia (UBC) as the coordinator for this work (see appendix 1 to this annex).

56. For the revision of the background document, evidence of the effects of trophic level decline on ecosystem health and human well-being, for example its effects on productivity, economic value of fisheries and on people depending on fisheries resources, should be included in the storyline and the MTI should be interpreted in the context of other indicators measuring the health of the marine ecosystems.

57. The relation to the baseline, which corresponds with the start of industrial fisheries, should also be emphasized because it provides a measure of the beginning of large-scale fishing impacts on ecosystems.

11. Water quality in aquatic ecosystems

58. The Group concluded that water quality should be monitored on the basis of three parameters for which data exist, are regularly updated and can be disaggregated or aggregated as required:

- (a) Biological oxygen demand;
- (b) Nitrate concentrations; and
- (c) Sediment loads in rivers and turbidity.

59. The Group identified the UNEP-GEMS/Water Programme as coordinator for this indicator (see appendix 1 below).

60. For the revision of the document, the Group recognized that wherever possible data should be presented in the form of colour-coded maps, either by value, showing vulnerable areas, or by decade (data available from the 1970s). Since all data are geo-referenced they can be presented as required for any geographical or biogeographic region. In preparing such maps and graphs, the latest water quality data should be used.

61. The Group also concluded that the link between water quality and biodiversity loss should be illustrated more clearly. This might be done by adding threshold analyses that demonstrate expected impacts on biodiversity.

62. The Group noted that few data are compiled and available regionally or globally for coastal regions.

63. A complementary indicator for water quantity (water use, water flow, water abstraction, water allocations etc.) should be developed, particularly in conjunction with the STRP of the Ramsar Convention. Water quantity is partly covered by the indicator on the extent of selected biomes, ecosystems and habitats applied to inland water ecosystems.

64. River fragmentation should be considered under the connectivity/fragmentation of ecosystems indicator. Although data on fragmentation are not complete it is important to analyse and present available information.

12. Application of the trophic index to freshwater and possibly other ecosystems

65. The Group noted that data are inadequate as yet to apply the trophic index to inland water fisheries. ^{11/} No agreed methodology is available to apply the concept of measuring the consequences of selective harvesting of the most valuable, long-lived individuals to terrestrial ecosystems, although data may be available. An equivalent indicator for terrestrial systems would likely be based on body-size and life-span. However, this indicator is policy relevant and has the potential to be very informative.

66. In developing this concept, data from the Millennium Ecosystem Assessment may be applicable, particularly regarding background information and issues related to ecosystem exploitation and consumption.

67. The Group concluded that the indicator should be kept in column C for further development and that the Secretariat should coordinate efforts to develop options (see appendix 1 to this annex).

13. Connectivity/fragmentation of ecosystems

68. The Group noted that information is available on a number of biomes and countries, including for example on major river systems, North American forests, most of the biomes in Brazil, land cover in the Pan-European region. It can be measured at a global scale, but must be clearly explained for policy makers. The indicator is also relevant to the Convention on Migratory Species (CMS).

^{11/} The *Sea Around Us Project* applied mean trophic levels to all FAO inland catches and found a decline (Pauly et al. 1998). However, there are questions concerning the quality of the underlying data.

69. Ongoing wilderness mapping efforts ^{12/} would provide useful information. A measure of habitat distribution by patch size is inexpensive to generate but the distinction between human-induced and natural fragmentation might be more complex and time series information might not yet be available.

70. Qualifications regarding the varying degrees of the impact of fragmentation on species (e.g. lower impact on smaller species; varying tolerance to fragmentation etc.) should be included. Social fragmentation, i.e. the number of owners per area “parcellization” should be considered but requires different data sets.

71. The Group concluded that sufficient information is available to apply the indicator to forest and freshwater ecosystems and that it is policy relevant and therefore the indicator is ready for immediate testing and use and should be transferred to column B. UNEP-WCMC should coordinate the work on this indicator (see appendix 1 below). The Group concluded that sufficient information is available to apply the indicator to forest and freshwater ecosystems, that it is policy relevant, and therefore that the priority assigned to this indicator should be upgraded and immediate testing initiated. UNEP-WCMC should coordinate the work on this indicator for freshwater ecosystems and should work closely with a consortium of World Wildlife Fund-U.S., Conservation International, the United States Department of Agriculture, Forest Service, FAO, and agencies responsible for space-based imaging assets to develop the forest fragmentation indicator.

14. *Incidence of human-induced ecosystem failure and cost*

72. The Group made number of observations on this indicator including:

(a) The key issue reflected in this indicator is how human activities reduce the resilience of ecosystems to withstand/recover from disasters;

(b) It is therefore important to distinguish between natural and human-induced disasters;

(c) The number of phase shifts in ecosystems (such as coral reefs) should also be included in this indicator;

(d) Environmental vulnerability indices such as the vulnerability index developed for SIDS may be useful in this context.

73. Criteria need to be developed as to when and how to measure impact:

(a) Relative measures may be the most effective as they take into account external factors;

(b) Geographical scale should be considered;

(c) Information is available on short-term impacts, but would be more difficult to find for long-term impacts (e.g. soil erosion);

(d) Case studies (e.g. impacts of hurricane Jeanne on the Dominica Republic *versus* Haiti) could be used to illustrate trends.

74. With respect to the calculations of cost the following the Group noted that:

(a) Existing research on calculating ecological liability may be useful;

(b) Ramsar has some cost calculations;

(c) Cost will vary across countries with different standards of living. The number of people affected could be another measure.

75. The Group noted that selected information is available for rivers, coral reefs, wetlands, forests, including information compiled by the Millennium Ecosystem Assessment (MA) on converted wetlands and dead zones among others and that the United Nations process on disasters may have relevant data and the indicator should be linked to this process. The Group concluded that more work is required on this

^{12/} For example, by the Wildlife Conservation Society

indicator and it should be kept in column C. The Secretariat, in collaboration with UNEP-WCMC, should explore options for its development (see appendix 1 below).

15. Health and well-being of communities who depend directly on local ecosystem goods and services

76. The Group considered this to be an important indicator as it encompasses socio-economic issues that are not addressed by other indicators: it demonstrates the link between poverty and vulnerability to biodiversity loss. However, the title “Health and well-being of people in biodiversity-based resource-dependent communities” was not considered to clarify the focus on local dependency and the Group therefore recommended that the indicator should be renamed “Health and well-being of communities who depend directly on local ecosystem goods and services”.

77. Data are available for certain communities (for example for fishing communities and forest dwellers), but the analysis would be difficult to undertake. This is also a sensitive indicator as the dependent communities are often the poorest communities and data may therefore not be readily made available. The Group noted the link of this indicator to those on access and benefit sharing and sustainable use.

78. The Human Well-being Index was not considered sufficiently sensitive to show changes in a particular ecosystem and the dependent community.

79. The Group concluded that no comprehensive data or methodologies exist and the indicator should be kept in column C for further refinement. This work should be coordinated by the Secretariat (see appendix 1 below).

16. Biodiversity used in food and medicine

80. The Group noted that this indicator helps to align the 2010 target with the Millennium Development Goals by highlighting the importance of biodiversity beyond conservation. However, aside from coarse data from FAO food balance-sheets and WHO on medicinal plants, no comprehensive information is available. This indicator should provide a measure of the number/diversity of taxa in use, not the quantity of biological resources, and the target should be to maintain a large number of species in use, thereby strengthening arguments for their conservation.

81. A composite measure may not be definable at present; however, trends could be illustrated with case studies or a series of different measures (e.g. number of new species used at the local level). This would provide a link to the indicator on genetic diversity.

82. The Group concluded that this is an important indicator that should be kept in column C for further development. This work should be coordinated by the Secretariat (see appendix 1 to this annex).

E. Status of traditional knowledge, innovations and practices

17. Status and trends of linguistic diversity and numbers of speakers of indigenous languages

83. The Group noted that data on the status of linguistic diversity and numbers of speakers of indigenous languages are available through the Ethnologue database. However, a methodology for the extraction of meaningful trends information from these data is yet to be developed. An index on the number of indigenous languages losing speakers vs. indigenous languages gaining speakers might be feasible and could be a more sensitive indicator of the actual status of indigenous languages rather than a simple count of languages in each category of numbers of speakers. The data from the Ethnologue might be suitable to applying the calculation used in developing the Red List Index. The Smithsonian Institution has been invited to explore the feasibility of developing such an index in collaboration with suitable partners.

84. The Group also noted that the relationship between biodiversity and linguistic diversity may be tenuous and that this complex link should not be over-emphasized when revising the background

document. While the indicator is socially relevant it may not be sensitive enough to show measurable change between now and 2010. The indicator can be presented in maps.

85. The Group identified UNESCO, in collaboration with UNEP-WCMC, to coordinate work on this indicator (see appendix 1 below).

18. Other indicators of the status and indigenous and traditional knowledge

86. The Group noted that additional indicators that relate more specifically to indigenous knowledge, innovations and practices need to be developed. Possible indicators discussed by the Group included:

- (a) Indigenous traditional land tenure;
- (b) Traditional indigenous territories under indigenous control (where indigenous and local communities may be able to exercise traditional ecological knowledge in managing their territories);
- (c) Protected areas co-managed by indigenous and local communities;
- (d) Demographics and statistics on the urbanization of indigenous and local communities away from traditional territories.

87. The Group recommended that the results of the discussion on this indicator be used in preparing relevant information as a basis for discussion by the Ad Hoc Open-ended Working Group on Article 8(j) and Related Provisions.

F. Status of access and benefit-sharing

19. Indicator on the status of access and benefit-sharing

88. The Group noted that an indicator on the status of access and benefit-sharing will be developed by the Ad Hoc Open-ended Working Group on Access and Benefit-sharing.

G. Status of resource transfers

20. Official development assistance provided in support of the Convention

89. Data and methodology are available for this indicator. The quality of the data, however, depends on participation of Parties and other Governments in marking their expenditure and reporting these figures. The Group welcomed that OECD has agreed to continue the biodiversity marker on a trial basis until 2007 when the quality of the information will be analysed. The Group confirmed that OECD should coordinate work on this indicator (see appendix 1 to this annex).

90. To facilitate the participation of countries in providing relevant information, criteria for marking funding for projects should be developed to ensure that all funding for CBD related initiatives is captured.

91. The Group recommended that the information on bilateral development assistance should be complemented with information on multilateral development assistance (GEF). As GEF indicators are currently being developed and it would be desirable to ensure that these are aligned with the CBD indicators.

92. Ways to capture pre-Rio investments should be explored. Pre- and post-UNCED data may be available from some countries, e.g. Brazil. The Commission on Sustainable Development, national reports from the Convention to Combat Desertification, and national reports under the Convention on Biological Diversity may provide additional data.

93. The Group recognized that other public and private financial assistance and investments are being made to conserve biological diversity. In the future, it would be desirable to have two additional indicators of trends in investments in support of the Convention. One should report on expenditures for biodiversity-related activities of large conservation NGOs, foundations, and the private sector. The second should report on in-country investments for biodiversity. By combining information from these

two indicators with the indicators on official development assistance discussed above, a fuller and more complete accounting of worldwide support for the conservation of biological diversity will be obtained. The Secretariat should coordinate efforts to develop these two indicators.

21. Indicator for technology transfer

94. The Group noted that this indicator would be based on information reported by countries, both donors and recipients. It might be possible to link the reporting to the OECD biodiversity marker or to include information into the national reports. Currently, however, no data are available for this indicator and it should be kept in column C for further development.

95. The Group recommended that the Expert Group on Technology Transfer should consider the options provided in UNEP/CBD/AHTEG-2010-Ind/1/3 and make concrete suggestions for developing such an indicator and that this work should be coordinated by the Secretariat (see appendix 1 to this annex).

Appendix I

SUMMARY OF INDICATOR STATUS AND WORK THAT NEEDS TO BE CARRIED OUT

Headline Indicator <u>13/</u>	Status <u>14/</u>	Potential Measures	Data available now?	Methodology available now?	Sources of data	Organizations to coordinate delivery of indicator
Trends in extent of selected biomes, ecosystems, and habitats	B	Forests, and forest types (eg. mangroves)	Yes	Yes	FRA (FAO); EU-JRC, NASA Modland; Corine land cover (see appendix 2)	UNEP-WCMC (with FAO, NASA-NGO Conservation Working Group, JCR and other relevant partners)
		Peatlands	Yes	Yes	Various national data sets and remote sensing (see appendix 2)	
		Coral reefs	Yes	Yes	GCRMN/Reefcheck	
		Croplands	Yes	Yes	National regional datasets and remote sensing (see appendix 2), MA	
		(Natural) grasslands	Yes	Yes	Remote sensing (see appendix 2), MA	
		Polar/ice	Yes	Yes	Remote sensing(see appendix 2), MA	
		Inland wetlands	No	No	Remote sensing (see appendix 2), MA	
		Tidal flats/estuaries	No	No	Remote sensing (see appendix 2), MA	
		Seagrasses	No	No	Seagrass Atlas, MA	
		Dry & sub-humid lands	No	No	LADA, Remote sensing (see appendix 2), MA	
		Urban	No	No	Remote sensing (see appendix 2), MA	
Trends in abundance and distribution of selected species	B	Living Planet Index	Yes	Yes	WWF	UNEP-WCMC (WWF, Birdlife International and others, encouraged to review and refine methodology for calculation of index; These groups and IUCN encouraged to compare and share data with that used for the RLI) Indices could be developed from

13/ **Bold = Indicator considered ready for immediate testing and use (column B in decision VII/30); *Bold italic = Indicator considered ready for immediate testing and use by the AHTEG and therefore recommended for upgrading from column C to column B***; Regular = Indicator confirmed by the AHTEG as requiring more work (to remain in column C)

14/ B = Indicator is considered ready for immediate testing and use; C = Indicator requires further work

Headline Indicator <u>13/</u>	Status <u>14/</u>	Potential Measures	Data available now?	Methodology available now?	Sources of data	Organizations to coordinate delivery of indicator
		Various species Assemblage Trends Indices	Yes	Yes	Birdlife International and partners, others	data disaggregated (e.g.: migratory species, wetland species))
Coverage of protected areas	B	Coverage according to World List of Protected areas.	Yes	Yes	WCMC/WCPA	UNEP-WCMC/IUCN-WCPA
		Overlays with IBAs	Yes	Yes	WCMC, WCPA, BirdLife International	
		Inclusion on community and private PAs	No	No		
		Management effectiveness	No	No		
Change in status of threatened species	B	Red List Index (IUCN-SSC)	Yes	Yes	Red List Consortium	Red List Consortium (Methodological refinements requested)
Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socioeconomic importance	B	<i>Ex situ</i> crop collections	Yes	Could be developed	FAO (SOW, WIEWS); IPGRI (CGIAR-SINGER); Fishbase, Wageningen University Research Centre (WUR)	FAO with IPGRI on behalf of CGIAR
		Livestock genetic resources	Yes	Could be developed	FAO (DADIS)	
		Fish genetic resources	Yes	Could be developed	FAO; Fishbase	
Area of forest, agricultural and aquaculture ecosystems under sustainable management	B	Certification	Yes	Yes	Certification bodies (eg: FSC, MSC, ISO)	UNEP-WCMC

Headline Indicator <u>13/</u>	Status <u>14/</u>	Potential Measures	Data available now?	Method-ology available now?	Sources of data	Organizations to coordinate delivery of indicator
Proportion of products derived from sustainable sources	C	Others	No	No	Equilibrium/WWF/World Bank/TNC intend to propose some indicators	SCBD
Nitrogen deposition	B		Yes	Yes	Available (INI) Models for 2010 could be developed with additional effort	INI with UNEP-WCMC
Numbers and cost of alien invasions	B		Yes – some areas	No	Various	GISP, IUCN-ISSG
Marine Trophic Index	B		Yes	Yes	Available (UBC)	UBC
Water quality of freshwater ecosystems	B	Indicator of BOD, Nitrates and sediments/turbidity	Yes	Yes	UNEP-GEMS/Water Programme	UNEP-GEMS/Water Programme
Trophic integrity of other ecosystems	C		No	No		SCBD to assemble available information
Connectivity / Fragmentation of ecosystems	B	Patch size distribution of terrestrial habitats (forests and possibly other habitat types)	Yes	Yes	NASA Consortium; CI; WWF-US based on remote sensing data	UNEP-WCMC (with FAO, CI, NASA-NGO Conservation Working Group and USDA-FS)
		Fragmentation of river systems	Yes	Yes	WRI	
Incidence of human-induced ecosystem failure	C	(see notes)	Some	No	SCBD to assemble available information for later consideration	SCBD/UNEP-WCMC
Health and well-being of communities who depend directly on local ecosystem goods and services*	C		No	No	To be identified	SCBD
Biodiversity for food and medicine	C		Some	No	FAO, IPGRI, WHO and others	SCBD
Status and trends of	B		Yes	Under	Ethnologue	UNESCO with UNEP-WCMC

Headline Indicator <u>13/</u>	Status <u>14/</u>	Potential Measures	Data available now?	Methodology available now?	Sources of data	Organizations to coordinate delivery of indicator
linguistic diversity and numbers of speakers of indigenous languages				review		(Smithsonian Institution requested to explore possible application of Red List methodology)
Other indicator of the status and indigenous and traditional knowledge	C		No	No	To be considered by WG-8j (Possibly including land-tenure of indigenous and local communities)	SCBD
Indicator of access and benefit-sharing	C		No	No	To be considered by WG-ABS	SCBD
Official development assistance provided in support of the Convention	B	ODA as marked	Some	Yes	Donor countries encouraged to mark data.	OECD (OECD is working on this for a trial period)
Indicator of technology transfer	C		No	No	Countries invited to submit information. EGTT may wish to consider this matter.	SCBD

Appendix 2

POSSIBLE DATA SOURCES FOR THE APPLICATION OF THE INDICATOR ON TRENDS IN SELECTED BIOMES, ECOSYSTEMS AND HABITATS TO THE THEMATIC PROGRAMMES OF WORK OF THE CONVENTION ON BIOLOGICAL DIVERSITY

(Identified datasets relevant to these habitats are shown in grey tint in the table)

Habitat type(s)	CBD Ecosystem theme(s) relevant	Scale	Dataset/source	Data available	Analysis available	Mapped?	Spatial resolution	Periodicity/future assessments	Limitations/ Future improvements needed/ or possible	Other comments/Notes – incl. robustness of result/storyline?
(1) All forests	Forests	Global	FAO: Global Forest Resources Assessment (FRA) 2000	Yes	Yes	No	-	Updates every 5 years: 1990, 2000, Next in 2005, then 2010	Sample based, no maps provided. See INF/1	2005 to be based on sample of 10km X 10 km windows of satellite change detection (30m) at each 1deg X 1deg intersection
(2) All forests	Forests	Global	EU JRC: GLC2000	Yes	Yes	Yes	1km	2000, next TBD		Update should be possible to estimate change. Next estimate may be done with newer data at 300m resolution however.
(3) All forests	Forests	Global Tropical	EU JRC: Achard et al 2002	Yes	Yes	No	-	1990, 1998, Next TBD	Sample based, no maps provided.	Based on random sample of satellite change detection (30m)
(4) All forests	Forests	Global	NASA MODLAND: Modis Land Cover Product	Yes	Yes	Yes	1km	2002, Next TBD		Wall-to-wall global 1km map. Funded to produce global change estimates
(5) All forests	Forests	Global	NASA MODLAND: Modis %Tree Cover Product	Yes	Yes	Yes	0.5km	2002, Next TBD		Wall-to-wall global 1km map. Funded to produce global change estimates
(6) All forests	Forests	Global	NASA MODLAND: Modis %Land Cover Change Product	Yes	Yes	TBD	1km	2002, Next TBD		TBD whether will be wall-to-wall mapped or points of locations change w/out areas assigned to each point.
(7) All forests	Forests	Many entire countries	Various national agencies, NGO, academic institutes	Yes	Yes	Yes	30m	~1990, ~2000, Next TBD	Based on wall-to-wall Landsat images that include up to 10% cloud cover.	Much work has been done and will continue. Major efforts are supported by USAID and NASA, such as CARPE (Congo Basin), SERVIR

Habitat type(s)	CBD Ecosystem theme(s) relevant	Scale	Dataset/source	Data available	Analysis available	Mapped?	Spatial resolution	Periodicity/ future assessments	Limitations/ Future improvements needed/ or possible	Other comments/Notes – incl. robustness of result/storyline?
										(Central America), Brazil-INPE (Amazonia), GFW (Indonesia, Boreal zone) and Conservation International (Biodiversity Hotspots, ie most of the tropical forest biome). Most based on free Landsat data provided by NASA for ~1990 and ~2000. High-resolution, wall-to-wall estimates will be the most precise available. Since large areas have already been mapped and by 2010 it is probable that deforestation across the entire tropics will have been mapped, these data should be somehow incorporated into CBD. There remains the question of how much CBD wishes to incorporate such regional products to complement coarser-resolution or sample-based global products.
Can be disaggregated to several forest types, incl.:										
Boreal natural forest	Forests	Global	FAO: Global Forest Resources Assessment (FRA) 2000	Yes	Yes					From 1 (FRA)

Habitat type(s)	CBD Ecosystem theme(s) relevant	Scale	Dataset/source	Data available	Analysis available	Mapped?	Spatial resolution	Periodicity/ future assessments	Limitations/ Future improvements needed/ or possible	Other comments/Notes – incl. robustness of result/storyline?
Temperate natural forest	Forests	Global	ditto	Yes	Yes					Should be doable for: 1, 2, 4, 5, 6. All but 1 are mapped. Sample density of 1 should enable such a stratification.
Tropical natural forest	Forests	Global	ditto	Yes	Yes					Should be doable for: 1, 2, 3, 4, 5, 6. All but 1 are mapped. Sample density of 1 should enable such a stratification. 2 is only tropical coverage.
Sub-tropical natural forest	Forests	Global	ditto	Yes	No					
Tropical peat swamp forest	Forests; Inland waters	Global	ditto	Yes	No					No existing global estimate of swamp forest. Analysis should be possible with existing satellite imagery.
Mangroves	Forests; coastal & marine	Global	ditto	Yes	Yes				See INF/1	Only from 1. TBD if FRA will have a mangrove assessment that is independent of the 1deg. global sample. This is necessary b/c a 1deg sample is too coarse given the small size of mangrove patches
Montane forest	Forests; mountains	Global	ditto	Yes	Yes					Should be doable for: 1, 2, 4, 5, 6. All but 1 are mapped. Sample density of 1 should enable such a stratification. For 1 (FRA) data could be obtained from a mapping exercise, but is not currently available.
Other wooded land	Forests	Global	ditto	Yes	Yes					From 1 (FRA)

Habitat type(s)	CBD Ecosystem theme(s) relevant	Scale	Dataset/source	Data available	Analysis available	Mapped?	Spatial resolution	Periodicity/ future assessments	Limitations/ Future improvements needed/ or possible	Other comments/Notes – incl. robustness of result/storyline?
Other land with tree cover	Forests	Global	ditto	Yes	Yes					From 1 (FRA)
Bamboo	Forests	Global	Ditto (in collaboration with INBAR)	Yes	Yes					From 1 (FRA)
Stratified by Ecological Regions	Forests	Global	ditto	Yes	Yes					Sources such as WWF Ecoregions could be used to stratify 1,2,4,5,6.
Forests	Forests	Europe	Corine land-cover	Yes	Yes			2 nd assessment (I&CLC 2000) in late 2004		
Peatlands	Inland waters	Europe	Corine land-cover	Yes	Yes			2 nd assessment (I&CLC 2000) in late 2004		
Peatlands	Inland waters	Canada	Wildlife Habitat Canada	Yes	Yes				?Baseline only – or will trend assessment be later developed?	Mappable
Inland Wetlands	Inland waters	USA	1986-1997 Dahl (2000)	Yes	Yes			?are further assessments planned?		Dahl, T.E. 2000. Status and trends of wetlands in the conterminous United States 1986-1997. US Department of the Interior, Fish and Wildlife Service,
Inland wetlands	Seasonally-inundated grasslands	Major large wetlands of globe	USGS	Yes	No					Change map 1975 - 2000 has been produced for mesopotamia. Should be doable for Pantonal in Brazil and Okavanga in Africa. Change estimates for these 3 plus several other major ones would be very informative.
Wetlands (incl large water	Inland waters	Global	Remote sensing (- i delete b/c should be implicit	?Yes – prob. partly/	No (additional funds			Could be x3 for 2010	Only large waterbodies done so far. Assumes data	Source: London 2010 habitats & biomes group

Habitat type(s)	CBD Ecosystem theme(s) relevant	Scale	Dataset/source	Data available	Analysis available	Mapped?	Spatial resolution	Periodicity/ future assessments	Limitations/ Future improvements needed/ or possible	Other comments/Notes – incl. robustness of result/storyline?
bodies)			throughout table. Actually would be good to add a sentence above requiring): Nat agencies, NFGOs, Universities	soon	needed)				continuity and low cost delivery to users. Next Landsat timing may be too late for 2010. Ramsar/CBD River Basin Initiative may help deliver new analyses	
Wetlands (incl large water bodies)	Inland waters	Global	Global Lakes and Wetlands Database							Lehner and Doll 2004. (see URL below). TBD if this is based on direct observations that can be repeatable to estimate change.
Live coral cover	Coastal/ &marine	Caribbean	Gardner et al 2003,	Yes	Yes			?	Approach could be extended to other regions	See INF/11
Coral reef extent?	Coastal/ &marine	Global	GCRM/Reefcheck , Reefbase?	Yes	No			? needs checking		See INF/11. Needs checking with data sources as to what's possible.
Coral bleached area?	Coastal/ &marine	Global	GCRM/Reefcheck , Reefbase? Another (or same?) paper on meta-analyses w/Isabel Coute as co-author. Check Royal Society meeting doc.	?Yes	?			?	?	Needs checking with data sources as to what's possible. Could be interesting in showing where any recovery occurs.
Tidal flats/estuaries	Coastal/ &marine	?global (or selected regions)	Remote sensing. Corine land-cover	Yes?	No? (costs = ?)			Could be x3 for 2010. CLC: 2 nd assessment (I&CLC 2000) in late 2004	Spatial resolution; data availability limitations	Source: London 2010 habitats & biomes group
Seagrasses	Coastal/ &marine	Global	Remote sensing Potentially via NASA and NOAA	Yes?					Spatial resolution; data availability limitations	Source: London 2010 habitats & biomes group

Habitat type(s)	CBD Ecosystem theme(s) relevant	Scale	Dataset/source	Data available	Analysis available	Mapped?	Spatial resolution	Periodicity/ future assessments	Limitations/ Future improvements needed/ or possible	Other comments/Notes – incl. robustness of result/storyline?
			projects such as SeaWIFS							
Mediterranean scrub	Dry & sub-humid lands	Europe	Corine land-cover	Yes	Yes			2 nd assessment (I&CLC 2000) in late 2004		
?	Dry & sub-humid lands	Global – selected countries Argentina, China, Cuba, Senegal, South Africa and Tunisia	Website: Global Land Degradation Assessment of Drylands (LADA) Funded by GEF executed by UNEP - FAO	Yes, some data available from pilot studies, more data will become available	Yes	Yes	To be determined	1 st assessment 2004 - 2009 (possibly updated Every 5 years)	Methodological approach is developed Indicators will be selected by countries with the view to develop a standard global assessment	The project will: <ul style="list-style-type: none"> integrate biodiversity, land degradation and socio-economic assessment criteria assess restoration and bright spots, as well as negative trends
Shrublands, grasslands & deserts	Dry & sub-humid lands	?Global	See Items 1,2,4,5,6.: Remote sensing: USA (MODLAND science team; EU (GEOLAND), FAO (Soil and land databases <i>i.a.</i> GTOS-TEMS, terrastat), LADA, NGO-Univ consortium. Corine Land-cover (Europe)	?Yes – could be extracted	?No (additional funds needed)			2, possibly 3 by 2010. CLC: 2 nd assessment (I&CLC 2000) in late 2004	Dryland classes not discrete; low resolution data, lack of validation; lack of in situ data integration	Might be doable for: 1, 2, 4, 5, 6. All but 1 are mapped. Sample density of 1 should enable such a stratification. But the difficulty is that natural, inter-annual variations in greenness and fire patterns can easily be mis-classified as 'change'. Mis-classification between natural grasslands and modified /improved permanent pasture are probable and should be distinguished in the medium term. A change in grasslands is usually a more gradual process

Habitat type(s)	CBD Ecosystem theme(s) relevant	Scale	Dataset/source	Data available	Analysis available	Mapped?	Spatial resolution	Periodicity/ future assessments	Limitations/ Future improvements needed/ or possible	Other comments/Notes – incl. robustness of result/storyline?
										compared to deforestation. Possibly could be addressed if based on a ~5year average estimate for one epoch vs another ~5year average for another epoch..
Croplands (high nature value agric)	Agricultural lands	EU15	EEA: IRENA	Yes	Yes - soon			?		
Cropland – rainfed, irrigated, shifting	Agricultural lands	Global	See Items 1,2,4,5,6, plus LADA. Corine Lnd-cover.	Yes (nearly)	Some (additional support needed)			2 existing (1 but old), prob 3 by 2010. CLC: 2 nd assessment (I&CLC 2000) in late 2004	Only reliable for intensive agriculture	Agriculture area estimates available globally from: 1, 2, 4, 5, 6. Mis-classification between natural grasslands and modified grazing lands are probable.
<i>Polar/Alpine:</i>										
Tundra	Inland waters = tundra?? Id say better in the drylands. The drylands catagory is quite a pain. Where are not-so-dry grasslands supposed to go?	Europe	Corine land-cover	Yes	Yes			2 nd assessment (I&CLC 2000) in late 2004		
Tundra	Inland Waters? Drylands? Or perhaps None.	Global	See Items 1,2,4,5,6	Yes	No					Grass and Shrub classes from Items 1,2,4,5,6 could be overlaid with a map of the tundra biome to pull out this catagory.
Ice	Biodiv & climate	Global	MODLAND Modis	Yes	Yes					MODLAND Modis

Habitat type(s)	CBD Ecosystem theme(s) relevant	Scale	Dataset/source	Data available	Analysis available	Mapped?	Spatial resolution	Periodicity/ future assessments	Limitations/ Future improvements needed/ or possible	Other comments/Notes – incl. robustness of result/storyline?
	change. Id say "None' its missing.		Snow-Ice product. Also Items 2 and 4.							Snow-Ice product is specifically to map these cover classes. TBD is truly global, ie includes temperate and tropical glaciers. Also Items 2 and 4 include a snow-ice class.
Urban	None	Global	Items 2,4 and 6. Lights-at-night derived urban area maps.	Yes	Yes					Items 2,4 and 6 include an 'Urban/Built-up' class. Lights-at-night derived urban area maps probably provide better detail and precision. TBD if plans are for regular update of products derived from these data.

Appendix 3

CRITERION USED FOR IDENTIFYING HABITAT/ECOSYSTEM DATASETS APPROPRIATE FOR ASSESSING AGAINST THE 2010 TARGET

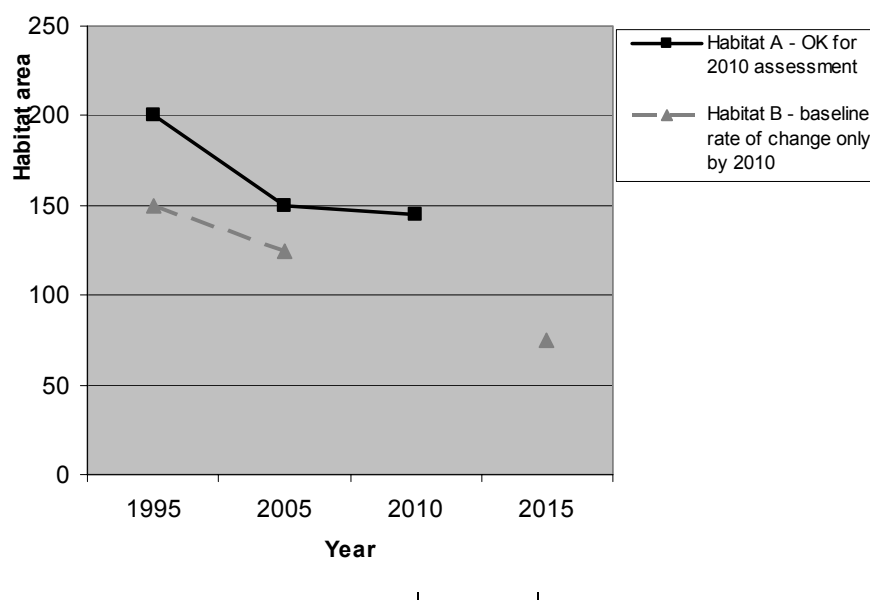
To yield data relevant for assessing against the 2010 target (i.e. assessing change in a rate of change), a dataset needs to provide a minimum of three data points, so as to provide a minimum of two trend (rate of change) estimates. The ideal is:

- one data point prior to 2002, so as to provide a baseline to assess the “rate of change current at 2002”,
- a second data point between 2002 and 2010, and
- a third data point at or around 2010.

A baseline data point at 2002, with two further data points to 2010 may also give relevant assessment.

Although not directly relevant to assessing the 2010 target, other datasets providing a two data points during this time-period can provide supporting information – for example identifying if the initial rate of change of that feature, for assessment of change in the rate of change subsequent to 2010 when a third data point become available.

This is illustrated with two hypothetical habitat datasets in the graph below. The Habitat A dataset is suitable for 2010 target assessment (and shows a reduction in the rate of loss of habitat). The Habitat B dataset provides the “2002-relevant current rate of change” (here a decline) but not a second rate assessment until after 2010.



The list in appendix 2 above covers global sources, and also some examples (not exhaustive) of regional/national supplementary sources, which may bring added value to understanding/interpreting the indicator assessment. It does not cover assessments of related indicator issue of ecosystem *quality*.

Appendix 4 below compares different land-class classifications in relation to the thematic programmes of work. Important satellite data and derived products concerning land-cover and land-cover change elements of possible indicators are listed in appendix 5 below.

Appendix 4

DIFFERENT CLASSIFICATION SCHEMES OF MAJOR GLOBAL LAND COVER MAPS

(*Italicized classes potentially fall into 2 thematic areas under the Convention on Biological Diversity*)

CBD Ecosystem themes	IGBP Classes (NASA MODLAND maps)	EU JRC GLC2000	U. Maryland Classes (NASA MODLAND maps)	U. Maryland %Tree Cover (NASA MODLAND product)	FRA
Agricultural lands	Croplands	Cultivated and managed areas	Cropland		
	<i>Forests / Agricultural lands</i>				
	<i>Forests / Agricultural lands</i>	<i>Mosaic: Tree Cover / Other natural vegetation</i>			
		<i>Mosaic: Cropland / Tree Cover / Other natural vege</i>			
		<i>Mosaic: Cropland / Shrub and/or grass cover</i>			
Dry and sub-humid lands	Savannas	Herbaceous Cover, closed-open	Grassland		
	Grasslands	Sparse herbaceous or sparse shrub cover	Bare Ground		
	Barren or Sparsely Vegetated	Bare Areas	<i>Wooded Grassland</i>		
	<i>Closed Shrublands</i>	<i>Shrub Cover, closed-open, evergreen</i>	<i>Open Shrubland</i>		
	<i>Open Shrublands</i>	<i>Mosaic: Tree Cover / Other natural vegetation</i>			
	<i>Woody Savannas</i>				
Forests	Evergreen Needleleaf Forest	Tree Cover, broadleaved, evergreen	Evergreen Needleleaf Forest	High % tree cover (eg >50%). Could be calibrated with large sample of higher-resolution maps.	Forest w/>10% tree-canopy cover and >5m height.
	Evergreen Broadleaf Forest	Tree Cover, broadleaved, deciduous, closed	Evergreen Broadleaf Forest		Tropical rain forest
	Deciduous Needleleaf Forest	Tree Cover, broadleaved, deciduous, open	Deciduous Needleleaf Forest		Tropical moist deciduous forest
	Deciduous Broadleaf Forest	Tree Cover, needle-leaved, evergreen	Deciduous Broadleaf Forest		Tropical dry forest
	Mixed Forest	Tree Cover, needle-leaved, deciduous	Mixed Forest		Tropical shrubland
	<i>Closed Shrublands</i>	Tree Cover, mixed leaf type	Woodland		Tropical desert

CBD Ecosystem themes	IGBP Classes (NASA MODLAND maps)	EU JRC GLC2000	U. Maryland Classes (NASA MODLAND maps)	U. Maryland %Tree Cover (NASA MODLAND product)	FRA
	<i>Open Shrublands</i>	Tree Cover, regularly flooded, fresh water	Closed Shrubland		Tropical mountain system
	<i>Woody Savannas</i>	Tree Cover, regularly flooded, saline water	<i>Wooded Grassland</i>		Subtropical humid forest
	<i>Forests / Agricultural lands</i>	Shrub Cover, closed-open, deciduous	<i>Open Shrubland</i>		Subtropical dry forest
		Regularly flooded shrub and/or herbaceous cover			Subtropical steppe
		Tree Cover, burnt			Subtropical desert
		<i>Mosaic: Tree Cover / Other natural vegetation</i>			Subtropical mountain system
		<i>Shrub Cover, closed-open, evergreen</i>			Temperate oceanic forest
		<i>Mosaic: Cropland / Tree Cover / Other natural vege</i>			Temperate continental forest
		<i>Mosaic: Cropland / Shrub and/or grass cover</i>			Temperate steppe
					Temperate desert
Inland Waters	Permanent Wetlands	Water Bodies	Water Bodies	Water	Temperate mountain system
Islands	IGBP Water Bodies				Boreal coniferous forest
Marine and Coastal Zones					Boreal tundra woodland
Mountains					Boreal mountain system
None	Snow and Ice	Snow and Ice			
	Urban and Built-up	Artificial surfaces and associated areas	Urban and Built-up		

Appendix 5

**IMPORTANT SATELLITE LAND COVER PRODUCTS OF POTENTIAL RELEVANCE TO
THE CONVENTION ON BIOLOGICAL DIVERSITY**

In general:

Coarse-resolution data (8 km - 1 deg.) and derived products exist globally since 1981 (AVHRR-based). No cost.

Medium-resolution data (250 m - 1 km) and derived products exist globally since 2002 (MODIS, SPOT Veg.). No cost.

High-resolution data (30 m - 80 m) have been collected globally since 1972 (eg Landsat series). Zero cost for 1 global (but partly cloudy) coverage of Landsat for ~1975, ~1990 and ~2000.

Very-high resolution (<10 m - 0.5 m) data exist from SPOT (2.5m - 10 m) and various commercial sources, but are more appropriate for site studies and are too costly and too voluminous to be practical for national-level inventories.

**** Note:** There is a big difference between availability of raw satellite image data and derived products such as land cover classifications. In my view we are currently in an excellent state of raw data availability thanks to resources dedicated to continuous data acquisitions and archiving and ease of user accessibility. The latter must all be maintained. We are in OK status in terms of several existing global maps of habitat cover. We are lacking dedicated resources to ensure that several global estimates of habitat cover and specifically habitat change will be regularly produced. Global habitat cover and change is too important to leave to one estimate. A relatively small investment, compared to data acquisition and archiving, could easily resolve this.

Existing habitat cover ('land cover') estimates (as of 10-19-04).

1. FAO FRA 2000 estimates of forest cover

- Forest defined as > 10 % tree canopy cover, area > 0.5 ha, trees able to reach minimum of 5 m in height, absence of other predominant land use.
- Country statistics (status and changes 1990 and 2000) based on national reports, forest resource inventories etc.
- Mapping and area estimates from remote sensing imagery for the pan-tropical region (stratified random sampling (10 %) of tropical forests through 177 sample units representing 87 percent of the tropical regions). Use of time series of Landsat imageries (1980, 1990, 2000) classified by FAO to assess forest status and changes over time (1980-1990 and 1990-2000) at regional level.
- World forest map 2000 based on AVHRR data.

Estimates of forest cover and forest cover change available in the future:

- Country statistics based on national reports, forest inventories etc. (2005 and 2010)
- Estimates of change at regional/global level based on sample of satellite data for 10x10 km plots at 1 degr. latitude, 1 degr. longitude intersections equalling 1% area sample proposed for FRA 2010. Funding not yet secured.
- World forest map 2010

2. Several maps at 1 km - 8 km for mid-1990s

- Produced by, several NASA-funded universities and USGS.
- Based on AVHRR data from the mid-1990s

- These were the first global maps of cover based on actual observations, now largely replaced by more recent products listed below.
 - Maps at 1 km - 8 km for mid-1990s.
3. Several maps at 0.5 km - 1 km for early-2000s
- Produced by NASA-funded universities and labs and EU's JRC.
 - Based on MODIS and SPOT VEGETATION imagery from 2000 - 2003.
 - Below are specific products:
 - a) Boston U. 1 km global map IGBP class scheme (MODIS)
 - b) Boston U. 1 km global map U. Maryland class scheme (MODIS)
 - c) U Maryland 0.5 km %tree/forest cover (MODIS)
 - d) EU JRC 1km map 'GLC 2000' (SPOT VEG)

Existing habitat change ('land cover') estimates, as of 10-19-04.

4. Global estimates of change
- Only exists for forest cover change
 - FRA 2000, based on stats listed above in (1)
 - EU JRC, for global tropical forests, change estimate for 1990 - 1998 based on sample of high-resolution satellite data. Achard, et al. 2002.
 - U. Maryland global map of deforestation (1 deg. or 0.5 deg. ?), based on AVHRR from 1981-1985 and from 1995-2000.

Existing habitat change ('land cover') estimates to be available by 2006.

5. Global estimates of change in progress
- FAO FRA 2005. Now based on sample of satellite data, classified habitat change, including secondary forests, for 10x10 km boxes at each 1deg. lat. 1deg. lon. intersection, equals a 1% area sample.
 - Boston U. is updating their maps each year. Caveat: not specifically aiming at mapping change but theoretically should reveal change. Continued funding through 2000s uncertain.
 - U. Maryland is updating their maps each year. Caveat: not specifically aiming at mapping change but theoretically should reveal change. Continued funding through 2000s uncertain.
 - U. Maryland cover change product. To be released in early 2005. Specific types of changes mapped, including deforestation. Format and resolution uncertain.
 - EU JRC 'GLC2000'. Likely that this will be updated in the near future, and theoretically change could be estimated from that. To confirm.
6. High-resolution, national - regional maps of change
- All below are based on Landsat data from ~1990 and ~2000.
 - Regions proposed to be completed by end 2005:

Americas:

 - a) Amazonia (Brazil INPE, Conservation Intl.)
 - b) Cerrado (Brazil, INPE?, Conservation Intl.)
 - c) Mata Atlantica (Brazil INPE, SOS Mata Atlantica, Guyra Paraguay, Argentina Fundacion Vida Silvestre)
 - d) Chaco (U. Maryland, Guyra Paraguay)
 - e) Tropical Andes (Conservation Intl., TNC)
 - f) Central America (USAID/NASA SERVIR)
 - g) USA (USFS?, NASA?, USGS?)

h) Canada (Canadian Space Agency?)

Europe & Central Asia:

i) CORINNE (EU JRC? National agencies?)

j) Ex-Soviet Union. None to my knowledge.

k) Middle East. None to my knowledge

Africa:

l) Central Africa (USAID/NASA CARPE project, mainly U. Maryland and Conservation Intl. to process data)

m) W. Africa (1/2 completed by Conservation Intl., seeking to complete)

n) Madagascar (Conservation Intl.)

o) Sahel and southern Africa? None to my knowledge.

Asia:

p) Burma (Smithsonian Inst., Conservation Intl.)

q) Sumatra, Indonesia (Forest Watch Indonesia, Conservation Intl.)

r) Rest of Asia ?

s) Australia & Pacific ?

7. Cross-walking Classification Schemes

- See XI file "CBD_lc_classes.xls"

8. Options for bases for regionalization

- WWF Ecoregions, global coverage, based on various sources on land cover and species composition.

- Udvardy Regions

- Bailey Regions

- Sub-national political boundaries. These could be labeled for their dominant ecosystem, eg in Brazil, states could be assigned to Mata Atlantica, Cerrado, Amazonia.

*Annex III***COMMENTS MADE ON THE GLOBAL BIODIVERSITY OUTLOOK – DRAFT OUTLINE
(ITEM 3.3 OF THE AGENDA)**

1. Attempts should be made to publish the main report in all the official languages of the United Nations and the Secretariat should endeavour to mobilise the necessary resources to meet this requirement.
2. The review process should explore the possibility of organising regional workshops for better inputs in the process. Whilst the electronic medium provides some very cost effective means of undertaking the review process, it nonetheless has some limitations that could be overcome using physical meetings. The two processes complement each other.
3. Section II of the report should include an assessment of the current status of progress in moving towards the 2010 target, the challenges that lie ahead and the level of effort required to overcome these challenges in order to achieve the 2010 target. This section (or section IV) should also demonstrate the amount of effort required to reduce the loss of biodiversity by a certain percentage and provide options, e.g. efforts required to reduce the loss of biodiversity by 5, 20 and 50 %.
4. The agreed indicators for immediate testing should be given high prominence in the report and its executive summary.
5. Consideration should be given to making use of traditional ecological knowledge as a supplementary source of information for supporting the analysis in section II. There exist several examples of this knowledge from various parts of the world.
6. Coordination with the Millennium Ecosystem Assessment would ensure that conclusions and messages are consistent. The GBO would build upon the findings and methods of the Millennium Assessment (which will be reviewed by SBSTTA-10).
7. The issue of cooperation and partnerships between the Convention and other international organizations, initiatives and process is particularly crucial not only to the work of the Convention but also in facilitating the mainstreaming of biodiversity considerations in the work of other organizations and initiatives. The delivery of the key messages about progress towards achieving the 2010 target is a collaborative process and efforts both in achieving, and assessing progress towards, the 2010 target must be characterized as a truly collaborative effort.
8. The report should incorporate “lessons learned” from the experiences of implementation of the Convention and other relevant processes such as the Millennium Ecosystem Assessment.
9. Preparation of the GBO should be aligned with the preparatory work for the open-ended working group on review of implementation of the Convention as well as with the SBSTTA process of testing and developing indicators. The GBO would be reviewed by SBSTTA-11 and, for relevant sections, by the open-ended working group on review of implementation of the Convention. The peer review process should be carried out in such a way as to facilitate the participation of national focal points and experts from all countries, including developing countries
10. Following adoption of the 2010 target by the CBD COP, the target was endorsed by the World’s leaders at WSSD. Given this, the GBO Executive Summary should be sent to every world leader as an interim report on progress in achieving the target, ensuring that the text also has sufficient in it to brief them on the Convention and the actions that it is facilitating.
11. Consideration should be given to the generation of ancillary products and in formats that best serve the needs of target audiences other than COP delegates and the Parties. This will also entail making use of different media to disseminate the key messages emerging from the GBO assessments. This has cost implications and the Secretariat should therefore catalyse the necessary funding support to cover

these costs. One approach would be to consult individual Parties and solicit their contributions in support of this process.

12. Close linkages and coordination with the UNEP GEO process is particularly crucial. The presence of a GEO representative on the GBO Advisory Group is perhaps the best mechanism to ensure that this coordination is maintained to identify and avoid potential overlaps, contradictions and inconsistencies in key messages to be delivered by the two reports.

13. The GBO process should be supported by a comprehensive and effective communication strategy that covers both the overall production process and the wide dissemination of the key findings and messages. This strategy should be in place now in order to publicize the expected outputs and thus raise the profile of the process amongst the Parties, international organizations, international and national NGOs and other key partners in the biodiversity community. This will also be crucial in efforts to raise funds for production of the report.

14. The GBO should be made available in electronic format through the CBD website.

15. In view of the mandate provided by decision VII/30 particularly with respect to the GBO report serving as a mechanism for providing an assessment of progress towards the achievement of the 2010 target and the need to communicate this at the global level, it would appear that the GBO-2 report, has assumed a high profile as a flagship publication on the 2010 target. In this regard, the mobilisation of funding for the report is a top priority for the Secretariat as is the available time to publish it. A plea was made to members of the AHTEG to give this issue serious attention and consider using their individual and collective “efforts” to support the fund raising activity.

16. An additional approach for consideration in raising the necessary funding for the GBO production process is to request SBSTTA to recommend to developed countries to provide contributions to this process. This should be supplemented with individual requests to Parties to contribute to this effort. Additional funding requests should be sent to donor agencies including the Global Environment Facility. A detailed work schedule with cost estimates should be submitted together with these requests.

17. In addition to the submission of their third national reports, some parties have supplementary information that could serve to provide pertinent examples in the analysis and presentation of national perspectives in some sections of the report. The Secretariat should send out requests to parties to provide such information wherever it exists. This could be considered as a form of institutional support to the GBO-2 production process.

18. Concern was raised about the response rate of submission of national reports and the relevance of the information for assessing biodiversity status and trends. It was also felt that the format for the third national reports is burdensome and may pose additional delays in the timely submission of these reports.

19. The members of the AHTEG offered to assist in the review of relevant sections of the GBO. The Secretariat was also requested to consider co-opting some members of the AHTEG (on Indicators for assessing progress towards the 2010 biodiversity target) into the existing GBO Advisory Group to provide additional expertise and continuity in the review of the application and analysis of the identified indicators in the GBO report.

Annex IV

**INDICATORS RELEVANT TO THE 2010 GOALS AND SUB-TARGETS
(ITEM 4 OF THE AGENDA)**

GOALS AND TARGETS	RELEVANT HEADLINE INDICATORS
Protect the components of biodiversity	
Goal 1. Promote the conservation of the biological diversity of ecosystems, habitats and biomes	
Target 1.1: At least 10% of each of the world's ecological regions effectively conserved.	Most relevant indicator: <ul style="list-style-type: none"> • Coverage of protected areas Other relevant indicators: <ul style="list-style-type: none"> • Trends in extent of selected biomes, ecosystems and habitats • Trends in abundance and distribution of selected species
Target 1.2: Areas of particular importance to biodiversity protected	Relevant indicators: <ul style="list-style-type: none"> • Trends in extent of selected biomes, ecosystems and habitats • Trends in abundance and distribution of selected species • Coverage of protected areas
Goal 2. Promote the conservation of species diversity	
Target 2.1: Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups	Most relevant indicator: <ul style="list-style-type: none"> • Trends in abundance and distribution of selected species Other relevant indicator: <ul style="list-style-type: none"> • Change in status of threatened species
Target 2.2: Status of threatened species improved.	Most relevant indicator: <ul style="list-style-type: none"> • Change in status of threatened species Other relevant indicators: <ul style="list-style-type: none"> • Trends in abundance and distribution of selected species • Coverage of protected areas
Goal 3. Promote the conservation of genetic diversity	
Target 3.1: Genetic diversity of crops, livestock, and of harvested species of trees, fish and wildlife and other valuable species conserved, and associated indigenous and local knowledge maintained.	Most relevant indicator: <ul style="list-style-type: none"> • Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socio-economic importance Other relevant indicators: <ul style="list-style-type: none"> • <i>Biodiversity used in food and medicine (indicator under development)</i> • Trends in abundance and distribution of selected species

GOALS AND TARGETS	RELEVANT HEADLINE INDICATORS
Promote sustainable use	
Goal 4. Promote sustainable use and consumption.	
Target 4.1: Biodiversity-based products derived from sources that are sustainably managed, and Production areas managed consistent with the conservation of biodiversity.	<p>Most relevant indicators:</p> <ul style="list-style-type: none"> • Area of forest, agricultural and aquaculture ecosystems under sustainable management • <i>Proportion of products derived from sustainable sources (indicator under development)</i> <p>Other relevant indicators:</p> <ul style="list-style-type: none"> • Trends in abundance and distribution of selected species • Marine trophic index • Nitrogen deposition • Water quality in aquatic ecosystems
Target 4.2 Unsustainable consumption, of biological resources, or that impacts upon biodiversity, reduced	<p>Relevant indicator:</p> <ul style="list-style-type: none"> • none assigned
Target 4.3: No species of wild flora or fauna endangered by international trade	<p>Most relevant indicator:</p> <ul style="list-style-type: none"> • Change in status of threatened species
Address threats to biodiversity	
Goal 5. Pressures from habitat loss, land use change and degradation, and unsustainable water use, reduced.	
Target 5.1: Rate of loss and degradation of natural habitats decreased	<p>Most relevant indicator:</p> <ul style="list-style-type: none"> • Trends in extent of selected biomes, ecosystems and habitats <p>Other relevant indicators:</p> <ul style="list-style-type: none"> • Trends in abundance and distribution of selected species • Marine trophic index
Goal 6. Control threats from invasive alien species	
Target 6.1: Pathways for major potential alien invasive species controlled.	<p>Relevant indicator:</p> <ul style="list-style-type: none"> • Numbers and cost of alien invasions
Target 6. 2: Management plans in place for major alien species that threaten ecosystems, habitats or species.	<p>Relevant indicator:</p> <ul style="list-style-type: none"> • Numbers and cost of alien invasions
Goal 7. Address challenges to biodiversity from climate change, and pollution	
Target 7.1: Maintain and enhance resilience of the components of biodiversity to adapt to climate change	<p>Relevant indicator:</p> <ul style="list-style-type: none"> • Connectivity/fragmentation of ecosystems
Target 7.2: Reduce pollution and its impacts on biodiversity	<p>Nitrogen deposition</p> <p>Water quality in aquatic ecosystems</p>

GOALS AND TARGETS	RELEVANT HEADLINE INDICATORS
Maintain goods and services from biodiversity to support human well-being	
Goal 8. Maintain capacity of ecosystems to deliver goods and services and support livelihoods	
Target 8.1: Capacity of ecosystems to deliver goods and services maintained.	Relevant indicators: <ul style="list-style-type: none"> • <i>Biodiversity used in food and medicine (indicator under development)</i> • Water quality in aquatic ecosystems • Marine trophic index
Target 8.2: biological resources that support sustainable livelihoods, local food security and health care, especially of poor people maintained	Most relevant indicator: <ul style="list-style-type: none"> • Health and well-being of communities who depend directly on local ecosystem goods and services Other relevant indicator: <ul style="list-style-type: none"> • <i>Biodiversity used in food and medicine</i>
Protect traditional knowledge, innovations and practices	
Goal 9 Maintain socio-cultural diversity of indigenous and local communities	
Target 9.1 Protect traditional knowledge, innovations and practices	Most relevant indicator: <ul style="list-style-type: none"> • Status and trends of linguistic diversity and numbers of speakers of indigenous languages Other relevant indicator: <ul style="list-style-type: none"> • <i>Additional indicators to be developed</i>
Target 9.2: Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit sharing	<i>Indicator to be developed</i>
Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources	
Goal 10. Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources	
Target 10.1: All transfers of genetic resources are in line with the Convention on Biological Diversity, the International Treaty on Plant Genetic Resources for Food and Agriculture and other applicable agreements.	<i>Indicator to be developed</i>
Target 10.2: Benefits arising from the commercial and other utilization of genetic resources shared with the countries providing such resources	<i>Indicator to be developed</i>
Ensure provision of adequate resources	
Goal 11: Parties have improved financial, human, scientific, technical and technological capacity to implement the Convention	
Target 11.1: New and additional financial resources are transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with Article 20.	Most relevant indicator: <ul style="list-style-type: none"> • Official development assistance provided in support of the Convention

GOALS AND TARGETS	RELEVANT HEADLINE INDICATORS
<i>Target 11.2: Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with its Article 20, paragraph</i>	<i>Indicator to be developed</i>

*Annex V***LIST OF ACRONYMS AND ABBREVIATIONS**

AHTEG	Ad Hoc Technical Expert Group
AVHRR	Advanced Very High Resolution Radiometer
CBD	Convention on Biological Diversity
CGIAR	Consultative Group on International Agricultural Research
CI	Conservation International
CI/CABS	Center for Applied Biodiversity Science at Conservation International
CMS	Convention on Migratory Species
COP	Conference of the Parties
DAC	Development Co-operation Directorate of OECD
DADIS	Domestic Animal Diversity Information System of FAO
EGTT	Expert Group on Technology Transfer
ELCI	Environment Liaison Centre International
EU-JRC	Joint Research Centre of the European Union
FAO	Food and Agriculture Organization of the United Nations
FRA	Forest Resources Assessment of FAO
FSC	Forest Stewardship Council
GBO	Global Biodiversity Outlook
GCRMN	Global Coral Reef Monitoring Network
GDEV	Genetic diversity, genetic erosion and genetic vulnerability
GEF	Global Environment Facility
GEMS	Global Environment Monitoring System
GISP	Global Invasive Species Programme
GLC2000	Global Landcover Classification for the year 2000, prepared by the EU-JRC
IBA	Important Bird Area
IGBP	International Geosphere-Biosphere Program
ISSG	Invasive Species Specialist Group of IUCN
INI	International Nitrogen Initiative: a joint programme of SCOPE and IGBP
IPGRI	International Plant Genetic Resources Institute
ISO	International Organization for Standardization
IUCN	The World Conservation Union
IUFRO	International Union of Forest Research Organizations
LADA	Land Degradation Assessment in Drylands, a project of FAO
LPI	Living Planet Index
MA	Millennium Ecosystem Assessment
MDGs	Millennium Development Goals
MODIS	Moderate-resolution Imaging Spectroradiometer
MSC	Marine Stewardship Council
MTI	Marine trophic index
NASA	National Aeronautics and Space Administration
NCI	Natural Capital Index
NGO	non-governmental organization
OECD	Organisation for Economic Co-operation and Development
PA	protected area
PGFRA	Plant Genetic Resources for Food and Agriculture
RLI	Red List Index
SBSTTA	Subsidiary Body on Scientific Technical and Technological Advice
SCOPE	Scientific Committee on Problems of the Environment

SI	The Smithsonian Institution
SIDS	Small Island Developing State
SOW1	First Report on the State of the World's Plant Genetic Resources for Food and Agriculture. FAO, Rome 1997.
SPOT	Satellite Probatoire d'Observation de la Terre
SSC	Species Survival Commission of IUCN
STI	Species Assemblage Trend Indices
STRP	Scientific and Technical Review Panel of the Ramsar Convention
TNC	The Nature Conservancy
UBC	University of British Columbia
UNCED	United Nations Conference on Environment and Development (Rio de Janeiro, 3-14 June 1992)
UNEP	United Nations Environment Programme
UNEP-WCMC	World Conservation Monitoring Centre
UNESCO	United Nations Educational, Scientific and Cultural Organization
UQAM	Université de Québec à Montréal
USDA-FS	United States Department of Agriculture, Forest Service
WCPA	World Commission on Protected Areas of IUCN
WDPA	World Database on Protected Areas
WDPA	World Database on Protected Areas
WEOG	Western European and others group
WG	Working group
WG-8j	Ad Hoc Open-ended Working Group on Article 8(j) and Related Provisions
WG-ABS	Ad Hoc Open-ended Working Group on Access and Benefit-sharing
WHO	World Health Organization
WIEWS	World Information and Early Warning System on PGRFA
WSSD	World Summit on Sustainable Development
WWF	WWF – the Conservation Organization (formerly: World Wide Fund for Nature)
