

Millennium Ecosystem Assessment

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Millennium Ecosystem Assessment Survey of Initial Impacts

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Executive Summary

Close to one year after the release of the core Millennium Ecosystem Assessment (MA) findings in March 2005, and one month after the release of the technical assessment reports in January 2006, a survey of individuals involved in the MA process provides widespread evidence that the assessment is having an impact on the intended audiences, but the extent of that impact is very mixed, with some institutions, regions, countries, and sectors significantly influenced by the MA while others have not been influenced at all.

¹ This draft incorporates minor edits made in May 2006.

Offices: IEG India | SCOPE France | UNEP Kenya | UNEP-WCMC UK | WRI & Meridian Institute USA | RIVM Netherlands | WorldFish Center Malaysia



Specifically:

- *Conventions:* The MA has had a significant impact on the Convention on Biological Diversity and the Ramsar Convention on Wetlands. A substantial amount of MA information and material has been utilized in decisions and recommendations taken by both of these conventions. There has been less impact on the Convention to Combat Desertification.
- *Regional, National, and Sub-national governments:* Among governments, the impact of the MA appears to be greatest in regions and countries where MA sub-global assessments were conducted, including the Caribbean, South Africa, China, Sweden, and Norway, although significant impacts are also noted in regions and countries that did not undertake sub-global assessments such as the European Union, U.K. and France. At a national level, there is little evidence of impact among several other economically and politically influential countries, including the U.S., India, Japan, and Brazil.
- *Business:* The MA findings were well-received by business journalists but the impact to date in the business sector has been relatively limited. The most significant impact of the MA within business and industry is the incorporation of the concept of ecosystem services in the environmental policy issued by Goldman Sachs in November 2005. The World Business Council for Sustainable Development is also working with companies on MA follow-up activities.
- *Donors:* The MA has had a notable impact on multi-lateral (particularly GEF) and bilateral (particularly Scandinavian countries) donors and to a lesser extent on foundations.
- *NGOs.* The MA has had a notable impact on international conservation-oriented NGOs but much less impact on national NGOs. To date, there is no evidence of any impact on NGOs focused on development, poverty reduction, or health issues.
- *International Agencies.* All of the UN agencies involved in the MA process (UNEP, UNDP, FAO, WHO, and UNESCO) have incorporated the MA findings and process into their activities. There appears to have been no impact at all within the Bretton Woods Institutions.
- *Capacity Building.* The MA sub-global assessments and the MA fellows program were the primary mechanisms established by the MA to build assessment capacity and these were generally successful. A handful of additional training and capacity building activities have been established by partners and by experts involved in the MA.
- *Education.* MA materials are being used extensively in University courses and curricula. There is less evidence of use at other levels of education.
- *Scientific Research.* The MA is having a notable impact on research directions and priorities.

It would be unrealistic to attempt a complete evaluation of the impact of the MA for at least another year since some reports are only now being released and several processes (such as convention negotiations) that the MA sought to inform will be taking important decisions related to the MA over the next year. Even so, based on perceptions of its preliminary impact, the MA is being viewed by some to have been a success. In December 2005, for example, the MA was awarded the Zayed International Prize for the Environment. The Jury indicated that “the success of the MA set a standard for monitoring and evaluating environmental change and its impact on sustainability of life on our fragile planet.” Similarly, The World Economic Forum, in its 2006 Global Governance Initiative Annual Report, recognized the Millennium Ecosystem Assessment as one of the ‘heroes’ in 2005 in the category of the environment. On the other hand, others involved in the MA process have stated that “the MA has had zero impact on policy”. Based on the preliminary impact described here, it appears that both perspectives may be correct depending on the region and sector being considered. Differences in perspectives regarding the overall impact exist in part because of striking regional and national differences in the attention that governments

and the media have given to the MA and because of differences in the use of the findings among different institutions and sectors.

I. Introduction

The core findings of the Millennium Ecosystem Assessment, published in the reports “*Ecosystems and Human Well-being: Synthesis*” and “*Living Beyond our Means*” were released on March 30, 2005 at press briefings and seminars in London, Washington DC, Tokyo, Beijing, Delhi, Cairo, Nairobi, Rome, Paris, Stockholm, Lisbon, Brasilia and Sao Paulo. Between May and November 2005, five additional MA Synthesis reports were released (on Biodiversity, Business, Desertification, Wetlands, and Human Health) and the four full MA technical volumes were released on January 19, 2006.

It will be several years from the time of release of the MA reports before a full evaluation of the impact of the MA can be carried out. However, now that one year has passed since the release of the core MA findings (and nearly three years since the release of the first MA publication: *Ecosystems and Human Well-being: A Framework for Assessment*) this paper provides interim information on the extent to which the MA is being used to inform decision-making and, to a lesser extent, on the extent to which the MA succeeded in building capacity to undertake integrated ecosystem assessments.

The MA project secretariat was fully funded only through March 2005 and there was no centralized means of monitoring the adoption and use of MA findings during 2005 and 2006. This report is based on personal observations and on information provided by MA ‘stakeholders’ (authors, review editors, board and panel members, national focal points of conventions) in response to an e-mail distributed on November 17, 2005 requesting information on the “use of the MA findings (global or sub-global) or of the adoption or application of the MA process or conceptual framework.” That e-mail request included the following examples of the types of impacts that would be of interest:

- Evidence that a new policy, program, study, or process is being considered by an agency, government, business, foundation or NGO as a result of the MA release or as a result of a MA sub-global assessment.
- Design of a new ecosystem assessment process or ecosystem service audit modeled on the MA or stimulated by the MA.
- Development of a new funding program or research grant program stimulated by the MA.
- Evidence of changes in priorities being considered by an agency, government, NGO, environmental foundation, or business as a result of the MA findings or MA sub-global findings.
- New decisions taken in intergovernmental bodies responding to the MA findings.
- Changes to reporting processes, environmental data reports, or monitoring systems in response to the MA or MA sub-global assessments.
- Use of the MA conceptual framework, approach, or findings in other studies, reports or assessments.
- Use of the MA in university courses or seminar series.
- Application of MA information in curricula, use in environmental education, use in NGO outreach or campaigns, use in documentaries.
- New research projects stimulated by the MA (or that resulted from your involvement in the MA).

The information in this report is not comprehensive and the report relies heavily on the perceptions of respondents regarding the apparent impact of the MA. This type of survey thus includes some risk of bias, since the respondents were often individuals engaged in the assessment process. Nevertheless, the information does provide insights into the preliminary impact of the MA.

In addition to information regarding the MA impact, this report includes a brief description of the MA outreach undertaken in 2005 (Annex 1), outreach activities undertaken independently by authors and others involved in the process (Annex 2), and publications stemming from the MA (Annex 3).

II. Conventions

The MA would not have been established had not three conventions – the Convention on Biological Diversity (CBD), Convention to Combat Desertification (UNCCD) and the Ramsar Convention on Wetlands – taken decisions: a) endorsing the establishment of the assessment; b) appointing representatives to the Board of the MA (in each case, the Executive Secretary of the Convention and the Chair of the scientific body), and c) requesting specific information from the Assessment.² As a result, while the MA sought to reach a very broad range of decision-makers, these three conventions were nevertheless the first priority for outreach and engagement activities. The MA regularly gave progress reports to the conventions (including regular plenary presentations in the CBD), organized side events, and prepared separate synthesis reports for each of the three conventions.

In the case of the CBD and Ramsar convention, the impact of the MA has already been significant with a substantial amount of MA information and material being adopted by the parties to the conventions. More specifically,

- The **Convention on Biological Diversity** Subsidiary Body on Scientific, Technical, and Technological Advice provided detailed review comments on the MA biodiversity synthesis at its 10th meeting and the parties adopted recommendation X/4 (UNEP/CBD/COP/8/3) “Implications of The Findings of the Millennium Ecosystem Assessment for the Future Work of the Convention” at its 11th meeting in November 2005 (See Annex 4). At that meeting of SBSTTA, there was broad support for the global MA findings and the process that had produced them, and wide recognition of the various ongoing sub-global assessments. The MA was referred to in a number of other discussions and interventions during the week. There was particularly strong support from countries with MA sub-global assessments underway, (esp. Peru, Norway, Sweden, China), as well as the Czech Republic, Slovenia, and the U.K. Brazil, Argentina, and Australia had some reservations stemming from the fact that the MA was not a formally negotiated text. There was a wide recognition that SBSTTA needs processes like the MA to feed into its discussions, and a commitment to review the evaluation of the MA in 2007 to see how future processes might be undertaken.
- The **Ramsar Convention on Wetlands** adapted and incorporated a considerable amount of the conceptual framework of the MA into its elaboration of the meaning of key concepts underpinning the convention including the “wise use” of wetlands and the “maintenance the ecological character of wetlands.” (See Annex 5.) In the discussions at the Ramsar COP in November 2005, there was resistance to accepting the term “services” in the context of “ecosystem services.” In the end, Parties approved the term “benefits/services” to be used throughout Ramsar materials. (Contact: Nick Davidson, davidson@ramsar.org)

The impact of the MA on the **Convention to Combat Desertification** was less significant, in that findings of the MA have not been translated into specific decision-language by the parties to the convention. The MA Desertification Synthesis Report was warmly received at the UNCCD COP7 (Nairobi; 17-28 October 2005) after a presentation to the plenary session of the Committee on Science Technology. Subsequently, in a formal decision (see Annex 6), the parties endorsed the report and encouraged its parties to use the findings from the report in efforts to address desertification (Annex 6.) (Contact: Zafar Adeel, adeelz@inweh.unu.edu; Uriel Safriel, uriel@vms.huji.ac.il)

² The Convention on Migratory Species later also took a similar decision after the MA was established.

III. Regional, National and Sub-National Governments

Decisions taken directly by national, state, or local governments have a more direct impact on ecosystems and biodiversity than decisions of international conventions (although convention decisions can stimulate and guide national or sub-national decisions). To date, the impact of the MA at these levels of government is very mixed. This type of impact is also difficult to accurately assess through a survey of this nature. Among governments, the impact of the MA appears to be greatest in regions and countries where MA sub-global assessments were conducted, including the Caribbean, South Africa, China, Sweden, and Norway, although significant impacts are also noted in regions and countries that did not undertake sub-global assessments such as the European Union, U.K. and France. At a national level, there is little evidence of impact among several other economically and politically influential countries, including the U.S., India, Japan, and Brazil. (In several countries where national governments have not been influenced, however, impacts have been seen at a sub-national level or with business and NGOs.)

Regional Governments

- The **Ministers of Environment of Latin America and the Caribbean**, at their October 2005 meeting, took a decision requesting the further development of capacity and methodologies to carry out assessments like the MA at country and sub-regional levels and encouraging participation in the follow-up activities to Caribbean Sea Assessment. (See Annex 7.)
- The **Nordic Council of (Environment) Ministers** has commissioned the Norwegian Ministry of Environment to convene a workshop to explore follow-up to the MA in international environmental cooperation as well as development policy. The workshop will be held as a Theme Forum on Biodiversity and the MA at the International Environmental Governance, Incentives and Capacity-Building under the International Association of Impact Assessment (IAIA) Conference to be convened in Stavanger, Norway on 23-27 May. (http://www.iaia.org/Non_Members/Conference/IAIA06/Conf_main_page/index.html) (Contact: Leif John Fosse; LeifJohn.Fosse@md.dep.no).
- The **European Environment Agency** indicated at a meeting in early March 2006 that it planned to use the MA conceptual framework when preparing the State of the Environment 2010 (SOE-2010) report on biodiversity.
- Henrique Pereira (hpereira@ist.utl.pt) reports that the **European Union** is using the MA framework and results in several reports and policy decisions relating to the biodiversity 2010 target and biodiversity conservation at large. For instance the Institute for European Environmental Policy (IEEP) is conducting a study for the European Commission (DG Environment) on the value of biodiversity in the EU and part of the study uses the MA framework. The background document for the consultation on the 2010 biodiversity target uses the conclusions of the MA Board Statement.

Finland is chairing the EU Presidency beginning in July 2006 and is arranging an informal ministerial meeting in July. The findings of the Millennium Ecosystem Assessment will be reflected in one of the discussion papers prepared for this meeting and Finland has invited a presentation from the MA. (Contact: Taina Nikula, Senior Advisor, Ministry of the Environment, Taina.Nikula@ymparisto.fi)

National Governments

- In **China**, Dr. Liu Yanhua, the Vice- Minister of the Ministry of Science and Technology, has announced on two occasions that China will launch a national program dealing with ecosystem assessment during 2006-2010. The research group that carried out the Western China Millennium Ecosystem Assessment, led by Prof. Jiyuan Liu, has submitted a proposal for an

Integrated Ecosystem Assessment of China (IEAC) to MOST for this work. This proposal includes 4 aspects: (1) to complete the Integrated Ecosystem Assessment System for supporting decision-makings of local and central governments, (2) to carry out China Ecosystem Service Assessment, (3) to conduct typical studies in several newly selected areas on local levels, (4) to promote establishment of the MA Asia-Pacific Sub-global institution in Beijing. The IEAC project would be carried out under MA conceptual framework and focus on: a) the headwater region of the Yangtze, Yellow, and Lancang rivers in Qinghai province (three-river-source area); b) Poyang Lake Basin in Jianxi province; and, c) serious soil erosion area in Gansu province. The project has the support of the Qinghai provincial government and the Institute of Geographical Sciences and Natural Resources Research (IGSNRR). (Contact Tian Xiang Yue, yue@reis.ac.cn).

- The Minister of Ecology and Environment in **France** has decided that France will undertake a national Millennium Ecosystem Assessment. All French authors of the MA are being invited to a meeting with the ministry, to draw lessons from the MA and see how best to implement a national study. (Contacts: Dr. Anne-Marie Izac, a.izac@cgiar.org and Dr. Patrick Lavelle, Patrick.Lavelle@bondy.ird.fr).
- Within the **United Kingdom**, the Department for Environment, Food and Rural Affairs (DEFRA) has used the MA methodology to develop draft environmental reporting guidelines for UK companies. (The consultation draft can be found at <http://www.defra.gov.uk/corporate/consult/envrep-kpi/index.htm>; the section which references the MA methodology is on p.13-14.) (Contact: David Capper; DEFRA, David.Capper@defra.gsi.gov.uk). DEFRA has also posted a web page (<http://www.defra.gov.uk/wildlife-countryside/natres/millennium-ecosystem.htm>) on the MA

Heather Blake (heather.blake@DEFRA.GSI.GOV.UK), with a unit in DEFRA responsible for strategic policy on the natural environment indicates that the MA “has definitely influenced our team's thinking and has also influenced some of the scoping studies we have commissioned, particularly a study on Pressures on the Natural Environment (NR0104) which has used the MA as a conceptual framework. (<http://www.defra.gov.uk/wildlife-countryside/natres/index.htm>; <http://www.defra.gov.uk/wildlife-countryside/natres/evidence.htm>)

There have been several discussions of the MA in the U.K. Parliament. On 7 April 2005, Hilary Benn, the Secretary of State for International Development was asked about the implications of the MA for DFID and replied:

“The Department for International Development (DFID) welcomes the launch of "Millennium Ecosystem Assessment" (MA). The report provides a useful and comprehensive overview of recent trends in ecosystem function. The detailed findings of the MA will further strengthen the evidence base for addressing the linkages between poverty and environment. DFID officials have reviewed the main findings of the MA Synthesis Report. They welcome the MA's detailed overview of the status of ecosystems and the consideration of change under different scenarios. The MA responses of particular interest to DFID include those on: strengthening the integration of environmental considerations in development co-operation; developing markets and economic based incentives for more sustainable ecosystem use; and the research and application of appropriate technologies. This will support development and improvement of tools to better integrate environmental considerations into development co-operation. ... DFID will encourage the agencies involved in commissioning the report, including the Food and Agriculture Organisation (FAO) and the Secretariats of the Conventions (in particular the Convention on Biological Diversity and the Framework Convention on Climate Change), to use the MA's analyses and results to inform their policy and implementation work.”

The MA was again discussed in a meeting involving Ian Johnson (World Bank) and Hilary Benn in the House of Commons on 7 February 2006. The UK Treasury has also been briefed on the MA. Another respondent from the U.K., however, wrote “I am not aware of any major use being made of the MA, but I have seen it referred to in several documents/reviews I have refereed.”

The U.K. Global Environmental Change Committee held a workshop “Evaluating the Millennium Ecosystem Assessment: messages, knowledge gaps, and policy implications” on 3 February 2006 in London. The group made a number of recommendations about carrying the work forward.

The MA scenarios were used to inform the horizon-scanning group that DFID set up to develop scenarios for 'wind-tunneling' the UK's new White Paper on aid. (Contact: Steve Bass, Steve.Bass@iied.org)

- In **Mexico** an evaluation of the biodiversity of the country is underway following the structure of the MA. It is planned to be completed by 2006 with CONABIO taking the lead. (Contact: Jose Sarukhan, sarukhan@servidor.unam.mx).
- The National Academy of Science and Technology of the **Philippines** – through a project to produce a modernization and competitiveness plan for Philippine agriculture into the year 2020 – has anchored the entire plan on the MA framework, process and findings. The development of the plan involves over 500 scientists, industry practitioners, NGO representatives, and government staff, doing an assessment of 14 key industry clusters of Philippine agriculture and primary productivity (including forestry and fisheries) and identifying how they can become more competitive and improve their ability to combat poverty in the country, into the next 15 years when certain changes are likely to occur in the planet's ecosystem services. The plan is expected to be presented to the Cabinet by April 2006. (Contact: Ben Malayang, beniim@yahoo.com.) In contrast, another individual from the Philippines reported that “[u]nfortunately, there is hardly any impact of the release of the Millennium Ecosystem Findings here in the Philippines.” (Contact: Carlo Custodio, custodiocarlo@yahoo.com)
- In **South Africa**, information from the Southern African MA (SAfMA) has been incorporated in the South Africa National Biodiversity Strategy. (Contact: Belinda Reyers, breyers@csir.co.za.) Phoebe Barnard at the South African National Biodiversity Institute (Barnard@sanbi.org) reports: “I believe that multiple agencies in southern Africa, including the South African National Biodiversity Institute, South African national and provincial environment agencies, and Namibian national environment agency are all increasingly incorporating the ES& HWB approach in their work. This is probably still too dependent on the influence of individuals and is insufficiently institutionalized – so policy and legislative changes need to follow.”
- Within the **Netherlands**, the MA findings “are considered as a key reference/basis for International and National environmental policies, for instance in the currently developed Netherlands 'Future Agenda for the Environment' and also in the Dutch Biodiversity policy.” (Contact: Henk Simons, henk.simons@iucn.nl.) A debate on Sustainable Development held in parliament in September 2005 used the MA findings as a main point of reference.
- In **India**, the MA Board Statement and Synthesis Report were presented to the Vice Chairman of the Planning Commission of India who received the papers on behalf of the Prime Minister. The Vice Chairman assured that due consideration would be given to the recommendations. The secretary of the Ministry of Environment & Forests also supported his statements. But, as of

November 2005 there appears to be no follow-up action by the Government of India. Ashish Kothari reports: "I have not heard of much activity on behalf of the government [of India] on [the MA]." (Contact: Ashish Kothari, ashishkothari@vsnl.com)

- The Danish Foreign Office of the government of **Denmark** is holding a conference on "Managing Ecosystems to Fight Poverty." What can be Learned from the UN Millennium Ecosystem Assessment?" in Copenhagen on 26 April 2006, organized jointly with the World Conservation Union (IUCN). Among the speakers are Ulla Tørnæs, Minister for Development Cooperation, Achim Steiner, Director General of IUCN, and Howard Shapiro, Chief Scientist of Mars Inc. For further details please see the attached Draft Programme. (Contact: Department for Environment and Sustainable Development, MIL@um.dk).
- In **Russia**, the government is considering proposals to carry out ecosystem assessments. (Contact: Valery Orlov, Ministry of Natural Resources.)
- The Ministry of Environment of **Portugal** has asked Henrique Pereira (hpereira@ist.utl.pt) to conduct a consultation of the civil society and private sector on the implementation of the Convention on Biological Diversity for the third national report, using the same methodology used in the Portugal sub-global Millennium Assessment.
- In **Argentina**, Ernesto Viglizzo reports that the MA approach linking ecosystem services to human well-being (and factors affecting them) contributed to several presentations in a late-2005 meeting of the Consejo Federal del Medio Ambiente (COFEMA -- a national council consisting of the provincial ministers of environment and the national government) held in Jujuy, Argentina. (Contact: Ernesto Viglizzo, evigliz@cpenet.com.ar)
- In **Germany**, the German Advisory Council on Global Change (WBGU), in its report "Development needs Environmental Protection: Recommendations for the Millennium + 5 Summit" stated: "By contrast, WBGU underlines that global environmental policy cannot be peripheral to, but must be at the heart of, the MDG strategy. The highly respected environmental advisory bodies set up by the UN – the Intergovernmental Panel on Climate Change (IPCC) and the Millennium Ecosystem Assessment (MA) – have convincingly demonstrated, in their reports, that unless countermeasures are taken, the impacts of global environmental changes will threaten human existence to an even greater extent in future."
- In **Sweden**, the government has made reference to MA on several occasions. They have specifically expressed that strategies and actions related to the marine environment should be based on an ecosystem approach addressing relevant ecosystem services. The Swedish Board of Fisheries has decided to have the MA principles and the ecosystem approach as the overarching principle for our vision and strategies. (Contact: Axel Wenblad, axel.wenblad@fiskeriverket.se).
- In the **United States**, no respondent reported any use of the MA findings in US national policy. Jeff McNeely reports "It is remarkable how little impact the MA has had in some parts of the world where one would have expected a significant impact, notably the US (Contact: Jeff McNeely, JAM@iucn.org). The MA is, however, being used in a report from the Science Advisory Board of the US Environmental Protection Agency that will provide guidance to the EPA on the issue of valuation of ecosystems. The lack of visible impact of the MA in the United States apparently does not mean that the MA has gone without notice in the government. One respondent reported: "There is a rather lively USG [US Government] discussion about the future of the MA – there are apparently those in the WH (CEQ) [White House (Council on

Environmental Quality)] who are not happy with some of the findings, particularly as they relate to the impacts of climate change...”.

- Ellen Woodley (tegwood@albedo.net) heard from **Parks Canada** that they have not heard much about the MA results - that they were surprised there was not more outreach and visibility.

Sub-national

- In the **Limpopo Province of South Africa**, the office responsible for State of Environment reporting has found the MA conceptual approach, as well as the specific SAFMA information, very useful. The office plans to adopt the Biodiversity Intactness index in SAFMA to become a standard indicator for the province. (Contact: Bob Scholes, BScholes@csir.co.za.)
- In **Portland, Oregon, USA**, Oregon State University organized a workshop in November 2005 for the executive leadership at the Port of Portland to help them develop long range (2-year) environmental goals. Several pieces of MA materials were used as background information for the workshop. (Contact: Gail Achterman, gail.achterman@oregonstate.edu.)

Respondents to this survey reported relatively little impact of the MA sub-global assessments. In part, this is likely to be due to the fact that only a small number of the sub-global assessments were completed in 2005. Some of the feedback received from the coordinators of sub-global assessments includes:

- **Salar de Atacama, Chile.** “...we haven’t had the time, or resources, to conduct (even informally) a monitoring exercise of the project impacts [in the Salar de Atacama]. Therefore, we are not aware of major impacts on the area, at least in terms of decisions that have been considerably influenced by the assessment, or that have considered the information we generated. ...Our take is that the project contributed to reinforcing the importance of ecosystems in some actors (most of the time anonymous), whereas those actors who had never had knowledge (let alone sensitivity) for ecosystems have not drastically changed their minds.” (Contact: Hernán Blanco, hblanco@rides.cl)
- **Colombia.** “The main stakeholder (the national coffee federation) and Humboldt Institute have jointly formulated a project (“Conservation and sustainable use of mountain ecosystems for the benefit of the people in three coffee producing areas of Colombia”) with the support of UNDP Colombia. The project partially follows the MA framework ... to address some issues at the very local level ... that was not possible to achieve with the MA sub-global assessment.” (Contact: Dolors Armenteras, darmenteras@humboldt.org.co.)

IV. Business

The MA arguably took more significant steps to involve business in the assessment process than any comparable global environmental assessment. Business stakeholders were represented on the Board of the assessment and an attempt was made to identify user needs from industry. A separate synthesis report was prepared for Business and Industry. The MA findings were well-received by business journalists (notably, the *Economist* covered the release and later wrote an editorial noting the significance of the way the MA had framed environmental issues in terms more relevant to business and industry.) Overall, however, the impact to date in the business sector has been relatively limited, with several notable exceptions.

The most significant impact of the MA within business and industry is the incorporation of the concept of ecosystem services in the environmental policy issued by **Goldman Sachs** in November 2005. This policy marks the first recognition of threats to ecosystem services within the financial sector and, given

Goldman Sachs leadership position in the industry, this may stimulate other companies to follow suit. Goldman Sachs has also committed to establish a “Center for Environmental Markets” to “explore/develop public policy options for establishing effective markets around climate change, biodiversity conservation and ecosystem services.” Before releasing its policy, Goldman Sachs requested a briefing on the MA findings. The Newsletter “SocialFunds.com” reported that “Setting the [Goldman Sachs] policy apart from other banks' policies is its commitment to the United Nations Millennium Ecosystem Assessment (MA), as well as its \$5 million donation to establish the Center for Environmental Markets to study how the free-market system can solve environmental problems.”

Other impacts within business include:

- The Executive Committee of the **World Business Council on Sustainable Development** re-launched the “Ecosystems Champions Group in June 2005 to lead business sector response to the Millennium Ecosystem Assessment (MA). The MA was featured significantly at WBCSD meetings in Nagoya, 6-10 June 2005 (<http://www.wbcd.org/web/nagoya/chronicle.pdf>). Subsequently, WBCSD developed an Issue Brief, distributed the MA's Business and Industry synthesis report and in August invited all WBCSD members to consider joining the Ecosystems Champions Group. By November 2005, a total of twenty-two companies from a range of key sectors (mining, aluminum, agribusiness, chemicals, oil & gas, forestry, energy utilities, cement, construction, and technical services) had joined the Group. In partnership with World Resources Institute and the Meridian Institute, WBCSD will now work with several companies to undertake pilot ‘ecosystem service audits.’ (Contact: James Griffiths, griffiths@wbcsd.org)
- A presentation by **BC Hydro** to its Board with regard to its future corporate strategy quoted from the MA Business and Industry Synthesis Report's "bottom line". The MA findings were one of the contributing factors to the sustainability approach it is taking. (Contact: Steve Percy, StevePercy@aol.com)
- The MA was discussed at a May 26, 2005 meeting of the Dutch "Leaders for Nature" initiative at the headquarters of **ABN/AMRO involving 35 people from the private sector and business**. The group agreed that the findings and approach of the MA should be considered urgently in policy making by the Dutch government. That message was later communicated by Antony Burgmans (CEO of Unilever) at a parliamentary hearing (Contact: Rik Leemans, Rik.Leemans@wur.nl).
- **New Zealand's Business Council for Sustainable Development** stated in its October 8, 2005 press release accompanying its annual report *Living within nature's income – preserving nature's capital*: “We ignore at our peril The Millennium Ecosystem Assessment which reports that human activity is putting such strain on the natural functions of Earth that the planet's ability to sustain future generations can no longer be taken for granted.”
- In **Italy**, FAO and WWF organized an outreach event on the MA for Italian businesses in December 2005 which was covered extensively in the 6 February 2006 edition of *Il Sole 24 Ore* (the leading financial/business newspaper in Italy). (Contact: Monika Zurek, monika.zurek@fao.org).
- A group in Northeast **Ohio** in the United States has been formed around the idea of using sustainability as an economic driver for this area, given that the region is struggling under the weight of "old industry", but has many natural assets that can be used in new ways (i.e. fresh water and wind). The group is developing a program of outreach to the business community and

has decided to use the findings of the MA as its main platform for communication. (Contact Steve Percy, stevepercy@aol.com).

- **Cambridge University's Business and Environment Programme**, which runs seminars around the world for very senior business leaders to help them understand the challenges and opportunities involved in reconciling profitability with sustainability, has been featuring ecosystem services in its seminars and requested copies of the MA Business and Industry Synthesis to distribute at these seminars. One expert involved in the MA indicated that he has been involved in a number of presentations to corporate business leaders on sustainability through this program and has used both data and graphics from the MA. (Contact: Bill Adams, wa12@cam.ac.uk).
- The **Brazil Business Council for Sustainable Development** has translated the MA Business and Industry synthesis into Portuguese and is distributing copies during the March 2006 Conference of Parties of the Convention on Biological Diversity, being held in Brazil. (Contact: Fernando Almeida, falmeida@cebds.org).

V. Donors

The MA has had a notable impact on multi-lateral and bilateral donors and to a lesser extent on foundations:

Global Environment Facility

- Len Good, CEO of the Global Environment Facility, said at the UN Summit in New York in September 2005: "Two major directions [for the GEF] where we want to put major new emphasis flow right out of the MA: a) integrated natural resources management, that is, the need to deal with ecosystems in an integrated way; and, b) the need to successfully deal with people if we want to successfully deal with the environment." Mr. Good again emphasized the impact of the MA on the priorities of the GEF during the GEF Scientific and Technical Advisory Panel (STAP) meeting in October 2005.
- Mario Ramos (MRamos@theGEF.org) reports that "MA findings have influenced the GEF substantively. This impact is likely to be larger once MA findings are discussed by the CBD/COP and then translated to action at the national and regional level. In relation to impact, MA findings have been used heavily in our programming paper presented to donors during the replenishment discussions underway. The Biodiversity, International Waters, and Sustainable Land Management focal areas relied heavily on these findings. Other focal areas used them selectively. The Adaptation program under the Climate Change focal area for example, is bringing together the various focal area interests to develop joint projects as climate change is one of the key direct causes of biodiversity loss. The GEF Implementing Agencies are trying to internalize MA findings as well."
- UNDP-GEF has started a process of integrating the MA conceptual framework into its work. It has developed an integrated MA/DPSIR model that it is using to develop GEF-related indicators for the Land Degradation (LD) Focal Area. These indicators (when fully finalized) will be the basis for reporting by GEF projects on impacts and results. Secondly, the MA terminology related to ecosystem services is being used more and more in GEF project proposals. While project proponents do not all have the expertise required to analyze ecosystem services, the staff is building such capacity building (doing by learning) into the preparatory phases of the GEF LD projects. Finally, they believe that the results of the MA drylands assessment has been instrumental in convincing the UNCCD COP 7 that more effort needs to be done on monitoring

and inventories. (Contact: Dr. Maryam Niamir-Fuller, Principal Technical Advisor, Land Degradation, UNDP-GEF, maryam.niamir-fuller@undp.org)

- The GEF Scientific and Technical Advisory Panel (STAP) is commissioning a study on how to operationalize the MA conceptual framework inside GEF LD projects in order to better determine the global benefits expected from the projects. (Contact: Anne Marie Verbeken, anne-marie.verbeken@unep.org)
- The UNDP-GEF Small Grants Program plans to promote the use of the MA sub-global assessment process as a component of small grants it is providing to indigenous communities. (Contact: Terrance Hay-Edie, terence.hay-edie@undp.org)
- Other GEF staff, however, questioned the extent to which the MA influenced the GEF, arguing that the MA didn't facilitate or provoke any shift in thinking regarding the focus of the biodiversity program.

Bilateral Donors

- DANIDA (Denmark) and SDC (Switzerland) have asked IUCN to organize a seminar for them on the MA findings and implications of those findings.
- SIDA and SwedBio (the Swedish International Biodiversity Programme, which funds biodiversity conservation activities in developing countries) have “found that the MA-reports are – from our perspective – very important...” and have organized briefings on the MA findings for SIDA and the Ministry of Foreign Affairs. (Contact Maria Berlekom, Maria.Berlekom@cbm.slu.se). SIDA is assembling background material on the MA for its field offices and will be encouraging those offices to use the MA findings in their own work and in their dialogue with their cooperation partners. (Contact: Jorgen Eriksson, jorgen.eriksson@sida.se)

National Donors and Foundations

- In June 2005, The Swedish research foundation **Mistra** announced a call for transdisciplinary research in governance and management of linked ecological and social systems. The MA served as the major impetus for launching this, by Swedish standards, major research initiative (up to US\$ 15 million). (Contact: Thomas Elmqvist, thomase@ecology.su.se)
- In October 2005, after hearing a presentation on the MA by Jane Lubchenco, the United States National Science Board was considering undertaking a study of how the **National Science Foundation** should respond to the challenges posed by the MA.
- The **David and Lucile Packard Foundation**, the **MacArthur Foundation**, the **Wallace Global Foundation**, and the **United Nations Foundation** have made grants to organizations for activities that follow-on from the MA findings or process.

VI. NGOs

The MA has had a notable impact on international conservation-oriented NGOs but much less impact on national NGOs. To date, there is no evidence of any impact on NGOs focused on development, poverty reduction, or health issues.

- **World Conservation Union (IUCN).** The MA has had a strong influence on the workplan of the World Conservation Union (IUCN). In its 2006 plan, IUCN acknowledged the release of the MA as one of the top five issues influencing its situation analysis and providing the intellectual

framework for its annual work plan. The work plan pledges that IUCN will give particular emphasis to demonstrating the role of ecosystem services in ensuring human well-being and in the achievement of the MDGs. IUCN also cited the MA in its contributions to the September 2005 UN Summit. For example, IUCN published a short paper for the high-level Plenary Meeting of the UN General Assembly held on 14-16 September 2005, focused on ways to invest in ecosystem services for people. Jeff McNeely, IUCN Chief Scientist, reports that “[S]uffice it to say that we here at IUCN have internalized the MA.” “It is probably fair to say that the intellectual framework has been used more than the details. We have enthusiastically adopted the ecosystem services approach...” (Contact: Jeff McNeely, jam@hq.iucn.org)

- **World Resources Institute.** The MA has been very influential as a source of input into WRI's strategies for future work (Contact: Janet Ranganathan, janetr@wri.org; Dan Tunstall, dan@wri.org):
 - WRI's new People and Ecosystems Goal (one its four institutional goals) is inspired by the MA conceptual framework and builds on the MA findings. WRI's "Biological Resources Program" has been renamed the "People and Ecosystems Program" in the same spirit.
 - WRI has several new objectives (strategic clusters of project activities) that encompass the MA integrated approach including: a) Equity, Poverty and Environment; b) Poverty, Agriculture and Trade (reforming agricultural subsidies); and, c) Forest Landscape Initiative.
 - WRI has several fledgling projects that embrace MA concepts and may evolve into a new institutional objective on integrated ecosystem management, including: a) poverty and ecosystem service mapping; b) valuation of ecosystem services in reefs; c) nutrient net; d) an Integrated Ecosystem Assessment Handbook; and, e) work with the business community on ecosystem services.
 - *World Resources Report 2005*, published by WRI, UNDP, UNEP, and the World Bank, draws heavily on the MA for the concept of ecosystem services, emphasizing that these are the wealth of the poor, particularly the rural poor. Four of the case studies show how once the poor have rights to some of these services they are able to generate income and sustain a certain level of wealth.
 - WRI is analyzing the role of ecosystem services in relation to poor and non-poor areas in Kenya. The report, to be published in 2006, examines water, wildlife, agriculture, fuelwood, recreation and tourism in the Tana River basin. WRI notes that there is a two-fold social science revolution going on: the availability of poverty maps that show where the poor live and a set of ecosystem service maps at comparable scales showing who has access services. Policy makers can use this information for planning and resource distribution, but even more importantly the public can use the information to hold policymakers accountable.
- Both **The Nature Conservancy** and **World Wildlife Fund-US** gave briefings on the findings of the MA to their Boards of Directors. (WWF-US distributed 150 copies of the MA Board Statement to its Board and Council.) The presidents of both organizations have said that they consider the MA findings and the issue of ecosystem services to be very important in their own planning and priority setting.
- **The Nature Conservancy, World Wildlife Fund, and Stanford University** have recently launched a project as a follow-up to the MA to carry out landscape-scale ecosystem service assessments in Asia (Upper Yangtze Basin, China), Africa (Eastern Arc Mountains), and the United States (Sierra Nevada mountains, California). (Contact: Gretchen Daily gdaily@stanford.edu, Peter Kareiva, Taylor Ricketts).
- Following a series of presentations on the MA to their board and chapter trustees (by WRI), the MA findings have been put on the agenda of several of the **American Society of Landscape**

Architects (ASLA) governing committees, including the Government Affairs Advisory Committee, Policy Committee, and the Public Practice Advisory Committee. These committees are taking the next steps to address the MA findings and communicate them to its 15,000 plus members. In addition, the national officers and a number of trustees from individual states have incorporated the findings in presentations they are giving across the US and internationally, including a recent one to Landscape architects in China. ASLA is the only national professional association representing landscape architects in the US. It has 15,000 members and 48 chapters, representing all 50 states, US territories, and 42 countries around the world. ASLA promotes the landscape architecture profession and advances the practice through advocacy, education, communication, and fellowship. (Contact: Janet Ranganathan, janetr@wri.org)

- The WWF office in Russia set up a number of programs base on the Altai-Sayan MA sub-Regional findings. (Contact: Alexander Shestakov, ashestakov@wwf.ru)
- Nahuacalli, the Embassy of the Indigenous Peoples, an NGO based in Phoenix Arizona, issued a proclamation in March 2006 announcing the launching of an ecosystem service assessment process for the Phoenix area modeled on the MA: “In particular we bring your attention to the recently completed Millennium Ecosystem Assessment (MA) commissioned by the United Nations which addresses issues and concerns within a global framework that identifies priorities for action, with particular attention to the relationship between the Community Ecology of urban systems, territories, and Sacred Sites of the Indigenous Peoples. We now announce the launching of a sub global regional assessment, to be conducted in complement with the conceptual framework of the MA, and led by the Nican Tlachah Nations of Indigenous Peoples. We project a yearly report back on this initiative over the next four years to the City of Phoenix.” (Contact: chantlaca@aol.com; <http://www.tonatierra.org>)

VI. International Agencies

All of the UN agencies involved in the MA process – UNEP, UNDP, FAO, WHO, and UNESCO – have incorporated the MA findings and process in their activities. However, the MA appears to have had no impact at all within the Bretton Woods Institutions (apart from the use of the MA by the Global Environment Facility), despite the fact that World Bank staff were centrally involved in the process and the World Bank was one of the sponsors.

- **United Nations Environment Programme (UNEP)**
 - UNEP is making use of the MA findings and processes extensively across its program areas.
 - UNEP and the London School of Economics held the workshop High-Level Brainstorming Workshop on Creating Pro-Poor Markets for Ecosystem Services on 10-12 Oct. 2005 in order to assess the desirability and feasibility of the creation of pro-poor markets for ecosystem services in the framework of multilateral environmental agreements, and to identify the process and institutional mechanisms required to create such markets. The workshop was stimulated in part by the MA and MA materials (and speakers) were prominent during the meeting.
 - UNEP's GEO-4 report, currently being written and due to be out sometime in 2007, draws heavily on the MA biodiversity chapter and synthesis as well as the framework of drivers and response options.
 - UNEP has recently completed a “Coastal and Marine” synthesis report based on the MA and will release this in June 2006.

- **UNDP** is developing a strategy for using the ecosystem service assessment framework of the MA as one of the methodologies applied in assisting countries to develop Poverty Reduction Strategies. (Contact: Charles McNeil, charles.mcneill@undp.org)
- The **Millennium Project** utilized the draft MA chapters extensively in the work of the Task Force on Environmental Sustainability. (http://www.unmillenniumproject.org/reports/tf_environment.htm).
- **FAO** is preparing a publication on Climate Change and Food Security which uses a conceptual framework that incorporates many ideas from the MA conceptual framework. (Contact: Monika Zurek, Monika.Zurek@fao.org).
- **UNESCO** has helped to promote attention to the MA. The MA was cited on the cover page of UNESCO's "A World of Science" Vo.3, No.3 (July-September 2005). UNESCO is also working with ICSU to identify the research needs stemming from the MA process.
- The **Poverty and Environment Partnership** (involving UNDP, UNEP, WRI, IIED and many other organizations) made use of the MA in its indicator and assessment paper prepared for the September 2005 UN Summit.
- The **European Environment Agency (EEA)** refers to the MA in:
 - the recently launched EEA report on "The European Environment: State and Outlook 2005" (http://www.eea.eu.int/main_html) (notably Biodiversity chapter)
 - in a position paper by the EEA on Land and Ecosystem accounts presented at the UN Committee on Environmental-Economic Accounting, New York, 29-31 August 2005 (<http://unstats.un.org/unsd/envAccounting/ceea/meetings/prelim9fii.pdf>)
- **World Bank.** The Washington DC release of the MA was held at the World Bank, a briefing on the MA findings was given to the Deputy Directors of the Bank, several Bank staff played central roles in the MA process, and the World Bank was one of the sponsors of the assessment. Nevertheless, one World Bank staff person wrote that the MA has had "no impact at all" on the World Bank and that the staff there are "waiting for [the] sub-global assessments [to be released]." (Contact: Bob Watson, rwatson@worldbank.org.)
- The **International Assessment of Agricultural Science and Technology for Development (IAASTD)** is using the same basic conceptual framework as the MA. The IAASTD scenarios are also based on the MA global scenarios. The MA scenarios provide the overall framework and the IAASTD scenarios flesh out the agriculture and agricultural knowledge, science and technology dimensions of the four different worlds. The sub-global component of the MA was also modeled in part on the MA sub-global assessments. (Contact: Monika Zurek, Monika.Zurek@fao.org, Anne-Marie Izac, a.izac@cgiar.org)

VIII. Capacity Building

One of the two goals of the MA was to build capacity to undertake integrated assessments of the consequences of ecosystem change for human well-being. The primary vehicle for achieving this goal was through the MA sub-global assessments. While we have no 'before' and 'after' assessment to establish how much capacity was built through these assessments, the individuals involved in these assessments clearly gained knowledge, contacts, and experience and it is likely that many of the institutions involved in these assessments were also strengthened. Very few of the respondents to the survey, however, commented on these dimensions of capacity building (or on the MA fellows program,

which involved ~50 young scientists in the MA process and was judged a success in the mid-term GEF evaluation.) Some of the capacity-building impacts of the MA noted by respondents include:

- As part of a **UNEP project on Poverty and the Environment**, Christo Fabricius and his colleagues organized and led a week-long introductory training course (for trainers) on the MA sub-global assessment methodology at Rhodes University in September 2005. Subsequently, the training materials have been refined, consolidated, and made available (along with a video of the course) on a DVD and the plan was that they were to be translated into French and Portuguese by the end of 2005. Momentum is building in several of the project countries, particularly Rwanda and Uganda, to undertake a pilot assessment that uses the MA framework (and possibly a multi-scale design) in 2006, and to also provide in-country training to support the process. Uganda and Rwanda have training workshops scheduled for March and April 2006, respectively. They both have identified coordinating institutions for their assessments (Makerere University and Butare University) and have assessment team leaders in place. The work in Rwanda will be designed so that the results can inform the next Poverty Reduction Strategy Paper which they will start preparing in June 2006. (Contact: Erin Bohensky, University of Stellenbosch, erin@sun.ac.za and Christo Fabricius C.Fabricius@ru.ac.za)
- As noted above, the multi-scale structure of the MA, with its inclusion of sub-global assessments, has been emulated in the new **International Agricultural Science and Technology Assessment (IAASTD)** being carried out by the World Bank.
- **UNEP, WRI, World Bank Institute, ICSU** and other partners are developing a project to provide training and capacity-building on the application of the MA assessment approach at national and sub-national scales.
- The **Tropical Forest Margins** assessment, conducted by the Alternatives to Slash-and-Burn systemwide programme of the CGIAR, has built capacity among its partners for participatory scenarios through a global workshop in Chiang Mai, Thailand, November 2004 (19 participants). Materials used in this training are now part of the CGIAR pool of Learning objects (OLR). See: <http://www.asb.cgiar.org/ma/scenarios/training>. The World Agroforestry Centre (ICRAF) and The Netherlands government provided with small grants for follow-up participatory ASB-MA scenarios exercises in Peru (4), Brazil (1), Thailand (1) and Cameroon (1) (20-30 participants each). An online exchange of lessons learnt on scenarios is planned for mid 2006. The scenarios exercises from Peru were used as case studies in the "Participatory Research & Scaling Up" African Network for Soil Fertility/Desert Margins Programme (AFNET/DPM) Training Workshop, September, 2005, Nairobi, Kenya. Results from Thailand will be presented at the International Symposium "Towards Sustainable Livelihoods and Ecosystems in Mountainous Regions" to be held in Chiang Mai, March 2006. A poster proposal was submitted to the International Dialogue on Science and Practice for Sustainable Development building on lessons learnt from Peru and Thailand. A manual on participatory scenario development based mainly on MA scenarios methodology will be available by the end of 2006, translations to French and Spanish will be available in 2007. (Contact: Sandra J. Velarde s.velarde@cgiar.org)
- One young scientist involved as a **MA Fellow** wrote: "At a personal level, I expect that most of my career will be significantly influenced by my involvement in the MA. It really was a fabulous opportunity as a young scientist, and I thoroughly enjoyed it. In projects than I may run one day, I would definitely like to incorporate this openness and opportunity for involvement for young people. Although not directly building on my work in [the MA], my PhD work will focus on how uncertainty plays out in ecosystem management – particularly how different approaches to risk affect ecosystem maintenance over time, as well as one's ability to learn about ecosystem

function. I will also be doing some work on how uncertainty can be manipulated in scientific decision-making processes. All of this has clear links to the broader role and goals of the MA.”

- Another young **MA scientist** involved as JPO - Pantropic Ecosystem Assessment for the Alternatives to Slash-and-Burn program wrote that the MA “has exposed me to international scientific debate. It has been a very joyful experience which has helped me to connect with international and national partners, both senior and young professionals. By leading the ASB capacity building on scenarios, I decided to start a PhD in Environmental Education where I will bring insights from the MA.”
- Dr. Shashi Kant, Faculty of Forestry, **University of Toronto** (shashi.kant@utoronto.ca) is designing a short module (one week) on Forest Ecosystems Assessment, and will be teaching this course in Vietnam and China in February to April, 2006. His group is using the MA Framework and regional studies for this course extensively. They will be using these materials in other courses as well.
- David Pitt, Coordinator in the Commission on Environmental, Economic and Social Policy, **World Conservation Union** (lacure@freesurf.ch) is using MA Scenarios ideas in two proposed projects: a) Polar Conservation Futures - an Open Learning Internet Course and Electronic Companion on Sustainable Development Scenarios in Times of Globalization and Rapid Change in the Cryosphere and Cold Regions; and b) Mediterranean Scenarios for Sustainable Development - an Electronic Discussion Book.
- An **ASEAN-wide executive training course** on natural resource management and decision-making has decided to use the MA framework as the framework to be used in setting the context of the training. The planning meeting for this course was held at Southeast Asia Regional Centre for Agricultural Research (SEARCA). (Contact: Ben Malayang, beniim@yahoo.com.)
- The MA Scenarios are one of the primary sources of input into the **Planet2025 Learning Conference** (<http://planet2025.net/conferences/>), an international conference examining how formal, non-formal, and informal learning initiatives are preparing humanity for a successful transition to sustainability.

IX. Education

Not surprisingly, given the number of scientists involved, MA materials are being used extensively in University courses and curricula. There is less evidence of use at other levels of education although since the sample of respondents was dominated by university researchers there is inevitable bias in the information.

- Martha Groom, **University of Washington** (groom@u.washington.edu) used the MA reports (the main synthesis and the CBD synthesis) “up to the minute” in the complete revision of *Principles of Conservation Biology* (Sinauer Associates) which came out in August 2005, and had over 6000 copies in use by the end of 2005 (including a large number that have been donated for use in developing countries).
- Cecilia Iglesias, Asociación Civil Red Ambiental, **Argentina** (ciglesias@copaara.org) reports:
 - a) She has been teaching the MA Conceptual Framework for the past 3 years to Environmental Management undergraduate students at a local university. She notes that the Framework is a wonderful way to teach the complexity of sustainable development issues with a systemic approach.

- b) She plans to integrate the MA Conceptual Framework and findings into the website of an educational project for sustainable development based on Information and Communication Technologies for Spanish-speaking children and adolescents (www.ecopibes.com).
 - c) UNDP will be funding their proposal *EcoTK del Plata* as part of a transnational project (Argentina and Uruguay) to promote pollution prevention and biodiversity conservation of the Rio de la Plata (www.freplata.org). *EcoTK del Plata* is basically an itinerant environmental library for public schools in the Buenos Aires area, that will contain books, games, articles and videos as well as ad hoc educational materials. They will develop those materials based largely on the MA Conceptual Framework: they will teach about the Rio de la Plata by explaining its dynamics, identifying its goods and services, analyzing direct and indirect drivers, assessing the sustainability of our current use of the river and identifying opportunities for intervention. Our final booklet will identify interventions that children can do to promote a sustainable use of the river.
- The **Ross School of Business at the University of Michigan** oriented its Fall 2005 Graduate Seminar around the findings of the MA (Contact: Andrew Hoffman, ajhoff@umich.edu).
 - Within **France**, a Senior Scientist at CNRS wrote: "I am a senior scientist teaching Conservation Biology to post grad students and given lectures on Biodiversity issues to future land use managers. This note is just to emphasize the very broad and pertinent use of the work of the Millennium Ecosystem Assessment. The value of the synthesis done by the MA is immense to pass certain messages and to give people a comprehensive but synthetic grasp of the state of the planet and on the challenges ahead of us. Outstanding and very useful work."
 - Colin Soskolne has used the MA slides in a new course called "Sustainability & Health" at the **University of Alberta**, Edmonton Canada. In addition, the slides were used by Dr. Duncan Saunders, in the class "Global Health - An Introductory Course". Both of these courses are in the Department of Public Health Sciences. (Contact Colin Soskolne, Colin.Soskolne@ualberta.ca)
 - Tipparat Pongthanapanich, a Ph. D. Student at the **University of Southern Denmark** has used MA reports for teaching: a) Market and the Nature, International undergraduate course, Southern Denmark University, Esbjerg. Oct-Nov, 2005 (4 MA reports were used as references for around 1/3 of the course lecture hours); and, b) Managing the Coast: Concepts and some Experiences from Asia, Guest lecture for the International undergraduate course on Tropical Ecology, 18 November 2005, Southern Denmark University, Odense. (Contact: Tipparat Pongthanapanich, tpo@sam.sdu.dk)
 - Dr. Pille Bunnell uses the MA scenarios in a course on "Systems Thinking" for a Master's program in Environmental Management offered at **Royal Roads University**. (Contact Pille Bunnell, pille@interchange.ubc.ca).
 - Several professors at the **University of Costa Rica** use MA information in their courses. (Contact Mara Lvis, maralvis@yahoo.com)
 - Bernadette O'Regan lectures in Conservation Ecology at the **University of Limerick**, and now uses MA reports, ideas and concepts within this module. (Contact: Bernadette O'Regan, Bernadette.ORegan@ul.ie)
 - David Cohen at **University of British Columbia** (david.cohen@ubc.ca) reports that:
 - a) He uses the MA PowerPoint slides in two of the classes he teaches (the section in globalization and the environment in a senior level course for BSc, "Globalization and the

- Marketing of Wood Products” and in a new MBA course titled “Sustainable Development.”) They are used in the context of global measures of social, environmental and economic impacts. In both cases the classes discuss both the content and the “voice” of how the information is presented.
- b) He “passed on the web site for the MA to a friend who teaches French Emersion in Grade 7. He will be using much of the MA (in French) for teaching global environmental issues and was very pleased with the information included in it. He has been looking for several weeks and the MA site provided all he was looking for and it was in French which was a pleasant bonus for him.”
- Jack Shepherd, Director, Africa Foreign Study Program, **Dartmouth College** (Jack.E.Shepherd.Jr@Dartmouth.EDU), reports that he has:
 - a) Included the MA report in the large Reader for Dartmouth's Africa Foreign Study Program in Southern Africa. He has given a lecture on the MA for these students and discussed the MA with them.
 - b) Included a copy of the Africa section of the MA in his Reader for a course he teaches at Dartmouth in the summer term.
 - c) Passed along copies of the Africa section of the MA to two of his South African homestay families; both of the parents are teaching some aspect of the MA. For example, one of the homestay fathers is a biology teacher in a secondary school in one of the townships. The school has computers, and he can use CDs and other resources. (Shepherd sent him both a copy of the MA and a copy of the PowerPoint slides.)
 - Elena Bennett (elena.bennett@mcgill.ca) uses the MA in lectures she gives to her class on Environment and Society at **McGill University**. She has also given guest lectures about the MA in several other classes at McGill.
 - In **South Africa**, the SAFMA material is being used in at least three universities in South Africa as teaching material at the graduate and postgraduate level: Prof Mary Scholes and Prof Coleen Vogel at University of the Witwatersrand; Prof William Bond at University of Cape Town, and Prof Christo Fabricius at Rhodes University. CSIR had several requests for the SAFMA integrated reports for use in primary-level Geography classes in South Africa. (Contact: Bridget Fleming, gffleming@csir.co.za)
 - Sandy Gauntlett, New Zealand (sandygauntlett@hotmail.com), is lecturing/tutoring in a new degree at the **Indigenous tertiary institute** and uses the MA findings as a way of illustrating several issues: a) how bad some of the environmental impacts actually are; b) the way in which both a report (the MA) and a conference (Alexandria) can be used to blend and honor both Indigenous and Western knowledge systems; c) the way in which assessments can help to inform international policy. He indicates that it “has been incredibly valuable and has helped to motivate the students around international issues and several of them have used some of the findings in their assignments and are also using them back in the home areas to help inform elders around why it is necessary to adopt certain practices on Maori land.”
 - Wolfgang Cramer, **Potsdam Institute for Climate Impact Research** (Wolfgang.Cramer@pik-potsdam.de) reports that he uses the MA in:
 - a) his course in "Biosphere Dynamics" for students in geocology (environmental sciences) at Potsdam University.
 - b) the second AVEC summer school run in Southern France in mid-2005 (<http://www.pik-potsdam.de/avec/peyresq2005.html>), where there were several presentations, by Rik Leemans and himself, on the MA process and findings.

- Stephan Halloy (HalloyS@crop.cri.nz) has used the MA results and slides in postgraduate classes on global change at the Postgraduate Center in Ecology and Conservation at the **Universidad Mayor de San Andrés, La Paz, Bolivia**.
- Jennifer Ruesink (ruesink@u.washington.edu) will be covering MA in an upper-level community ecology course in winter 2006 at the **University of Washington**.
- William R. Freudenburg, Environmental Studies Program **University of California Santa Barbara**, (freudenburg@es.ucsb.edu) has used a number of the MA findings in his "Introduction to Env. Studies, ES1" class – an audience of about 400. He commented on the “the combination of clarity, conciseness and credibility” of the material.
- Eduardo S. Brondizio, Chair, Department of Anthropology, **Indiana University** (ebrondiz@indiana.edu) reports that his colleague Emilio Moran used the MA Synthesis report for his graduate course on the human dimensions of environmental change and that another colleague was using it at the Center for the Study of Global Change.
- Claire Horner-Devine, **University of Washington, Seattle, USA**, reported that the MA Reports were used in a recent graduate seminar in the School of Aquatic and Fishery Science at the University of Washington: *Diversity, Ecosystem Services and the Millennium Assessment*. <http://faculty.washington.edu/mchd/FISH513/syllabus.shtm>
- Kai N. Lee, **Williams College** (Kai.N.Lee@williams.edu) has been using MA materials on ecosystem services and human well-being in his teaching since 2004.
- Bill Clark, **Harvard University** (william_clark@harvard.edu) features MA approaches and materials in two courses:
 - a) At Harvard College, the required course for those majoring in "Environmental science and public policy" (ESPP-10 "Environmental science and public policy").
 - b) At the Kennedy School of Government, the required course for those majoring (at Masters level) in "Environment and Natural Resource Policy" (ENR-100 "Environmental science for public policy.")
- Alexander Tetior, **Moscow State University of Environmental Engineering**, has used MA information related to cities in an educational course "Ecology for builders".
- Prof. Vladimir Bocharnikov, **Vladivostok State University**, includes findings from the MA in his course "Geography of Tourism" at Vladivostok State University Economics, Vladivostok, Russia. In 2006, he will publish a new book for students "Basics for Biodiversity" based on information from the MA and from the CBD Global Biodiversity Outlook.
- Philippe Crabbé, **University of Ottawa**, is using the MA framework for a course he is teaching.
- Shelton Davis, Senior Fellow, Center for Latin American Studies, **Georgetown University** plans to do a course in the Fall 2006 with the Center for the Environment at Georgetown on "Poverty, Democratic Governance and the Environment in Latin America" and will use the MA summary volume in the initial part of the course.
- Patricia Balvanera (pbalvane@oikos.unam.mx) reports that MA materials are being used in several graduate courses at Universidad Nacional Autónoma de México, including talks on

ecosystem services management and on biodiversity and ecosystem services for courses on “Resource management” and “Community Ecology” at the Centro de Investigaciones en Ecosistemas. The MA material is also being used in short courses for decision makers: “Evaluación de sustentabilidad para el manejo de recursos naturales” (Evaluation of sustainability for natural resources management) organized by the NGO Grupo Interdisciplinario de Tecnología Rural Apropiable and “Restauración Ecológica” (Ecological restoration) organized by Instituto Nacional de Ecología-Semarnat and the U.S. Fish & Wildlife Service in September 2003, September 2004 and October 2004.

- Stephen Carpenter (srcarpen@wisc.edu) has incorporated MA materials into several lectures in my Ecosystem Concepts course at **University of Wisconsin**. (The materials are available at <http://limnology.wisc.edu>, click on education, then click on Zoology 725, 'Ecosystem Concepts'.)
- At the **Instituto Superior Técnico, Portugal**, Henrique Pereira (hpereira@ist.utl.pt) has included the results of the Portugal Millennium Assessment in lectures to students of Land Planning, Architecture, and Environmental Engineering.
- Dr. Tekin Kara, **Ondokuz Mayıs University, Turkey** (tekinkar@omu.edu.tr) has been using MA results and slides in graduate and undergraduate courses.
- Neil Pelkey (pelkey@juniata.edu) uses MA materials in his GIS course and environmental economics course at **Juniata College in Pennsylvania**.
- At **Stockholm University, Sweden**, findings from the MA are discussed in the International Master Program "Natural Resource Management, Governance and Globalization" <http://www.ctm.su.se/ngg>. This is a transdisciplinary program consisting of four novel course modules and a thesis, presenting several perspectives of how ecosystem services, governance and human well-being are linked. (Contact: Thomas Hahn, hahn@ctm.su.se).

Despite these examples of the use of the MA materials in education within Universities around the world, the nature of this survey does not enable us to determine how widely the use of these materials extends beyond the people involved in the MA. Elda Tancredi of **Lujan National University in Argentina** reports, for example, that she “doesn’t know of any impact of MA especially in National Universities or evidence of considerations by programs and studies, research grant programs, use of MA CF, approach or findings in studies and reports, in universities courses, seminars or curricula.”

X. Scientific Research

Science assessments are not undertaken with a research audience in mind, but effective assessments inevitably influence scientific research for a number of reasons. First, they help to identify important research and information gaps, particularly those most relevant to decision-makers. Second, they influence priorities of research funders. Third, they create opportunities for new interdisciplinary interactions and these often stimulate new collaborative research.

Particularly because of the novelty of its conceptual framework, the MA does appear to be having a notable impact on research directions and priorities. One particularly interesting report in this regard came from Andrew Dearing, who was a member of the Steering Committee that developed the MA in 1998-2000. He reported in January 2006: “I had only given occasional thought to the process that we helped to set in motion at those various meetings at the WRI seven years ago. Last week, I had lunch with a senior French academic, who, knowing nothing about my involvement at that time, mentioned just

how significant a part the assessment was now playing in setting the research agenda for major parts of the world community. His own area is Foresight – not Ecology.”

Some examples of the impact on research directions include (See also Annex 3 which lists some recent publications and research articles linked to the MA):

- The core conceptual framework developed for the MA (examining links between drivers, ecosystem services, and human well-being at multiple scales) has been adopted by the **International Council for Science (ICSU)** as a core framework for its environmental program. ICSU also hopes to launch a project to synthesize the ‘place based’ research needs identified through the MA sub-global assessments. Finally, ICSU opened its Africa Regional office in September 2005 and “one of the office's first activities will be to set up a network of climate change researchers from across the continent. The network will work on sub-regional ecosystem assessments based on the United Nations' Millennium Ecosystem Assessment.” (Sci Dev Net, 2 September 2005).
- The **World Wildlife Fund and World Bank** are undertaking a research project on Trade, Environment and Rural Poverty involving case studies from seven countries (China, India, Vietnam, Mexico, Chile, South Africa and Madagascar) and have utilized the MA Conceptual Framework as the framework for this work. (Contact: Owen Cylke, owen.cylke@wwfus.org).
- The **World Conservation Union** and the **UK Department for International Development (DFID)** are undertaking a project to explore the delivery of ecosystem economic benefits for upland livelihoods and downstream water users in India and Nepal using the MA conceptual framework as the organizing framework for the project. In addition, **Green Indian State Trust, India** and **Deutsche Bank** are undertaking policy research on green accounting for ecosystem services in India using the MA framework of provisioning, regulating and cultural services of forest ecosystems. (Contact: Pushpam Kumar, pk@iegindia.org).
- The **European Commission's DG Research** organized a meeting in September 2005 involving all of the directorates and a number of experts involved in the MA to explore the implications of the MA for the EC activities, particularly related to research. (Contact Rik Leemans, rik.leemans@wur.nl). At a meeting in early 2006, Pierre Valette, Acting Director for environment research at DG Research indicated that the MA results contributed directly to the development of the research priorities for their next framework program.
- The **Global Environmental Change and Food Systems (GECAFS)** project is using the MA global scenarios as the background for developing a set of pilot scenarios for the Caribbean on environmental change and food systems interactions. (Contact: Monika Zurek, Monika.Zurek@fao.org)
- Within France, the MA is referenced centrally in the **draft French national action plan for biodiversity research** (to be published in spring 2006). (Contact: Dominique Richard drichard@mnhn.fr).
- Richard Moles is using the MA scenarios in the work in the **Centre for Environmental Research at the University of Limerick**. He indicates that these represent a very important way of creating a shared vision on what future possibilities might be.
- The **Russian Academy of Sciences** (Pacific Institute of Geography) carried out a series of sub-regional assessments for forest, marine-coastal, freshwater and mountain ecosystems in the

Russian Far East using tools and approaches from the MA. The first results have been published as: The Biodiversity of the Russian Far East Ecoregion Complex. Bocharnikov V., A. Martynenko, Yu. Glushenko, P. Gorovoi et al. Vladivostok "Apelsin", 2004 (In Russian). (Contact: Vladimir Bocharnikov).

- Sylvie Blangy prepared a commissioned paper for a **European Commission DG Research** FP5 funded project called AVEC on "ecotourism and ecosystem vulnerability in Europe" using a framework based on the MA findings and results; ecosystem services, value and valuation approaches. (Contact: Sylvie Blangy sylvie.blangy@club-internet.fr.)
- Ernesto Viglizzo reports that "Nowadays, most of our research on the lower Del Plata watershed aims at elucidating the vulnerability of ecosystems to human intervention, resting on the MA notion of "tradeoffs and synergies between agricultural and ecological services". For example, my organization (**INTA**) in **Argentina** is today elaborating a big national project in which our main focus is put on the design of sustainable land-use strategies in ecosystems that were exposed to a quick and aggressive human intervention during the 1990's and part of the 2000's. The core of our approach is the tradeoffs analysis between economic, social and ecological good and service provisioning, and our expected outcome is the generalization of standard typologies of land-use strategies adapted to different environments in our country." (Contact Ernesto Viglizzo, evigliz@cpenet.com.ar)
- Dr. Bernadette O'Regan at the **University of Limerick** reports that "my participation in the MA has resulted in improvements to existing research, funding for new projects and considerable broadening of my teaching." (Contact: Bernadette O'Regan, Bernadette.OREgan@ul.ie). Dr. O'Regan is using the MA scenario methodology in 2 research projects:
 - a) developing/improving stakeholder participation in decision making (one for a rural village and one in a case where they have developed sustainability indicators and were looking for a way to 'futurize' the work, also using GIS). These projects were funded by the Irish EPA and the Irish Research Council for Science, Engineering and Technology.
 - b) examining alternative futures for the Shannon Estuary region in Ireland. This project just commenced, funded by the Irish Research Council for Science, Engineering and Technology and includes the involvement of Dr Kasper Kok who was also involved in the MA.
- In **Ireland**, a group of researchers have set up a working party to consider the implications of MA findings for Ireland, and the extent to which Irish government policy on biodiversity conservation might be adapted, in light of MA findings. Contact: Richard Moles.
- Phoebe Barnard at the **South African National Biodiversity Institute** (Barnard@sanbi.org) reports that:
 - a) We have incorporated the general framework and MA principles of focusing on ecosystem services and human well-being at multiple scales, albeit quite loosely, in a new GEF targeted research proposal for Africa called BISCC (Biodiversity, Invasive Species and Climate Change - Predicting Compound Impacts in Vulnerable Areas). This is partly a direct response to the MA's perceived rather thin content on invasive species and the need to elucidate compounding interactions between invasive species and other global change trends.
 - b) We are slowly developing a broad research framework or vehicle called GCBESA (Global Change, Biodiversity, Ecosystems and Society in Africa) to provide a coherent, Africa-wide vehicle for MA-oriented assessments of ecosystem services, human wellbeing and vulnerability to global change – modeled on the MA or stimulated by the MA. This will be a long-term process (perhaps 10 years, and much less tightly choreographed than the MA) and is likely to be funded in parts, rather than as a single major vehicle.

- Several research projects being developed by Elena Bennett at **McGill University** (elena.bennett@mcgill.ca) will be based on findings of the MA or research gaps noted by the MA. For example, next year, she will undertake a project to assess trade-offs among ecosystem services through time in the Quebec region and a project to understand human impact on multiple nutrient cycles in the St. Lawrence River Valley.
- Kamaljit Kaur, School of Business, **James Cook University**, Townsville, Queensland, Australia (Kamaljit.kaur@jcu.edu.au) has developed a research proposal drawing from the MA approach: “Role of ecosystem services in well-being of Aboriginal and non-Aboriginal people in Australian savannas.”
- In **India**, a Ph.D. dissertation on "Biodiversity in the Greater Nicobar" by Suresh Babu, jointly supervised by Kanchan Chopra and C. R. Babu, of the Centre for Degraded Ecosystems, University of Delhi, used the MA conceptual framework. In addition, a research project funded by the South Asian Network for Development and Environmental Economics entitled “Storm Protection Function of Mangroves in Orissa” also used the MA framework.

XI. Awards

In December 2005, the MA was awarded the **Zayed International Prize for the Environment**:

“for scientific and technological achievements in recognition of the outstanding multilateral work that underlined the economic importance of nature’s capital and demonstrated the alarming degradation of ecosystems which is threatening life on Earth. The Jury indicated that the success of the MA set a standard for monitoring and evaluating environmental change and its impact on sustainability of life on our fragile planet.”

The Zayed Prize comes with an award of \$300,000 and these funds will be used to help extend the impact of the MA, particularly through capacity building in developing countries.

The **World Economic Forum**, in its 2006 Global Governance Initiative Annual Report (WEF, Geneva) recognized the Millennium Ecosystem Assessment as one of the ‘heroes’ in 2005 in the category of the environment:

“The Millennium Ecosystem Assessment, released in 2005, provided compelling evidence of our failure to keep pace with the rate at which we are damaging nature. This landmark study, involving more than 1,300 scientists from 95 countries over the past four years, offered an audit of our management of the planet. It showed that most of the 24 ecosystem services key to human wellbeing are now being degraded or used unsustainably—from fisheries and forests to freshwater resources.”

Diana Wall, Natural Resource Ecology Laboratory, Colorado State University, received an honorary doctorate from the **University of Utrecht, Netherlands** partially in recognition of her work for the environment, including the Millennium Assessment and the SCOPE Committee on Soil and Sediment Biodiversity and Ecosystem Functioning. (March 2006)

XII. Other

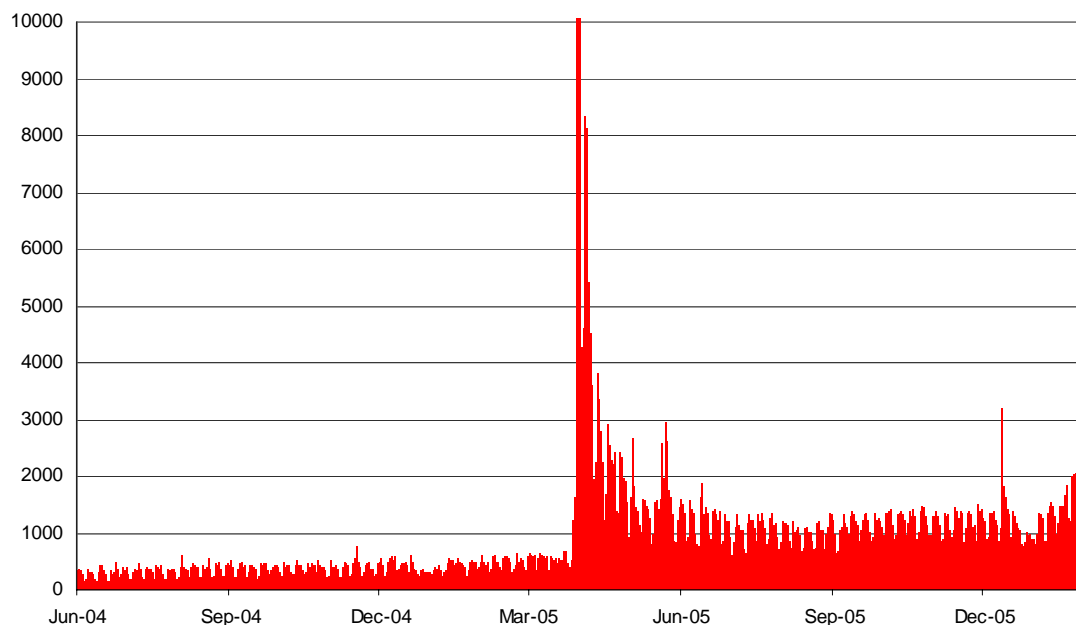
Other examples of MA impact include:

- **Publication Sales.** The MA secretariat distributed thousands of free copies of the MA Conceptual Framework Report and the synthesis reports to the target user audience and also is distributing hundreds of free copies of the technical reports to the authors, convention focal points and other users. Island Press is also selling copies of the MA Conceptual Framework report, General Synthesis, and technical volumes. Sales reported by Island Press are:
 - MA Conceptual Framework Report “*People and Ecosystems: A Framework for Assessment*” (sales between 2003 and November 2005): 4776 copies
 - *General Synthesis* (sales between March 31 2005 and December 15, 2005): 1299 copies.

Amazon.com publication sales rankings (on February 10, 2005) for the commercially available MA publications (and other publications for comparative purposes) were:

Publication	Amazon Sales Rank
MA reports	
General Synthesis	53,082
Ecosystems and Human Well-being: A Framework for Assessment	421,445
State and Trends Assessment Report	1,294,212
Scenarios Assessment Report	1,765,228
Responses Assessment Report	2,648,418
Multi-scale Assessment Report	2,960,464
Others (for comparison)	
IPCC Climate Change 2001 Synthesis Report	280,604
World Bank World Development Report 2005	135,792
Global Environmental Outlook 3	2,782,699

- **Website.** The pattern of website hits on the MA website is shown in the Figure below. Use of the site jumped from an average of 400 sessions per day in the 10 months prior to the March 2005 launch of the core findings to 1580 sessions per day in the 10 months after the launch. The peak usage was on the day of the MA launch with 26,400 sessions. A search for “Millennium Ecosystem Assessment” in Google turns up 265,000 pages (February 2006). By way of comparison, a search for “Intergovernmental Panel on Climate Change” yields 1,560,000 pages, “Pew Oceans Commission”: 81,000, “Global Environment Outlook”, 176,000 pages and “World Conservation Union”: 1,150,000 pages.



- **Downloads.** The table below lists the number of downloads of the various MA products from the MA website as of February 1, 2006:

Document Category	Downloads
Synthesis Reports	162,104
Chapters from <i>Ecosystems & Human Well-being: A Framework for Assessment</i>	54,862
Statement of the MA Board	41,109
Slide Presentations	22,303
Sub-global Assessment Report: Southern African Millennium Ecosystem Assessment (SAfMA)	13,323
Chapters from: <i>Assessment Report – Current State and Trends</i>	10,572
Newsletters	8,764
Chapters from: <i>Assessment Report – Scenarios</i>	2,827
Chapters from: <i>Assessment Report – Policy Responses</i>	2,535
Chapters from: <i>Assessment Report – Multiscale Assessments</i>	1,905
Chapters from: <i>Assessment Report – Summary</i>	1,415
Sub-global Assessment Report: Coffee-Growing Regions (Colombia)	954
MA Training and Capacity-Building Tools	910

- During a Fall 2005 trip to North America, **Prince Charles of the UK** referred to the MA in his presentations: “Charles hailed the warnings of the U.N.-commissioned Millennium Ecosystem Assessment, which chronicles crises of over-fishing, loss of forests and pollution. ‘Incidentally,’ he said, ‘I really do recommend you all read it as a matter of priority.’” (LA Times, November 8, 2005)
- Plans are being developed to launch a **state-level ecosystem assessment for Minnesota** using the MA framework (contact: Ann Kapuscinski, University of Minnesota, kapus001@umn.edu).

- A MA Chapter Review Editor attending a meeting of the **German Forum** in late November in Berlin noted that all three papers on desertification made reference to the MA's scenario projections for dryland areas.
- Scientists involved in the **DIVERSITAS** First Open Science Conference, Integrating biodiversity science for human well-being, held in Oaxaca, November 9-12, 2005 issued a declaration calling on governments to establish an on-going assessment process modeled on the MA (See Annex 8).
- Zhao Shidong, **China Academy of Sciences**, notes that the MA has become a very important and well known program by decision-makers, scholars and media in China. The results of the MA have been cited by the media and scholars widely.
- **Sandy Gauntlett**, New Zealand (sandygauntlett@hotmail.com) reported that “The release of the findings here got really big media coverage and since their release more people have been taking environmental issues seriously.”
- **Mike Young CSIRO, Australia** (mike.young@csiro.au) reports that “the main impact that I am seeing is its repeated use as a baseline point of reference in presentations on the environment in international conferences, [such as] OECD Workshop on Water & Agriculture in Adelaide, and International Symposia on the Restoration of Natural Capital in Missouri.” He has “yet to see an Australian politician use it to justify a local action but in Australia we have local data that is more connected.”
- The MA has also made impacts up in less-expected ways. See for instance:
 - Cartoons that appeared in the press (including the US, France, Australia) following the 30 March launch;
 - Canadian composer Matthew Lien’s project “An Island Called Earth” (“... to capture musically what the United Nations' Millennium Ecosystem Assessment is trying to explain economically”) in http://www.matthewlien.com/current_projects/current_projects.php;
 - The entry for the MA in Wikipedia: http://en.wikipedia.org/wiki/Millennium_ecosystem_assessment;
 - GlobeScan's Survey of Sustainability Experts on the MA in http://surveys.globescan.com/sose_highlights/sose05-1_highlights.pdf;
 - The virtual discussion on MA scenarios in WorldChanging at <http://www.worldchanging.com/archives/002447.html>;
 - The call to “the youngest generation” for a Flash Mobbing (“...the gathering of people at a fixed time and location, where something extraordinary is done (shaking peoples hands for a minute). Right after that everyone disappears again”) on June 1 at 13:00 in <http://www.platform2005.org/language/scripts/ua.html>. “The message: Our common value making clear to world leaders: 1 Family 1 Nature!”;
 - AILA Scientific Commission on Language and Ecology’s in exploring the representations of the non-human world within the MA, specifically the representation of fish (<http://www.ecoling.net>).
- In addition, the MA has been the subject of other discussions that directly inform decision-making. For example:
 - Ministers of environment in the UK and New Zealand were subject to questioning by members of parliament specifically on the MA and its findings;
 - The MA figured highly in closed ministerials and plenaries during 13th session of the UN Commission on Sustainable Development.

- The Director of the Federation of Canadian Municipalities sought more information from the MA to link it to local authorities;
 - Officials from the Ministry of Agriculture in Germany have sought advice from MA staff on how to use the findings;
 - Other international NGOs are actively using the MA, including large international organizations as diverse as Friends of the Earth, Global Witness and the Natural Resources Defense Council.
- In contrast, Charles Hall (chall@esf.edu) commented with respect to the query as to whether he had observed any impact or use of the MA findings: “My answer as an ecologist/environmental/ecosystem scientist that is very much involved in global and international issues is: none.” Similarly, Antony Berger (IUGS Geoindicators Initiative, bergerar@telus.net) indicated: “From my little perch in the earth science world I have not noted any use being made of the MA findings: I wish it were otherwise.”

Annex 1. MA Outreach Activities

Launch events for the MA findings were held simultaneously in major cities (London, Washington DC, Tokyo, Beijing, Delhi, Cairo, Nairobi, Rome, Paris, Stockholm, Lisbon, Brasilia and Sao Paulo) on March 30, 2005. The seminars and press briefings were well attended (from over 90 participants in London to more than 400 in Sao Paulo) and press coverage was very broad. At least 29 wire services in nine languages reported the story and a number of journals and papers featured the MA findings prominently. Hundreds of newspapers around the world carried the story; it was front page in papers such as *Le Monde* (France), the *Guardian* (U.K.), both leading papers in the Netherlands, both leading papers in Norway, and *Folha de Sao Paulo* in Brazil. It was covered on the evening broadcast news in countries ranging from the United Kingdom and Italy to India, and CNN International ran the story repeatedly. The BBC's *Earth Report* ran two half-hour programs covering the MA in the week prior to the launch. The *Economist* covered the launch and two weeks later ran a cover story ("Rescuing Environmentalism and the Planet") and lead editorial that were prompted largely by the MA release. Nearly one year after the launch, new media citations to "Millennium Ecosystem Assessment" appear on Google News at a rate of between one and two per day.

Separate launch events have now been held for the Biodiversity, Desertification, Business & Industry, Wetlands, and Health synthesis reports:

- The Biodiversity Synthesis was launched on May 19, 2005 in conjunction with celebrations led by the CBD Secretariat in Montreal for the International Day for Biodiversity, with a simultaneous launch organized by UNEP-WCMC in London and Cambridge. A Chinese version of the report's Summary for Decision Makers was also launched in Beijing by the State Environmental Protection Authority of China.
- The Desertification Synthesis was launched with the CCD Secretariat in conjunction with the World Day to Combat Desertification on June 17, 2005 in Bonn, Germany.
- The Business and Industry Synthesis was launched on July 12, 2005 with press releases and follow-up media coverage which included an E&ETV interview with Steve Percy.
- The Wetlands & Water Synthesis was released at the Ramsar Convention on Wetlands' 9th Conference of Parties meeting on 8 November, 2005 in Kampala, Uganda.
- The Health Synthesis was released on 9 December 2005 by the World Health Organization at a press conference in Bangkok, Thailand during the Scientific Conference on Asia Pacific Environmental Health organized by the Thai Ministry of Natural Resources and Environment and the Chulabhorn Research Institute.

On June 3, 2005 on the occasion of World Environment Day (Sunday, June 5), a series of videoconferences focused on the MA findings were organized in Latin America (connecting also to speakers at UC Berkeley and Brown University) in Buenos Aires, Santiago de Chile, Lima, Quito (and from there re-broadcast to three other cities in Ecuador) and Mexico City (and from there rebroadcast to two additional cities in Mexico). In all locations except Mexico, the videoconference was preceded by a local event. Participants included government officials, NGOs, academia and the press.

The MA technical assessment reports, *State and Trends*, *Scenarios*, *Policy Responses*, and, *Multi-scale Assessments* and the summary volume (containing the Summaries for Decision-makers from the four technical volumes) were released at a press conference in Washington, D.C. on January 19, 2006.

Annex 2. Other MA Expert Outreach

MA authors have taken the initiative to provide briefings on the MA in a number of forums, including the following briefings and presentations by the MA secretariat:

- The fourth session of the UN Permanent Forum on Indigenous Issues (UN Headquarters)
- Rights & Democracy Conference (Canada)
- Annual Conference of the Green Party of Aotearoa New Zealand
- Friends of Le Monde Diplomatique conference on the state of the planet (France)
- Annual meeting and legislative conference of the Directors of North American Zoo's and Aquaria (USA)
- World Economic Forum meeting of 'Young Global Leaders' (Switzerland)
- WBCSD Water Scenario Workshop (Beijing, 1 June 2005)
- First International Congress on Successful Cases on Sustainable Development in the World Tropics (Mexico)
- Abdus Salam Intern Centre for Theoretical Physics (Italy)
- FIDIC (International Federation of Consulting Engineers) annual meeting, Beijing, 7 September 2005: plenary presentation for annual meeting. <http://www1.fidic.org/conference/2005/talks/>
- INTOSAI (International Organization of Supreme Audit Institutions), 10th assembly of the Working Group on Environmental Auditing, Moscow, 27 October 2005. Plenary presentation.
- Ecological Society of America (August 10, 2005). Symposium on the MA findings.
- John D. and Catherine T. MacArthur Foundation (August 25, 2005). President's Roundtable presentation to senior foundation staff.
- Rainforest Action Network (September 7, 2005). Briefing for staff.
- Tlahtokan Nahuacalli, Phoenix, Arizona (September 9-10, 2005). Briefing and seminar for an indigenous group in Phoenix Arizona. This group subsequently has taken steps to undertake a sub-global assessment modeled on the MA.
- COM+, New York (September 13, 2005). Briefing for African journalists on the MA findings organized by the Alliance of Communicators for Sustainable Development (includes the World Bank and other organizations).
- Danish Minister of the Environment, Ms. Hedegaard, New York. (September 13, 2005)
- Aldo Leopold Leadership Program Training Workshop, Washington, D.C. (September 26, 2005).
- World Bank Country Environment Officers, Washington, D.C. (September 27, 2006).
- University of Virginia (October 5, 2005). Presentation to inaugurate a new program in Environmental and Biological Conservation at the University of Virginia.
- GEF Scientific and Technical Advisory Panel, Washington, D.C. (October 11, 2005).
- Carnegie Institute, Stanford University (October 12, 2005)
- Canadian Business for Social Responsibility Annual Meeting (October 18, 2005)
- Seattle Town Hall, Seattle (October 25, 2005). A public forum marking the tenth anniversary of the Brainerd Foundation and sponsored by that foundation.
- Goldman Sachs, New York. (November 4, 2005).
- UC Berkeley, Energy and Resources Group Seminar. (November 9, 2005)
- US Environmental Protection Agency Science Advisory Board, Washington, D.C. (December 13, 2005). Keynote presentation for annual meeting.
- Inter-American Development Bank, Washington, D.C. (December 19, 2005) Presentation on the MA for the president of the IDB focusing on the implications of the report for biodiversity in Latin America. Participation in a half day seminar focused on the MA findings.
- Environmental Law Institute, Washington, D.C. (December 20, 2005). Monthly seminar for members.
- Bren School of the Environment, UC Santa Barbara (January 13, 2006).
- David and Lucile Packard Foundation

- Eco-Assets in Business Conference, EPRI Solutions, Palo Alto (Opening Keynote; March 13-14, 2006)
- Gordon and Betty Moore Foundation All-Staff Seminar (March 17, 2006)
- US Senate staff
- US House of Representatives staff

In addition, MA experts have undertaken outreach events including:

- Lisen Schulz, Stockholm University (lisen@ecology.su.se) reports that “I must say that the MA has gained a lot of attention in **Sweden**, and the concept of ecosystem services and human dependence of ecosystems have been raised as a result of the programme. So far, the MA has mostly been used as a reason/opportunity to discuss the links between human wellbeing and ecosystems, and what this means for the future. For example, almost all presentations and courses made by Albaeco Research Information Institute (www.albaeco.com) use the MA as a background and to give weight and credibility to the issue of sustainable development. Focusing on the MA, we have made presentations at:
 - The Ministry for Sustainable Development
 - The unit for Global Development at the Ministry for Foreign Affairs
 - The Swedish EPA
 - The Swedish EPA conference for all counties (about future directions for nature conservation)
 - The Swedish EPA conference for all municipalities
 - The Royal Swedish Academy of Agriculture and Forestry - conference on the possibility of establishing markets for ecosystem services. Audience of politicians (representing Sweden in the EU parliament), journalists, scientists, NGOs (40 persons)
 - Future Design Days (large international conference for designers) "Research night" at the Cultural house in Stockholm for the public (50 persons), also broadcast on national TV
 - Conference at Swedish University of Agriculture (scientists and farmers)
 - A National Radio show on natural disasters
 - Stockholm Junior Water Prize (30 young students from all over the world)
 - "Fiction Hotel", Exhibition about the future on planet Earth, at the Cultural house in Stockholm
 - Education seminar for high school teachers
 - Several lectures in undergraduate courses at Stockholm University
 - In addition, we all mention the MA in most of the presentations and lectures we make, within and outside the university.”
- In September 2005, Rik Leemans, rik.leemans@wur.nl, Bob Watson, and Antony Bergmans (CEO of Unilever), participated in a 4 hour session with **Dutch parliament** focusing on the findings of the MA.
- Sue Mainka (IUCN) used some of the MA graphics in her presentation at the **Conference on Health and Biodiversity** held in Galway, Ireland on 23-25 August.
- Jeff McNeely gave a presentation on 23 September 2005 entitled “The Millennium Ecosystem Assessment: An international effort to understand the state of our planet”, at the **European Nature Conference** in The Netherlands.
- Rodrigo Gamez, former Director of Costa Rica’s National Biodiversity Institute (InBio) presented a keynote at the **Costa Rica National University**, Costa Rica’s second largest university, based entirely on the key findings of the MA. The top authorities reacted very positively to the

challenge he presented, of the role of the universities in front of this situation. The conference was part of a rethinking or reinventing the university, a 3-year process.

- Dr. Syed M. Saifullah (smsaifullah2001@yahoo.com), University of Karachi, **Pakistan**, has undertaken a number of outreach activities including:
 - Letter to Editor, Daily “Dawn” Karachi, (May 5, 2005).
 - Three column Press Briefing in Urdu language to the largest Urdu daily of Pakistan, the daily “Jang”, dated July 7th, 2005.
 - Lecture on MA at the Lecture Hall of H.E.J. Research Institute of Chemistry, Karachi on August 11th, 2005, organized jointly by the H.E.J. Institute, International Center for Chemical Sciences and Dr. Panjwani Center for Molecular Medicine and Diagnostic Research.
 - Keynote lecture on MA at the Workshop on “Sustainable Fishery Policy in Pakistan” organized by WWF-Pakistan on 14th September, 2005 at the Wetland Centre, Sandspit, Karachi.
 - A brief TV interview televised by the channel ARY-1 on 15 September 2005.
 - A lecture on MA at Faculty of Marine Science K.A.A. University, Jeddah, Saudi Arabia on 18th December.
 - Charles Barber has given two presentations on the MA Forests C&T chapter (with some coverage of the responses chapter as well), one in late-September hosted by the **United States Forest Service International Program** and one for the **World Bank** forest group.
 - The Cropper Foundation of Trinidad and Tobago is planning a one-day seminar (likely to be held in March 2006) at the **University in Trinidad**, during its annual research week, to present the MA, CARSEA and Northern Range findings. (Contact: Angela Cropper, acropper@thecropperfoundation.org)
 - Oonsie Biggs (biggs@wisc.edu), **University of Wisconsin** (formerly with **CSIR in South Africa**), has given a number of talks focused on the Southern African Millennium Assessment (SAfMA), bringing in some of the conceptual aspects of the broader MA (e.g. the classification of Ecosystem Services, and the conceptual framework diagram) including seminars at:
 - CSIR annual public scientific seminar series, to which the public and key stakeholders are invited, Pretoria, South Africa
 - CSIRO Sustainable Ecosystems Division in Canberra, Australia
 - Scientific Services Division of the Kruger National Park, South Africa
 - Center for Limnology, Madison, Wisconsin
 - Center for Sustainability and the Global Environment, Madison, Wisconsin
 - Ecological Society of America Meeting in Montreal
- She also participated in two workshops that drew heavily on conceptual aspects of the MA in the development of their proposals/ projects:
- The GECAFS (Global Environmental Change and Food Systems) scenarios project led by John Ingram (jsii@ceh.ac.uk) - Monika Zurek and Bob Watson also attended.
 - The Restoring Natural Capital initiative, led by James Aaronson (james.aaronson@cefe.cnrs.fr) - Bob Scholes, Richard Norgaard also attended.
- M.K. Prasad of **India** gave a presentation on the MA at the annual conference of his organization – Kerala Sastra Sahitya Parishad – in February 2006 and to the Kerala State Science Congress during January 2006. He has also published articles covering MA findings in local languages.

- Steve Percy has presented the MA Business and Industry Synthesis report to several forums including the **ERB Institute at the University of Michigan**, the corporate benchmarking gathering of the **AHC Group of Companies**, and the **Businesses for Social Responsibility (BSR)** conference recently held in Washington DC. He planned to use the MA as the centerpiece of a lecture in February 2006 to a session convened by the college of Baldwin Wallace on corporate ethics.
- Dr. Boshra Salem, **Alexandria, Egypt**, has given presentations of the MA findings on the level of:
 - Local community (presentations in different forums including NGOs and Rotary clubs)
 - Scientific community at the University of Alexandria
 - Private sector companies and their decision makers.
 - National government (scheduled to give a presentation for the Ministry of Environment. in December 2005.
- Jo Mulongoy, with the Secretariat of the **Convention on Biological Diversity** used the MA report(s): a) when he was interviewed twice for the radio in Montreal; b) in the courses / seminars that I gave at the Kennesaw University (Georgia, U.S.A.), University of Pisa, Italy and the University of Klagenfurt (Austria); c) in all publications or presentations in conferences he has attended since March 2005.
- Zhao Shidong, **China Academy of Sciences**, has made many presentations on MA to different institutions and university students and planned to make another presentation for an international workshop organized by SEPA and UNDP in Beijing on December 15, 2005.
- Erin Bohensky, **University of Stellenbosch, South Africa**, has given presentations on the MA (mainly the SAfMA perspective) in five countries (Kenya, Mali, Mauritania, Tanzania and Uganda) and at a UNEP/UNDP workshop in Ghana on mainstreaming the environment into development processes in Sub-Saharan Africa. The audiences in all cases have included a mix of individuals from government, NGOs, academia, and donor agencies. (Contact: Erin Bohensky, erin@sun.ac.za)
- Phoebe Barnard at the **South African National Biodiversity Institute** (Barnard@sanbi.org) reports: “I have given one institutional seminar on the MA findings within the South African National Biodiversity Institute which was well attended by about 35 professional conservation biologists and researchers.” She has also included MA slides in 3 other talks in the past 15 months aimed (1 and 2) at young African postgraduate students in the environmental sciences (two different classes of about 15 students each); and (3) at about 150 South African invasive species policy, regulatory and science specialists.
- Cecilia Iglesias, **Asociación Civil Red Ambiental**, (ciglesias@copaara.org) the former coordinator of the MA User Forum in Argentina, delivered several presentations on the MA to different audiences during 2005, including one in October during the National Youth and Environment Meeting in Argentina.
- Zhao Shidong, **Chinese Academy of Sciences** (zhaosd@cern.ac.cn) reports that he made four presentations on the MA in different meetings in December 2005, and will make more in the coming months. He reports “I was surprised by the very enthusiastic discussion following my presentation – the audiences have liked the ideas and approaches of the MA very much.”

- In **Mexico**, Patricia Balvanera (pbalvane@oikos.unam.mx) has given presentations to the general public and local decision makers (authorities within ejidos, staff of state governmental offices) during a 2-day event focused on ecosystem services organized by the Consejo Estatal de Ecología (State Ecology Council) in March 2005.
- Andrew Bennett, with **Syngenta Foundation for Sustainable Agriculture**, organized a set of lectures on "Agriculture's Future: Perspectives on the Millennium Ecosystem Assessment" on the occasion of World Food Day, October 2005.
(http://www.syngentafoundation.com/wfp_symposium/index.htm)
- Delegates at the **New Zealand Association of Environmental Education** conference on sustainability were presented with the findings of the Millennium Ecosystem Assessment.
- Diana Wall, Natural Resource Ecology Laboratory, Colorado State University presented a talk on World Ecosystems in Peril: Millennium Ecosystem Assessment Findings at **Wesleyan University's (Connecticut)**, "Where on Earth are We Going" symposium, October 8, 2005.
- Scott Muller (s.muller@codesta.org), CODESTA, utilized the MA Frameworks, slides and results at a presentation at the **Smithsonian Tropical Research Institute** in Panama on the importance of implementing practical guidelines and tools from the Multilateral Environmental Agreement process. March, 2005.
- Dr. Tekin Kara (tekinkar@omu.edu.tr) will give a seminar at **Ondokuz Mayıs University, Samsun, Turkey** in May, 2006, entitled: "Global change; from past to future" based largely on MA results and slides.
- Carlos Corvalan (corvalanc@who.int) organized a side event on the MA and Environmental Health linkages at the **World Health Assembly** in May 2005 and presented the findings of the health synthesis at the **Biodiversity and Health Conference** in Galway in August 2005.
- Uriel Safriel (uriel36@gmail.com) delivered the following presentations of the MA:
 - 9th May 05 – Panel Discussion on "Desertification Monitoring and Assessment" in a Plenary Session of the **Committee to Review the Implementation of the Convention of the CCD** in Bonn, Germany.
 - 6 June 05 - the **U.S. Forest Service** in Washington DC, the team which prepares the coming 10-year strategy of the Service.
 - 25 August 05 - a workshop on "Security threats, challenges, vulnerabilities and risks" at the **First World International Studies Conference in Istanbul, Turkey**
 - 25 September 05 - a team of the **Israeli afforestation and land management organization**, preparing a management program for a large desert watershed in Israel.
 - 5 October 05 - a conference organized by the **Italian National Committee to Combat Drought and Desertification**, in cooperation with the University of Viterbo, titled "Toward an integration of traditional knowledge and new technologies for combating drought and desertification"
 - 31 October 05 - a **side event of COP7 of the CCD** in Nairobi, to a team preparing a document on indicators for supporting land degradation projects by the GEF.
- Patrick Lavelle (Patrick.Lavelle@bondy.ird.fr) has given a dozen talks on the MA findings and uses the material in his teaching. A video of one of these conferences is available at <http://www.diffusion.ens.fr/index.php?res=conf&idconf=993>.

Annex 3. Publications about, derived from, or using the MA

The following list is very incomplete and simply lists publications mentioned by the respondents to the survey. There was no attempt to comprehensively gather information on MA citations. A search for “Millennium Ecosystem Assessment” in Google Scholar yields 822 citations. (For comparison, “Intergovernmental Panel on Climate Change” yields 17,100 citations.)

Publications stemming from the MA process

- Sachs, Jeffrey and Walter Reid. *In press*. Development is environment. *Science*.
- Two special feature issues of the on-line Journal *Ecology and Society* (<http://www.ecologyandsociety.org/>) consist of research articles stemming from the Millennium Ecosystem Assessment: *Scenarios of Global Ecosystem Services* and, *Strengthening People's Adaptive Capacity for Ecosystem and Human Wellbeing*.
- Brovkin, V., J. House, R. Defries. 2006. New assessment focuses on ecosystems, human well-being, and the climate system. *Eos*. Vol. 87 (5): 50.
- Prof. Zhao Shidong has written a paper "Millennium Ecosystem Assessment: The Achievements and Perspectives", which will soon be published in a leading Chinese journal.
- Dr. Xu Jianchu (ICIMOD) has written three papers on the MA.
- Weinstein, Philip. 2005. Human health is harmed by ecosystem degradation, but does intervention improve it? A research challenge from the Millennium Ecosystem Assessment. *EcoHealth* 2:1–3.
- Carpenter, Stephen R. and Carl Folke. *In press*. Ecology for transformation. *Trends in Ecology and Evolution*. Available online on March 10, 2006.
- Butler CD, Corvalan CF, Koren HS. Human health and well-being in global ecological scenarios. *Ecosystems* 2005; 7: 1-10.
- Corvalan C. and D. Campbell-Lendrum. Focusing on the future through the looking glass: Building scenarios of health and environment. *EcoHealth*, 2005, 2(1): 18-20.
- Hales S, Butler CD, Woodward A, Corvalan C. Health Aspects of the Millennium Ecosystem Assessment. *EcoHealth*, 2004; 1(2): 124-128.
- Bohensky, E.L., B. Reyers, and A.S. van Jaarsveld. *In Press*. "Future Ecosystem Services in a Southern African River Basin: a Scenario Planning Approach to Uncertainty." *Conservation Biology*
- Lasco, RD, MVO Espaldon, and MA Tapia (eds). 2005. Ecosystems and People: The Philippine Millennium Ecosystem Assessment (MA) Sub-Global Report: Main Report. Environmental Forestry Programme, University of the Philippines. 233pp
- Lasco, RD, MVO Espaldon, and MA Tapia. 2005. Ecosystems and People: The Philippine Millennium Ecosystem Assessment (MA) Sub-Global Report: Synthesis Report. Environmental Forestry Programme, University of the Philippines. 34pp

- Peña-Neira, Sergio. 2005. La importancia del “Millenium Ecosystem Assessment” o “Evaluación de los Ecosistemas Mundiales para el Presente Milenio.” *EcoAmerica*. November 2005, p. 31.

Publications about or analyzing the MA

- Miller, Clark A. In press. (will appear in Oct. 2006 or Apr. 2007.) Knowledge, Reason, and the Constitution of Democratic Order in Global Governance. *Governance*.

Publications using or citing MA information

- Tetior, Alexander. 2005. *Ecological Infrastructure*. MA Information on cities used in this textbook
- Groom, Martha. 2005. *Principles of Conservation Biology* (Sinauer Associates, publishers). This publication uses the MA reports (the main synthesis and the CBD synthesis) “up to the minute” in the complete revision of which came out in August 2005. By the end of the year over 6000 copies will be in use (including a large number that have been donated for use in the third world).
- Dirzo, R. and M. Loreau (2005) Biodiversity science evolves. *Science* 310:943-943.
- Rodríguez, J. P., T. Good and R. Dirzo (2005) Diversitas and the challenge of Latin American biodiversity conservation. *Interciencia* 30:450-450.
- Ernesto Vigilizo (evigliz@cpenet.com.ar) indicated that “the MA conceptual framework is present in our research work, and the following refereed publications (already published or in press) found their roots in such approach. I attach copy. Although MA was not cited in all cases, it is clear that mainstream MA thinking is behind our work.”:
 - Viglizzo, E.F., Pordomingo, A.J., Buschiazzi, D. and Castro, M.G. (2005). A methodological approach to assess cross-scale relations and interactions in agricultural ecosystems of Argentina. *Ecosystems* 8: 546-558.
 - Viglizzo, E.F. and Frank, F.C. (2005). Land use options for Del Plata Basin in South America: Tradeoffs analysis based on ecosystem service provision. *Ecological Economics*, XXXX (accepted, in press).
 - Viglizzo, E.F. and Frank, F.C., Bernardos, J., Buschiazzi, D.E., Cabo, S. (2005). A rapid method for assessing the environmental performance of commercial farms in the Pampas of Argentina. *Environmental Monitoring and Assessment*, XXX, 1-26 (accepted, in press).
- All three of the draft chapters (Ch. 2, 19, 20 in WG 2) of the 4th IPCC report reviewed by Wolfgang Weimer-Jehle and Ortwin Renn included citations to the MA.
- The MA is cited in *State of the World 2006* (World Watch Institute) including quoting the MA Business Synthesis in the opening of the final chapter "Transforming Corporations."
- Lester Brown cites the MA in his next book, *Plan B 2.0* (2006).
- The following publication uses the MA conceptual framework as its basis: Maass, J.M., Balvanera, P., Castillo, A., Daily, G.C., Mooney, H.A., Ehrlich, P., Quesada, M., Miranda, A., Jaramillo, V., García-Oliva, F., Martínez-Yrizar, A., Cotler, H., López-Blanco, J., Pérez-Jiménez, A., Búrquez, A., Tinoco, C., Ceballos, G., Barraza, L., Ayala, R. Ecosystem services delivered by tropical dry forests: a case study from the Pacific Coast of Mexico. *Ecology and Society* 10(1): 17. [online] URL: <http://www.ecologyandsociety.org/vol10/iss1/art17>.

- Finlayson, C. Max, Maria Grazia Bellio and John B. Lowry. 2005. A conceptual basis for the wise use of wetlands in northern Australia – linking information needs, integrated analyses, drivers of change and human well-being. *Marine and Freshwater Research* 56(3) 269–277.
- Two graduate students, one at Wisconsin and one at McGill, are chairing a Young Scholar's Dialog about the MA through the portal of the Resilience Alliance. This involves a moderated web conversation among about 15 young scientists from around the world, leading to a multi-authored synthesis paper by all of the young scientists involved. The web conversation began in early March and was scheduled to run for about 2 weeks. Eventually the paper will be published in *Ecology and Society*. Several faculty are running student-generated blogs about the MA. The Resilience Science blog (<http://www.resalliance.org>) also includes material on the MA. (Contact: Stephen Carpenter, srcarpen@wisc.edu)
- Folke, C., T. Hahn, P. Olsson, and J. Norberg, 2005: Adaptive governance of social-ecological systems. *Annual Review of Environment and Resources*, 30:441–73. <http://arjournals.annualreviews.org/loi/energy>. This publication refers to four of the sub-global assessments - Laguna Lake Basin, Sweden KW, San Pedro de Atacama, and Tropical Forest Margins - as examples of successful collaboration and leadership that managed to bridge the concerns and solve conflicts across different stakeholder groups. The source for this information is Chapter 9 (Responses) of the Multiscale Volume.

Annex 4. Convention on Biological Diversity SBSTTA-11 Decision

CONFERENCE OF THE PARTIES TO THE CONVENTION ON BIOLOGICAL DIVERSITY

Eighth meeting

Curitiba, Brazil, 20-31 March 2006

Item 9 of the provisional agenda

X/4. Implications of the findings of the Millennium Ecosystem Assessment for the future work of the Convention

The Subsidiary Body on Scientific, Technical and Technological Advice recommends that the Conference of the Parties:

(a) *Welcomes* the reports of the Millennium Ecosystem Assessment, in particular the synthesis report on Biodiversity and its summary for decision makers, as well as other reports, including the General Synthesis Report, synthesis reports on Desertification, Human Health, and Wetlands and Water, the report on Opportunities and Challenges for Business and Industry, and the reports of the four working groups on Current Status and Trends, Scenarios, Policy Responses and Multi-Scale Assessments, recognizing that these reports include key findings relevant to the implementation of the Convention's programmes of work;

(b) *Notes* the successful use of indicators in the Millennium Ecosystem Assessment, including those indicators of the framework contained in decision VII/30, for communicating trends in biodiversity and highlighting its importance to human well-being, and further notes the need for additional and improved measures of biodiversity and ecosystem services, in order to assist in communication, setting achievable targets, addressing trade-offs between biodiversity conservation and other objectives, and optimizing responses;

(c) *Takes note* of the main findings of the Biodiversity Synthesis Report, namely that:

- (i) Biodiversity is being lost at rates unprecedented in human history;
- (ii) Losses of biodiversity and decline of ecosystem services constitute a concern for human well-being, especially for the well-being of the poorest;
- (iii) The costs of biodiversity loss borne by society are rarely assessed, but evidence suggests that they are often greater than the benefits gained through ecosystem changes;
- (iv) The drivers of loss of biodiversity and the drivers of change in ecosystem services are either steady, show no evidence of declining over time, or are increasing in intensity;
- (v) Many successful response options have been used, but further progress in addressing biodiversity loss will require additional actions to address the main drivers of biodiversity loss; and
- (vi) Unprecedented additional efforts will be required to achieve, by 2010, a significant reduction in the rate of biodiversity loss at all levels;

(d) *Notes* the key messages contained in the Biodiversity Synthesis Report (UNEP/CBD/SBSTTA/11/INF/22);

(e) *Noting* that the Millennium Ecosystem Assessment finds that the degradation of ecosystem services could significantly increase during the first half of this century, and is a barrier to achieving the Millennium Development Goals, and that, at the same time, many of the actions being

undertaken to promote economic development and reduce hunger and poverty could contribute to the loss of biodiversity, *emphasizes* that the Millennium Development Goals, the 2010 target of significantly reducing the rate of biodiversity loss, and other internationally agreed targets related to biodiversity, environmental sustainability and development need to be pursued in an integrated manner;

(f) *Noting* the new and significant evidence presented in the Millennium Ecosystem Assessment, *urges* Parties, other Governments and relevant organizations to strengthen their efforts and take the measures necessary to meet the 2010 target adopted in the Strategic Plan of the Convention, and the goals and subtargets annexed to decision VII/30, taking into account the special needs, circumstances and priorities of developing countries, in particular the least developed countries and small island developing States among them, and countries with economies in transition;

(g) *Invites* the financial mechanism, in coordination with the Executive Secretary, to identify gaps and needs in relation to existing financial resources to meet the unprecedented additional efforts needed to significantly reduce the rate of biodiversity loss and maintain the provision of ecosystem goods and services;

(h) *Noting* the finding of the Millennium Ecosystem Assessment that an increase in average global temperature of two degrees or more above pre-industrial temperatures will give rise to globally significant impacts on ecosystems, with significant consequences for livelihoods, *urges* Parties and other Governments, where appropriate, to meet their commitments under, and to take cognizance of, the provisions of the United Nations Framework Convention on Climate Change and its Kyoto Protocol, in order to avoid dangerous impacts;

(i) Mindful that the loss of biodiversity is continuing, and recognizing the inertia in ecological systems and in the drivers of biodiversity loss and therefore the need for longer-term targets, *decides* to consider, at its ninth meeting, the need to review and update targets as part of the process of revising the Strategic Plan beyond 2010;

(j) *Recognizes* that the main drivers of biodiversity loss differ among regions and countries;

(k) *Decides* to consider the findings of the Millennium Ecosystem Assessment in the implementation and the future review of the programmes of work under the Convention;

(l) *Notes in particular* the urgent need to address the issues which the Assessment finds most significant at the global level in terms of their impacts on biodiversity and consequences for human well-being, such as:

- (i) Land use change and other habitat transformation;
- (ii) The consequences of over-fishing;
- (iii) Desertification and degradation in dry and sub-humid lands;
- (iv) The multiple drivers of change to inland water ecosystems;
- (v) Increasing nutrient loading in ecosystems;
- (vi) The introduction of invasive alien species; and
- (vii) The rapidly increasing impacts of climate change;

(m) *Aware* of the inter-sectoral nature of many of these issues, *urges* Parties to promote dialogue among different sectors to mainstream biodiversity, at the regional and national levels including, when appropriate, through the processes of the Convention, to address linkages between the conservation and sustainable use of biodiversity and, among others, international trade, finance, agriculture, forestry, tourism, mining, energy and fisheries, in order to contribute to the more effective implementation of the Convention, in particular its Article 6;

(n) *Recognizing* that these issues are the concern of a number of other international and regional conventions and processes, *encourages* Parties to also address these issues within these other international conventions and regional processes;

(o) *Requests* the Executive Secretary to bring the findings of the Millennium Ecosystem Assessment to the attention of the liaison group of the biodiversity-related conventions, and to other multilateral environmental agreements and relevant international and regional processes, with a view to explore options, as appropriate, for joint activities to successfully address and respond to the direct and indirect drivers of biodiversity loss;

(p) *Aware also* of the impacts of the inequalities in the use of resources and the implications of this imbalance for the drivers of biodiversity loss, *urges* Parties to change unsustainable patterns of production and consumption that impact on biodiversity, taking into account the Rio Declaration on Environment and Development, including, *inter alia*, the principle of common but differentiated responsibilities, as set out in Article 7 of the Rio Declaration, as well as the provisions of the Johannesburg Plan of Implementation;

(q) *Aware also* of the need to improve knowledge of trends in biodiversity, and understanding of its value, including its role in the provision of ecosystem services, as a means of improving decision-making at global, regional, national and local levels, and also recognizing cross-scale interactions in ecosystems, *urges* Parties, other Governments and relevant organizations, including scientific bodies, to increase support for and coordinate research, *inter alia*, to improve: basic knowledge and understanding of biodiversity and its components; monitoring systems; measures of biodiversity; biodiversity valuation; models of change in biodiversity, ecosystem functioning and ecosystem services; and understanding of thresholds;

(r) *Requests* the Executive Secretary, in collaboration with relevant organizations, taking into account the Millennium Ecosystem Assessment scenarios, to develop proposals for the consideration of the Subsidiary Body on Scientific, Technical and Technological Advice on appropriate regionally-based response scenarios within the framework of the Convention's programmes of work, and to coordinate these efforts with other international and regional organizations involved with work on scenarios;

(s) *Requests* the Subsidiary Body on Scientific, Technical and Technological Advice to take note in its deliberations of the linkages between biodiversity and relevant socio-economic issues and analysis, including economic drivers of biodiversity change, valuation of biodiversity and its components, and of the ecosystem services provided, as well as biodiversity's role in poverty alleviation and achieving the Millennium Development Goals;

(t) *Requests* the Subsidiary Body on Scientific, Technical and Technological Advice and *invites* Parties to draw upon the lessons learned from the Millennium Ecosystem Assessment process, including the sub-global assessments, and to make use as appropriate of its conceptual framework and methodologies in further developing work on environmental impact assessment, strategic environmental assessment and the ecosystem approach;

(u) *Requests* the Executive Secretary to draw upon relevant information from the Millennium Ecosystem Assessment in the preparation of future editions of the Global Biodiversity Outlook and meeting documentation;

(v) *Invites* Parties and the Executive Secretary to use all relevant Millennium Ecosystem Assessment reports in strengthening dialogue with other stakeholders, including the private sector;

(w) *Encourages* Parties, other Governments and relevant organizations to make use, as appropriate, of the methodologies and conceptual framework of the Millennium Ecosystem Assessment;

(x) *Emphasizes* the need for contributions of Parties, other Governments and relevant organizations for capacity-building to support integrated ecosystem assessment and improvement of knowledge and understanding about trends in biodiversity, ecosystem goods and services and human well-being, through the provision of adequate resources and the dissemination of findings, methodologies and procedures of the Millennium Ecosystem Assessment, especially in developing countries, in particular the least developed countries and small island developing States among these, and countries with economies in transition

(y) *Requests* the Subsidiary Body on Scientific, Technical and Technological Advice and the Executive Secretary to contribute to the evaluation of the Millennium Ecosystem Assessment, due to be undertaken during 2007 by the institutions represented on the Millennium Ecosystem Assessment Board, focusing in particular on the impact of the Millennium Ecosystem Assessment on implementation of the Convention at global, regional, national and local levels;

(z) *Decides* to consider, at its ninth meeting, the evaluation of the Millennium Ecosystem Assessment to be undertaken during 2007, and the need for another integrated assessment of biodiversity and ecosystems, taking into account the future plans of the Global Biodiversity Outlook, as well as the outcomes of the current and future processes of the UNEP Global Environment Outlook, and scientific assessments that may be undertaken by the Subsidiary Body on Scientific, Technical and Technological Advice;

(aa) *Also decides* to consider, at its ninth meeting, taking into account the results of other relevant processes, options for improving availability to the Subsidiary Body on Scientific, Technical and Technological Advice of scientific information and advice on biodiversity.

Annex 5. Ramsar Wetlands Convention Decision



9th Meeting of the Conference of the Parties to the Convention on Wetlands (Ramsar, Iran, 1971)

Kampala, Uganda, 8-15 November 2005

Resolution IX.1 Annex A

A Conceptual Framework for the wise use of wetlands and the maintenance of their ecological character

Introduction

1. Definitions of the key Ramsar Convention concepts of “wise use” and “ecological character” of wetlands were adopted by COP3 (1987) and COP7 (1999) respectively. Action 3.1.1 of the Ramsar Strategic Plan 2003-2008 requested the Convention’s Scientific and Technical Review Panel (STRP) to “review the wise use concept, its applicability, and its consistency with the objectives of sustainable development”.
2. In addition, COP8 Resolution VIII.7 requested the STRP to further review and, as appropriate, develop guidance and report to COP9 concerning identified gaps and disharmonies in defining and reporting the ecological character of wetlands, including, *inter alia*, harmonization of definitions and terms in the guidance on inventory, assessment, monitoring and management of the ecological character of wetlands.
3. The work of the STRP has been greatly assisted by the concurrent work of the Millennium Ecosystem Assessment (MA), in particular the MA’s Conceptual Framework for Ecosystems and Human Well-being (Millennium Ecosystem Assessment 2003. *Ecosystems and Human Well-being: A Framework for Assessment*. Island Press, Washington, D.C.), and its definition and description of the characteristics of ecosystems and ecosystem services.
4. The STRP determined that it is appropriate to update and harmonize the Convention’s “wise use” and “ecological character” definitions to take into account other now more-widely used terms and definitions relating to ecosystems and sustainable development, and that a conceptual framework for the delivery of “wise use” would be of assistance to Contracting Parties and others in determining when and where to make policy and management interventions to support this delivery.
5. This guidance covers harmonizing wetland ecosystem terminologies and provides both a conceptual framework for wetland wise use and updated and harmonized definitions of “ecological character”, “change in ecological character”, and the “wise use” of wetlands.

Wetland ecosystem terminology

6. Within the Millennium Ecosystem Assessment (MA), ecosystems are described as the complex of living communities (including human communities) and non-living environment (Ecosystem Components) interacting (through Ecological Processes) as a functional unit which provides *inter alia* a variety of benefits to people (Ecosystem Services).

7. Included in “MA Ecosystem Services” are provisioning, regulating, and cultural services that directly affect people, and supporting services which are needed to maintain these other services. Further information can be found in the Synthesis Report prepared by the MA for the Ramsar Convention (Finlayson, C.M., D’Cruz, R. & Davidson, N.C. 2005. *Wetlands and water: ecosystem services and human well-being*. World Resources Institute, Washington D.C). In the context of the Ramsar Convention this refers to products, functions and attributes as defined in Resolution VI.1 and expanded to include both material and non-material cultural values, benefits and functions as outlined in COP8 DOC.15 “Cultural aspects of wetlands”.
8. Terms currently used in previous Ramsar guidelines and documents are shown in Table 1 alongside those used in the MA. Further review of the harmonization of definitions and terms related to ecosystem benefits/services (with reference to Resolution VIII.7 (paragraph 15) and COP9 DOC. 16, taking into account the usage of such terms in other international fora) is needed by the STRP, to be reported to COP10.

Table 1. Comparative terminology for describing wetland ecosystems

MA Ecosystem terms	Ramsar terms
Ecosystem Components: physical; chemical; biological (habitats, species, genes)	“components”, “features”, “attributes”, “properties”
Ecological Processes within and between ecosystems	“processes”, “interactions”, “properties”; “functions”
Ecosystem Services: provisioning; regulating; cultural; supporting	“services”, “benefits”, “values”, “functions”, “goods”, “products”

A Conceptual Framework for wetland wise use

9. The Conceptual Framework developed by the Millennium Ecosystem Assessment (MA) for the maintenance of ecosystem services for human well-being and poverty reduction provides a multi-scalar approach which indicates how and where policy and management interventions and decision-making can be made (Figure 1). Under the MA framework, “wise use” equates to the maintenance of ecosystem benefits/services to ensure long term maintenance of biodiversity as well as human well-being and poverty alleviation.

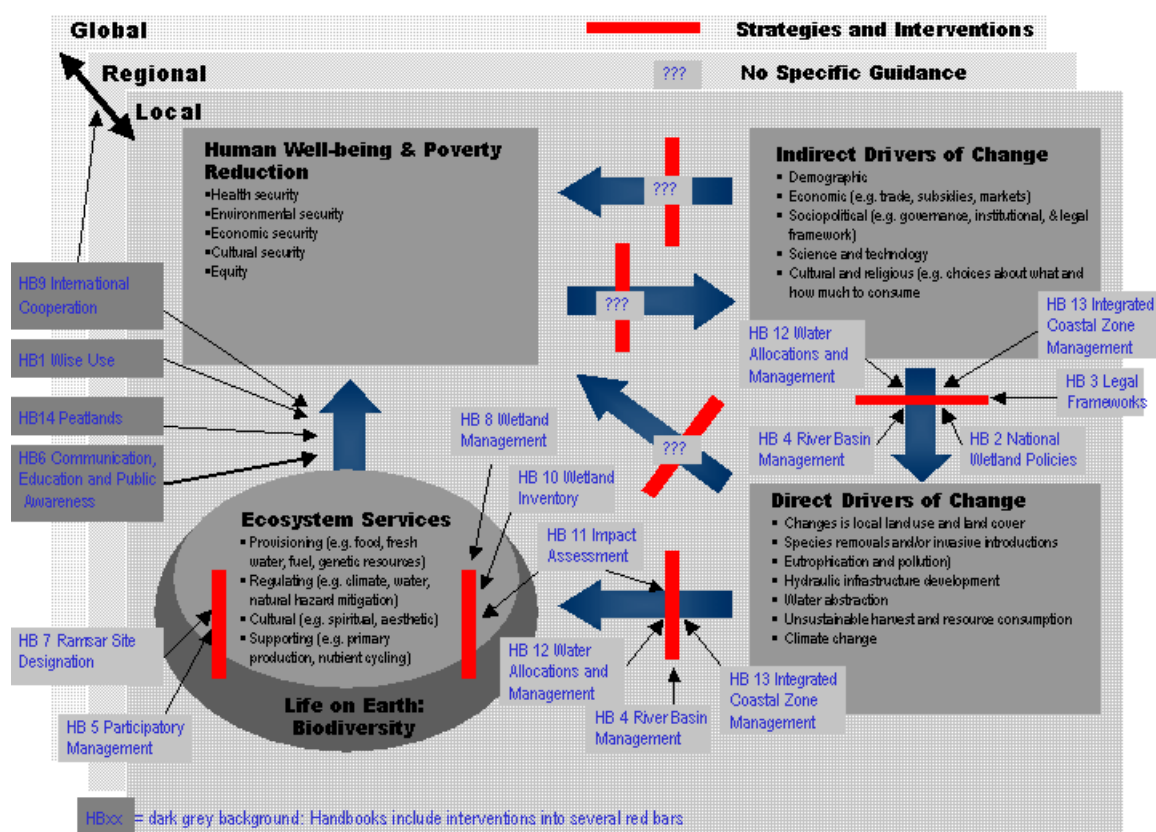


Figure 1. A Conceptual Framework for the Wise Use of Wetlands and the maintenance of their ecological character, and the application of the guidelines in the Ramsar ‘toolkit’ of Wise Use Handbooks 2nd edition (2004). (From the MA report to the Ramsar Convention: *Ecosystem Services and Human Well-Being: Wetlands & Water*. Synthesis. 2005. World Resources Institute, Washington D.C.)

10. Mapping the Ramsar Wise Use toolkit contents onto this conceptual framework also permits an assessment of the toolkit’s coverage and gaps in coverage in relation to intervention opportunities and topics. It should be noted that many of the current Ramsar wise use guidelines concern strategies and interventions to ecosystems and their processes, or strategies and interventions addressing aspects of the direct drivers of change to ecosystems. Also, these concern interventions chiefly at local or national levels, since Ramsar guidance is for Contracting Parties acting within their territories, although some guidance also applies regionally and globally (e.g., aspects of the Guidelines for International Cooperation – Handbook 9).
11. The strategies and intervention opportunities which are relevant for the application of each of the guidelines of the Ramsar toolkit are listed in Table 2.

Table 2. The application of guidelines in the Ramsar “Toolkit” of Wise Use Handbooks, supported by *Ramsar Technical Reports*, to different intervention opportunities in the MA’s Conceptual Framework (see Figure 1).

Intervention opportunity(ies)	Relevant Ramsar Wise Use Handbooks (2 nd edition), COP9 Resolutions and <i>Ramsar</i>
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Technical Reports (RTR)

Indirect drivers → Direct drivers	2. National Wetland Policies 3. Laws and Institutions 4. River Basin Management (some parts) 12. Water Allocation and Management (some parts) 13. Coastal Management (some parts) Resolution IX.1 Annex C. Water-related framework
Direct drivers → Wetland Ecosystems	4. River Basin Management 10. Wetland Inventory 11. Impact Assessment 12. Water Allocation and Management 13. Coastal Management Resolution IX.1 Annex C. Water-related framework Resolution IX.1 Annex C i. RBM “critical path” Resolution IX.1 Annex C ii. Groundwater RTR. Environmental water requirements RTR. Economic valuation of wetlands RTR. Vulnerability Assessment
Within Wetland Ecosystems	5. Participatory Management 7. Designating Ramsar Sites 8. Managing Wetlands 10. Wetland Inventory 11. Impact Assessment 12. Water Allocation and Management Resolution IX.1 Annex C i. RBM “critical path” Resolution IX.1 Annex C ii. Groundwater Resolution IX.1 Annex E. inventory/assessment /monitoring framework Resolution IX.1 Annex E i. Rapid assessment RTR. Vulnerability Assessment RTR. GIS for inventory, assessment & monitoring
Covers several types of intervention opportunities (Indirect drivers → Direct drivers, Direct drivers → Wetland Ecosystems, and within Wetland Ecosystems)	1. Wise Use of Wetlands 6. Wetland CEPA 9. International Cooperation 14. Peatlands Resolution IX.1 Annex D. Indicators of effectiveness

12. Only two current Ramsar wise use guidelines - National Wetland Policies and Reviewing Legislative and Institutional Frameworks - wholly concern interventions to indirect drivers of change, although some other guidelines include some policy aspects. However, it is clear that these ‘interventions’ onto the indirect drivers of change are important to have in place if efforts to manage wetland ecosystems sustainably through the application of the rest of the suite of Ramsar wise use guidelines are to be effective and efficient. Without such a policy and legislative framework in place, there is a risk that other interventions will take place in a ‘political vacuum’ without a clear authorizing environment for their delivery, thus risking such efforts failing.
13. For some intervention opportunities indicated by the MA Conceptual Framework – for example, between indirect drivers of change and human well-being and vice versa - there are currently no Ramsar guidelines developed.
14. All aspects of the outline *Guidelines for the implementation of the wise use concept* adopted by COP4 (Recommendation 4.10) and most aspects of the *Additional guidance for the implementation of the wise use concept* adopted by COP5 (Resolution 5.6) have now been superseded by the suite of elaborated guidelines adopted by subsequent Conferences of Contracting Parties and compiled in the Ramsar toolkit of Wise Use Handbooks (see Table 2). However, three aspects of the COP5 guidance have not

been further developed, those concerning “Research”, “Training” and “Technical issues” of sustainable technologies.

Updated definitions of “ecological character” and “change in ecological character” of wetlands

15. Applying the MA’s terms and concepts, under which services form an integral part of ecosystems, an updated definition of Ramsar “ecological character” is:

“Ecological character is the combination of the ecosystem components, processes and benefits³/services that characterise the wetland at a given point in time.”
16. The phrase “at a given point in time” refers to Resolution VI.1 paragraph 2.1, which states that “It is essential that the ecological character of a site be described by the Contracting Party concerned **at the time of designation for the Ramsar List**, by completion of the Information Sheet on Ramsar Wetlands (as adopted by Recommendation IV. 7).”
17. Furthermore, paragraph 2.3 of Resolution VI.1 states that “Contracting Parties are requested to verify the data which they have provided on Information Sheets on Ramsar Wetlands every six years, i.e., every second meeting of the Conference and to provide the [Secretariat] with updated sheets if necessary.” In addition, under paragraph 2.4 “Change in ecological character of a listed site should be assessed against the baseline status presented in the Information Sheet on Ramsar Wetlands, at the time of designation for the List (or at the time the Information Sheet was first provided to the [Secretariat]), together with any information which has been received subsequently.”
18. Essential to wetland management is baseline data that establishes the range of natural variation in components, processes and services at each site within a given time frame, against which change can be assessed. Contracting Parties have already adopted a range of guidance relevant to the identification, assessment, monitoring and management of the ecological character of Wetlands of International Importance and other wetlands, including wetland risk assessment (Resolution VII.10), impact assessment (Resolutions VII.16 and VIII.9), monitoring (Resolution VI.1), inventory (Resolution VIII.6), and management planning (Resolution VIII.14). In addition, the STRP is committed to the future development of a hierarchical mechanism for describing the ecological character of wetlands.
19. Consistent with the updated definition of “ecological character”, an updated definition of “change in ecological character of wetlands” is:

“For the purposes of implementation of Article 3.2, change in ecological character is the human-induced adverse alteration of any ecosystem component, process, and/or ecosystem benefit/service.”
20. The inclusion of specific reference to Article 3.2 of the Convention text within the definition is designed to clarify the maintenance obligation for the ecological character of listed Wetlands of International Importance (Ramsar sites) under Article 3.2, and to note that such change concerns only adverse change caused by the actions of people. This is in line with the context of Article 3.2 and Recommendation 4.8 (1990) establishing the Montreux Record, which was re-affirmed by COP8 Resolution VIII.8. For the purposes under the Convention, this definition therefore excludes the processes of natural evolutionary change occurring in wetlands and also excludes positive human-induced change.

³ Within this context, ecosystem benefits are defined in accordance with the MA definition of ecosystem services as “the benefits that people receive from ecosystems”.

21. However, it should be noted that other actions adopted by the Convention, such as those concerning assessing the overall status and trends of wetlands and Ramsar sites, require information on all types of change in ecological character – positive and negative, natural and human-induced (as is recognized in COP8 DOC. 20 and by Resolution VIII.8). Likewise, the Ramsar Convention has also recognized that wetland restoration and/or rehabilitation programmes can lead to favourable human-induced changes in ecological character (Annex to Resolution VI.1, 1996) and are a key aspect of wetland management interventions (see, e.g., Annex to Resolution VIII.14).

An updated definition of the “wise use” of wetlands

22. An updated definition of “wise use”, taking into account the Convention’s mission statement, the MA’s terminology, the concepts of the ecosystem approach and sustainable use applied by the Convention on Biological Diversity, and the definition of sustainable development adopted by the 1987 Brundtland Commission, is:

“Wise use of wetlands is the maintenance of their ecological character, achieved through the implementation of ecosystem approaches⁴, within the context of sustainable development⁵.”

23. The wise use provisions of the Convention apply, as far as possible, to all wetland ecosystems. Societal choice is inherent in advancing human well-being and poverty alleviation, which depends on the maintenance of ecosystem benefits/services. Pressures to follow sustainable development precepts, and to maintain environmental, economic and social sustainability in land use decisions, encourage compromises (“trade-offs”) between individual and collective interests.
24. Within the context of ecosystem approaches, planning processes for promoting the delivery of wetland ecosystem benefits/services should be formulated and implemented in the context of the maintenance or enhancement, as appropriate, of wetland ecological character at appropriate spatial and temporal scales.

Resolution IX.1 Annex B

Revised Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance

II. The vision, objectives and short-term target for the List of Wetlands of International Importance (the Ramsar List)

Modify, as follows, the Vision for the List in the light of the updated definition of “ecological character” in Resolution IX.1, Annex A.

The vision

⁴ Including *inter alia* the Convention on Biological Diversity’s “Ecosystem Approach” (CBD COP5 Decision V/6) and that applied by HELCOM and OSPAR (Declaration of the First Joint Ministerial Meeting of the Helsinki and OSPAR Commissions, Bremen 25-26 June 2003).

⁵ The phrase “in the context of sustainable development” is intended to recognize that whilst some wetland development is inevitable and that many developments have important benefits to society, developments can be facilitated in sustainable ways by approaches elaborated under the Convention, and it is not appropriate to imply that ‘development’ is an objective for every wetland.

To develop and maintain an international network of wetlands which are important for the conservation of global biological diversity and for sustaining human life through the maintenance of their ecosystem components, processes and benefits/services⁶.

Delete the “target for the Ramsar List to the year 2005” (box following current paragraph 21) and replace with 2010-related target adopted by COP8 Resolution VIII.26:

To ensure that the List of Wetlands of International Importance contains at least 2,500 sites covering 250 million hectares by 2010.

IV. Guidelines for adopting a systematic approach to identifying priority wetlands for designation under the Ramsar Convention

Add additional guidance after current paragraph 45:

- A1. Less visible interests should not be overlooked. Fish are not only an integral part of aquatic ecosystems, but are a vital source of food and income for people throughout the world. However, the production of fisheries in many parts of the world is declining as a consequence of unsustainable harvest regimes and the loss and degradation of habitats including spawning and nursery areas. Underwater species such as fish and other aquatic fauna and flora can often be overlooked in the development of cases for Ramsar site designation, unlike more visible animals and plants. Such aquatic interests should be carefully and systematically reviewed.

Add additional guidance after current paragraph 51:

- A2. **Sites of importance for the interactions between the ecosystem structure and functioning and their benefits.** Wetlands exist within landscapes in which people’s activities are influenced by the wetlands and their delivery of ecosystem benefits/services, and in which the wetlands themselves are influenced by the use of such benefits/services by dependent local communities (e.g., by forms of traditional management). There are many examples where the ecosystem structure and functioning of the wetland has developed as a result of cultural features or legacies. There are also many examples where the maintenance of the ecosystem structure and functioning of wetlands depends upon the interaction between human activities and the wetland’s biological, chemical, and physical components.

Move section IV.I (Guidelines for identifying and designating specific wetlands types) to follow section V, to improve readability and use of the *Strategic Framework*. Add new section D as follows:

D. Guidance for identifying and designating artificial wetlands

- D1. Article 1.1 of the Convention states that “For the purpose of this Convention wetlands are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres.”
- D2. Many existing Ramsar sites are artificial (in whole or in part) in as much as they are human-made wetlands which have, in some parts of the world and especially in anthropogenic landscapes, developed international importance for biodiversity in the period following their creation.

⁶ Within this context, ecosystem benefits are defined in accordance with the MA definition of ecosystem services as “the benefits that people receive from ecosystems”.

- D3. However, within the legal context of the Convention, the fact that some artificial wetlands may eventually develop importance for biodiversity should never be used as justification for the destruction, substantial modification, or conversion of natural or near-natural wetlands at a location.

V. Criteria for identifying Wetlands of International Importance, guidelines for their application, and long-term targets

Guidance for the application of Criterion 1

Add additional guidance after current paragraph 167:

- A3. When selecting a biogeographic regionalisation scheme to apply, it is generally most appropriate to use a continental, regional, or supra-national scheme rather than a national or subnational one.

Amend current paragraph 168 as follows:

168. Objective 1 and, in particular 1.2 (paragraph 10 above), indicates that another consideration under this Criterion is to give priority to those wetlands whose ecological character plays a substantial role in the natural functioning of a major river basin or coastal system.”

Guidance for the application of Criterion 2

Amend current paragraph 171 as follows:

171. Ramsar sites have an important role in the conservation of globally threatened species and ecological communities. Notwithstanding the small numbers of individuals or sites that may be involved, or poor quality of quantitative data or information that may sometimes be available, particular consideration should be given to listing wetlands that support globally threatened communities or species at any stage of their life cycle using Criterion 2 or 3.

Amend current paragraph 172 as follows, so as to remove reference to Appendices II and III of CITES (since these list those species potentially endangered by trade rather than those whose conservation may necessarily be effectively pursued by site-based conservation measures).

172. General Objective 2.2 within this Strategic Framework urges Contracting Parties to seek to include in the Ramsar List wetlands that include threatened ecological communities or are critical to the survival of species identified as vulnerable, endangered or critically endangered under national endangered species legislation/programmes or within international frameworks such as the IUCN Red Lists or Appendix I of CITES and the Appendices of CMS.

Amend current paragraph 174 as follows:

174. For identifying sites with threatened ecological communities, greatest conservation value will be achieved through the selection of sites with ecological communities that have one or more of the following characteristics. They:
- i) are globally threatened communities or communities at risk from direct or indirect drivers of change, particularly where these are of high quality or particularly typical of the biogeographic region; and/or
 - ii) are rare communities within a biogeographic region; and/or
 - iii) include ecotones, seral stages, and communities which exemplify particular processes; and/or

- iv) can no longer develop under contemporary conditions (because of climate change or anthropogenic interference for example); and/or
- v) are at the contemporary stage of a long developmental history and which support a well-preserved paleoenvironmental archive; and/or
- vi) are functionally critical to the survival of other (perhaps rarer) communities or particular species; and/or
- vii) have been the subject of significant decline in extent or occurrence.

Add additional guidance after current paragraph 174:

- A5. When selecting a biogeographic regionalisation scheme to apply under paragraph 174 (i) and/or (ii), it is generally most appropriate to use a continental, regional, or supra-national scheme rather than a national or subnational one.

Add additional guidance after current paragraph 175:

- A6. Be aware also of the biological importance of many karst and other subterranean hydrological systems (see specific guidance below).

Guidelines for the application of Criterion 3

Add additional guidance after current paragraph 177:

- A7. Be aware also of the biological importance of many karst and other subterranean hydrological systems (see specific guidance below).
- A8. When selecting a biogeographic regionalisation scheme to apply, it is generally most appropriate to use a continental, regional, or supra-national scheme rather than a national or subnational one.

Guidelines for the application of Criterion 5

Add additional guidance after current paragraph 183:

- A9. Criterion 5 should be applied not only to multi-species assemblages, but also to sites regularly holding more than 20,000 waterbirds of any one species.
- A10. For populations of waterbirds of more than 2,000,000 individuals, a 1% threshold of 20,000 is adopted on the basis that sites holding this number are of importance under Criterion 5. To reflect the importance of the site for the species concerned, it is also appropriate to list such a site under Criterion 6.

Add additional guidance after current paragraph 184:

- A11. Turnover of individuals, especially during migration periods, leads to more waterbirds using particular wetlands than are counted at any one point in time, such that the importance of such a wetland for supporting waterbird populations will often be greater than is apparent from simple census information.
- A12. However, accurate estimation of turnover and total number of individuals of a population or population using a wetland is difficult, and several methods (e.g. cohort marking and resighting, or summing increases in a count time-series) which have at times been applied do not yield statistically reliable or accurate estimates.

- A13. The only currently available method which is considered to provide reliable estimates of turnover is that of unique capture/markings and resighting/recapture of individually-marked birds in a population at a migratory staging site. But it is important to recognize that for this method to generate a reliable estimate of migration volume, its application usually requires significant capacity and resources, and for large and/or inaccessible staging areas (especially where birds in a population are widely dispersed) use of this method can present insuperable practical difficulties.
- A14. When turnover is known to occur in a wetland but it is not possible to acquire accurate information on migration volume, Parties should continue to consider recognizing the importance of the wetland as a migratory staging area through the application of Criterion 4, as the basis of ensuring that their management planning for the site fully recognizes this importance.

Guidelines for the application of Criterion 6

Add additional guidance after current paragraph 188:

- A15. At some sites, more than one biogeographical population of the same species can occur, especially during migration periods and/or where flyway systems of different populations intersect at major wetlands. Where such populations are indistinguishable in the field, as is usually the case, this can present practical problems as to which 1% threshold to apply. Where such mixed populations occur (and these are inseparable in the field) it is suggested that the larger 1% threshold be used in the evaluation of sites.
- A16. However, particularly where one of the populations concerned is of high conservation status, this guidance should be applied flexibly and Parties should consider recognizing the overall importance of the wetland for both populations through the application of Criterion 4, as the basis of ensuring that their management planning for the site fully recognizes this importance. This guidance should not be applied to the detriment of smaller, high conservation status populations.
- A17. Note that this guidance applies just during the period of population mixing (often, but not exclusively, this is during periods of migration). At other times, it is generally possible to assign a 1% threshold accurately to the single population that is present.
- A18. Turnover of individuals, especially during migration periods, leads to more waterbirds using particular wetlands than are counted at any one point in time, such that the importance of such a wetland for supporting waterbird populations will often be greater than is apparent from simple census information. For further guidance on estimation of turnover see the guidance under Criterion 5, paragraphs A12-A14.

Add new Criterion and guidelines:

Specific criterion based on other taxa

Criterion 9:

A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of wetland-dependent non-avian animal species.

Long-term target for the Ramsar List:

- A19. To have included in the Ramsar List all wetlands which regularly support 1% or more of a biogeographical population of one non-avian animal species or subspecies.

Guidelines for the application of Criterion 9

- A20. When Contracting Parties are reviewing candidate sites for listing under this Criterion, greatest conservation value will be achieved through the selection of a suite of sites that hold populations of globally threatened species or subspecies. Refer also to paragraph [44] above, “Species presence in perspective”, and paragraph [52] above, “Complementary international frameworks”. Consideration may also be given to turnover of individuals of migratory animals at migration periods, so that a cumulative total is reached, if such data are available (see guidance in paragraphs [A11-A14] related to waterbirds which is also applicable to Criterion 9 in relation to non-avian animals).
- A21. To ensure international comparability, where possible, Contracting Parties should use the most current international population estimates and 1% thresholds provided and regularly updated by IUCN’s Specialist Groups through the IUCN Species Information Service (SIS) and published in the *Ramsar Technical Report* series, as the basis for evaluating sites for the List using this Criterion.
- A22. This Criterion can also be applied to nationally endemic species or populations, where reliable national population size estimates exist. When making such an application of the Criterion, information concerning the published source of the population size estimate should be included in the justification for the application of this Criterion. Such information can also contribute to expanding the taxonomic coverage of the information on population estimates and 1% thresholds published in the *Ramsar Technical Report* series.
- A23. It is anticipated that this Criterion will be applicable to populations and species in a range of non-avian taxa including, *inter alia*, mammals, reptiles, amphibians, fish and aquatic macro-invertebrates. However, only species or subspecies for which reliable population estimates have been provided and published (paragraphs A21 and A22) should be included in the justification for the application of this Criterion. Where no such information exists, Contracting Parties should give consideration to designation for important non-avian animal species under Criterion 4. For better application of this Criterion, Contracting Parties should assist, where possible, in the supply of such data to the IUCN-Species Survival Commission and its Specialist Groups in support of the future updating and revision of international population estimates.

Annex 6. UN Convention to Combat Desertification Decision

Decision 14/COP.7 **The Millennium Ecosystem Assessment**

The Conference of the Parties,

Recalling decision 19/COP.6 on the Millennium Ecosystem Assessment (MA) and noting that the MA has been completed,

Taking note of the presentations made by representatives of the MA as well as of the information contained in document ICCD/COP(7)/CST/9 and the comments made by the CST at its seventh session,

Acknowledging that the Convention could especially benefit from the MA findings in its further consideration of benchmarks, indicators, and monitoring and assessment activities,

1. *Encourages* the Parties to consider the findings, conclusions and response options contained in the “Ecosystems and Human Well-being: Desertification Synthesis”, and to make the best possible use of them in addressing the problems of land degradation;
2. *Invites* the CST to take the findings of the MA into consideration in its programme of work, inter alia in the GoE’s activities for the remainder of their term.

12th plenary meeting
28 October 2005

Annex 7. XV Meeting of the Forum of Ministers of the Environment of Latin America and the Caribbean

October 2005

Decision 19

The Millennium Ecosystems Assessment

Recalling that the Millennium Development Goal of achieving environmental sustainability was reaffirmed in the World Summit for Sustainable Development, with the incorporation of the principles of sustainable development as one of the goals in national policies and programmes and the reversal of the degradation of natural resources;

Considering that the Millennium Ecosystem Assessment may become a framework for decisions related to the sustainable utilization of natural resources and conservation of ecosystems;

Bearing in mind that there is already a degree of experience in managing many of the services provided by ecosystems;

Bearing in mind that the health of ecosystems has been considered at a global level as a high priority, especially because of the need to sustain the services that they provide.

Decide

1. To appraise the Reports of the Millennium Ecosystem Assessment as a contribution to the analysis and information concerning the current status of ecosystems.

2. To request the further development of capacity and methodologies to make such assessments at country and sub-regional levels so that they may become tools for decision making in the countries of the region.

3. To further request that the ITC agencies consider within the framework of their mandates the building of the corresponding capacities of the countries in the region and to support the conduct of regional and sub-regional assessments as a basis for improving sustainable management of ecosystems.

4. To encourage participation, at technical and policy levels, in the follow-up activities in the Region relating to the Caribbean Sea Assessment.

5. To request the Secretariat of the Forum of Ministers of the Environment of Latin America and the Caribbean in collaboration with the organizers of the Caribbean Sea Assessment to consider how it might support those follow-up activities in the region.

Annex 8. Oaxaca Declaration on Biodiversity

The scientists participating in the DIVERSITAS First Open Science Conference, Integrating biodiversity science for human well-being, held in Oaxaca, November 9-12, 2005, support the conclusions of the Millennium Ecosystem Assessment and of the Conference Biodiversity Science and Governance held in Paris in January 2005:

- Biodiversity is our common natural heritage and the foundation for a wide variety of ecosystem services that are crucial to human well-being.
- Irreversible destruction of biodiversity is taking place globally as a result of human activities; there is insufficient political and public attention to its extent and consequences.
- Mechanisms to conserve and sustainably use biodiversity have been developed at local, national and international levels; these need to be supported and considerably expanded.
- Scientific knowledge of biodiversity must be substantially increased, but immediate actions must be taken to better protect biodiversity based on existing knowledge.

Therefore, they call upon governments, policy makers and citizens:

- to integrate biodiversity into the criteria considered in all economic and policy decisions that affect environmental management;
- to launch and support ambitious interdisciplinary research programmes to explore the Earth's biodiversity, the ecological and socio-economic causes and consequences of its changes, and the best means to conserve and sustainably use it;
- to commit resources to build and greatly expand the capacity, especially in developing countries, to undertake biodiversity research and implement the conservation and sustainable use of biodiversity.

In agreement with the recommendations of the Paris Conference, they urge national governments and United Nations bodies to establish a properly resourced international scientific panel that includes an intergovernmental component and that aims at providing, on a regular basis, validated and independent scientific information relating to biodiversity to governments, international conventions, non-governmental organisations, policy makers and the wider public.