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**OBSERVATIONS OF THE RAMSAR CONVENTION SECRETARIAT ON INLAND WATERS,
WETLANDS AND WATER AND THE STRATEGIC PLAN OF THE CBD POST 2010;
INCLUDING OUTCOME-ORIENTED GOALS AND TARGETS, AND ASSOCIATED
INDICATORS**

Note by the Executive Secretary

1. The Executive Secretary is hereby presenting information on this subject, prepared by the Secretariat of the Ramsar Convention on Wetlands.
2. This document is circulated in the form and language in which it was received by the Secretariat.

* UNEP/CBD/SBSTTA/14/1.

EXECUTIVE SUMMARY

This note: (i) reviews the effectiveness of indicators for assessing progress towards the 2010 biodiversity target and sub-targets related to inland waters/wetlands; (ii) provides an overview of indicator development ongoing by the Scientific and Technical Review Panel of the Ramsar Convention and related processes, (iii) reflects on possible sub-targets and indicators for inland waters/wetlands in the strategic plan for post-2010 period; and (iv) considers the options for incorporating water as an ecosystem service and driver of ecosystem functioning and biodiversity loss in the strategic plan for post-2010 period. The analysis is based on the draft revised strategic plan (post-2010) as available at 30 November 2009 – but is presented in a flexible fashion enabling relevant considerations to be incorporated into the revised strategic plan as its framework evolves towards eventual adoption at the tenth meeting of the Conference of the Parties. For this reason, firm recommendations are not made. The subject herein is therefore relevant to the deliberations of both SBSTTA and the Working Group on Review of Implementation of the Convention.

The indicators currently available or under development are mapped against the current sub-targets for inland waters (2002-2010). A summary assessment is then made of the most relevant indicators and their utility as a package. A regime of feasible and relevant sub-targets for inland waters/wetlands for the CBD in the post 2010 period is then presented. Essentially, relevant targets or sub-targets for inland waters/wetlands are identifiable for most of the objectives and targets as developed in the strategic plan as of 30 November 2009; that is, most objectives/targets can be framed in an inland waters/wetland context. For most of the potential targets, indicators for assessing progress towards them are well advanced. The current assessment framework for the Ramsar Convention, and the on-going work of the Ramsar STRP, are highly relevant in terms of contributions towards the CBD strategic plan and assessing progress in many relevant areas. The exemplary level of harmony/collaboration between the CBD and Ramsar Convention is self evident, reflecting the high degree of synergy between these two processes.

The way in which relevant objectives, targets and indicators (etc.) are reflected in the post-2010 CBD strategic plan will depend not only on the overall framework of the plan itself, but also on the strategy adopted for uptake of the strategic plan by stakeholders and mechanisms for monitoring and reporting. For example, for inland waters/wetlands, one option is to have relevant targets or sub-targets in all relevant areas for all objectives under the plan, and a monitoring and reporting process for each of these using indicators (similar to the approach in the 2002-2010 strategic plan). The alternative is to have a simpler framework whereby a few key and "higher level" targets regarding inland waters/wetlands might be established and to recognise the role of the Ramsar Convention (and its partners) in elaborating those further for inland waters/wetlands, monitoring progress and reporting back to the CBD on the salient points. On the latter point, one option, for example, would be to have full and effective implementation of the Ramsar Convention as a strategic objective (or target) of the CBD (worded to capture needs in the case of non-Parties to the Ramsar Convention).

The note also considers the options for incorporating water (as an ecosystem service) and the maintenance of the hydrological cycle better into the post-2010 strategic plan based upon the needs identified in the in-depth review of the programme of work on the biological diversity of inland water ecosystems (in documents UNEP/CBD/SBSTTA/14/3 and UNEP/CBD/SBSTTA/14/INF/3). The subject of water and the hydrological cycle goes beyond just inland waters and wetlands issues and transcends most aspects of the CBD. A specific section is therefore devoted to this topic. Relevant objectives, targets and indicators to incorporate "water" need to be framed beyond the boundaries of specific programmes of work. Two options have emerged, which are not mutually exclusive. The first is to have the "maintenance of the hydrological cycle" (or similar wording) as a key overall objective (or strategic goal) of the CBD – with targets under that relating essentially to sustaining the functions of ecosystems, the services they provide and benefits to people and biodiversity. The second is to incorporate relevant water related targets and sub-targets under the other objectives that are eventually included; but it is noted that there is an

identifiable and important water dimension to practically all of these. Regarding indicators, due to the importance of water to economic and development interests, monitoring, indicator and reporting processes in many relevant areas are well developed. Criteria for eventual approaches/frameworks adopted should also consider the considerable opportunity here to select objectives, targets/sub-targets and indicators which resonate with broader economic, development, political, business and public interests. For example, some of the key "headline" indicators for trends in hydrological cycles and water use relevant to biodiversity (in the context of both water as an ecosystem service and water as a resource required to sustain ecosystem functions and other services) are already in use by these other interests – including existing monitoring processes for the Millennium Development Goals and by the Commission on Sustainable Development. Many of these represent further opportunities for the CBD to articulate the strategic plan as being directly relevant to sustainable development, using similar (if not identical) target terminology and indicators.

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1. INTRODUCTION

1. In 2002, the Conference of Parties (COP), in its Decision VI/26, adopted a Strategic Plan which included the target of “achieving by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on Earth”. This target was subsequently endorsed by the World Summit on Sustainable Development and the United Nations General Assembly, and was incorporated into the Millennium Development Goals. In Annex IV of its Decision VIII/15 (2006), the COP set out 21 targets to be achieved through its Programmes of Work by the year 2010. These constitute “sub-targets” of the overall global 2010 biodiversity target.

2. In para. 25 of decision VIII/15, the Conference of the Parties invited the Ramsar Convention, in line with its role as the lead implementation partner on wetlands, to contribute to the implementation of the targets for this programme of work, to monitoring progress towards them and to develop the targets further for specific application to wetlands.

3. In decision IX/9, para. 5, the Conference of the Parties requested the Subsidiary Body on Scientific, Technical and Technological Advice at its meeting prior to the tenth meeting of the Conference of the Parties to examine the outcome-oriented goals and targets, and associated indicators contained in the annex to decision VIII/15, with a view to recommending adjustments, if and where necessary, taking into account the third edition of the Global Biodiversity Outlook, the analysis/synthesis prepared by the Secretariat and further work by the Biodiversity Indicators Partnership and the scientific community. In the same decision, para. 1, the Conference of the Parties requested the Working Group on the Review of Implementation, at its third meeting, to prepare, for consideration and adoption by the Conference of the Parties at its tenth meeting, a revised and updated Strategic Plan including a revised biodiversity target, as well as a multi-year programme of work for the period 2011-2022, and proposals for the periodicity of meetings after 2010, drawing upon, *inter alia*, an examination of the scientific and technical aspects of the outcome-oriented goals and targets, and associated indicators by the Subsidiary Body on Scientific, Technical and Technological Advice.

4. Consequently the Ramsar Convention Secretariat has prepared this note, in collaboration with the Secretariat of the CBD, to assess the indicators and targets in the current strategic plan of the convention (2002-2010) and similar considerations for the revised and up-dated strategic plan (post 2010). Since the latter plan is still under discussion and development this note has used as a basis for its structure the draft strategic plan (post-2010) as available to the Secretariat as of 30 November 2009. However, this note is designed to be flexible and relevant observations or suggestions to be incorporated into the revised strategic plan as it evolves and is considered further.

5. Much of the work contributing to the preparation of this report is based on an informal expert meeting held between the Secretariats of the CBD and Ramsar Convention held back-to-back with the 11th meeting of UN-Water, 14-16 August, and the World Water Week (16-22 August), in Stockholm, Sweden. The process also involved discussions at an expert meeting on post 2010 targets and indicators for inland waters/wetlands held at UNEP-WCMC, Cambridge, United Kingdom (19-22 October 2009), attended by a number of members of the Biodiversity Indicators Partnership. The Government of Spain generously supported these preparatory activities through a grant to the Secretariat of the CBD.

6. A range of indicators has been established to assess progress towards the 2010 target, while others have been developed for other reasons but are well suited to support the same goal. Included among them are specific measures relating to biodiversity of inland waters (or more typically of wetlands in general). A selection of the most relevant of these has been considered for the present review. The review examines experience of operating these indicator systems and the extent to which they illuminate the question of progress towards the inland waters sub-targets, and thereby the 2010 target.

7. Based on this experience, and taking account of discussions in a sequence of meetings on designing an appropriate regime of biodiversity targets and indicators for the post-2010 period (up to the point those discussions had reached at the time of writing, in November 2009), the present review then puts forward suggestions in relation to feasible and relevant sub-targets for inland waters/wetlands for the CBD in the post-2010 period. These are for consideration by SBSTTA and the Working Group on Review of Implementation (WGRI), as appropriate, and by CBD COP10, in the context deliberations on “a revised and updated Strategic Plan including a revised biodiversity target, as well as a multi-year programme of work for the period 2011-2022” (Decision IX/9).

8. These processes will also have implications for the existing/future strategies and targets of other biodiversity-related Conventions and UN agencies. The present review summarises future work to be undertaken under the Convention on Wetlands (the Ramsar Convention) on monitoring and on indicators of the status and trends of wetlands, and refers to further linkages between Ramsar and the CBD in this area.

9. Existing quantitative information derived from the existing indicators in use and other sources has been used to, *inter alia*, assess the current status and trends of inland water ecosystems/wetlands as an input into the in-depth review of the programme of work on inland waters: the findings are summarised in documents UNEP/CBD/SBSTTA/14/3 and UNEP/CBD/SBSTTA/14/INF/3; and a very detailed assessment of this information is provided in the chapter “Status and Trends” in the background document prepared for that in-depth review (<http://www.cbd.int/waters/doc/sbstta-14/background-document>). These sources provide an assessment of what our current indicator/data/information tell us. This current note goes beyond this first analysis to explore how effective the indicators are, explain the indicator development process ongoing under the Ramsar Convention and consider the subject of objectives, goals, targets and indicators largely in the context of the options available for the post-2010 strategic plan.

2. THE INDICATORS CONSIDERED

10. A suite of measures adopted in 2005 by the Ramsar Convention, as ecological “outcome-oriented” indicators of effectiveness of implementation of that Convention, are of particular relevance. CBD COP Decision III/21 in 1996 established Ramsar as its “lead implementation partner” on wetlands (a role which is applicable to all programmes of work, cross-cutting issues and other CBD activities of relevance to wetlands). In Decision VIII/15 the CBD COP invited Ramsar to contribute to the implementation of the targets adopted for the inland waters and marine and coastal programmes of work, to the monitoring of progress towards them and to the further development of the targets. Decision VIII/20 invited Ramsar to explore ways of improving mechanisms for assessing inland water ecosystems, including drivers of change, and to take the lead in developing for the two Conventions a framework for harmonised reporting on inland waters biodiversity.

11. The Biodiversity Indicators Partnership (BIP) is a GEF-funded initiative which has brokered consortium activities for generating indicator information on progress towards the 2010 target, for various end-users including the CBD and other Conventions. Around 20 headline indicators are at various stages of development, some divided into sub-indicators; and the list overall has been designed to match more or less closely the headline 2010 indicators defined by the CBD in Decision VIII/15. The CBD is represented on the BIP Steering Committee. Some of the BIP indicators in turn are linked to the Ramsar indicators of effectiveness, and others could conceivably be analysed in such a way as to separate out a wetland or inland waters “cut” of the results.

12. A number of other programmes, such as the Red List Index (based on data from the IUCN Red List system for classifying species in terms of their risk of extinction), the Living Planet Index (compiled by the World Wide Fund for Nature, tracking trends in populations of vertebrate species), the Wild Bird Index (developed by BirdLife International at regional level to track trends in selected groups of bird species) and the Management Effectiveness Tracking Tool for protected areas (developed by the World

Bank/WWF Alliance for Forest Conservation and Sustainable Use, and since applied beyond forests to other systems including wetlands) also address relevant issues, and are linked to differing degrees with the Ramsar, BIP and other processes. One or two examples of sub-global assessments such as the “Streamlining European 2010 Biodiversity Indicators” initiative (SEBI2010) have also been considered, though no full attempt has been made here to address the sub-global level.

3. MATCHING INDICATORS TO THE INLAND WATERS SUB-TARGETS

13. A comparison of existing indicators devised under the Ramsar Convention of other processes and their relevance as indicators of progress towards the current CBD inland waters sub-targets is provided in Table 1.

Table 1: Summary table of existing indicators, devised under the Ramsar Convention and other processes, which could be expected to illuminate progress towards the 21 CBD inland waters sub-targets for 2010.

CBD inland waters biodiversity sub-targets, for achievement by 2010 (from CBD Decision VIII/15 Annex IV)	Ramsar ecological outcome indicators of effectiveness (from Ramsar Resolution X.1 Annex D)	Biodiversity Indicators Partnership - headline indicators (see www.twentyten.net)	Others
Focal area 1: Protect the components of biodiversity			
Goal 1. Promote the conservation of the biological diversity of ecosystems, habitats and biomes			
Sub-target 1.1 At least 10% of known inland water ecosystem area effectively conserved and under integrated river or lake basin management.	-	-	(Potentially) the UN CSD questionnaire on implementation of the WSSD IWRM/Water Efficiency Plans target
Sub-target 1.2 275 million hectares of wetlands of particular importance to biodiversity protected, including representation and equitable distribution of areas of different wetland types across the range of biogeographic zones.	Indicator H (under development): “the proportion of candidate Ramsar sites designated so far for wetland types/features” will assist with the second part of this Indicator E: “Wetland sites with successfully implemented conservation or wise use management plans” addresses the	Coverage of protected areas Management effectiveness of protected areas	Important Bird Areas Protection Index (incorporated in BIP indicator). Alliance for Zero Extinction Protection Index (incorporated in BIP indicator). CIESIN Ecoregion Protection Indicator. At a regional scale, “coverage of protected areas” is an indicator in

CBD inland waters biodiversity sub-targets, for achievement by 2010 (from CBD Decision VIII/15 Annex IV)	Ramsar ecological outcome indicators of effectiveness (from Ramsar Resolution X.1 Annex D)	Biodiversity Indicators Partnership - headline indicators (see www.twentyten.net)	Others
	<p>meaningfulness of the “protected” aspect of this target, as opposed to the mere coverage aspect</p>		<p>Europe under the SEBI-2010 process. “Proportion of terrestrial and marine areas protected” is also Indicator 7.6 for reporting on progress towards the UN Millennium Development Goal 7 Target 7.B on reducing biodiversity loss.</p>
Goal 2. Promote the conservation of species diversity			
Sub-target 2.1 Reduce the decline of, maintain or restore populations of species of selected taxonomic groups dependent upon inland water ecosystems.	<p>Indicator F: “trends in the status of waterbird biogeographic populations”</p> <p>Indicator G: “changes in threat status of wetland taxa”</p>	<p>Trends in abundance and distribution of selected species</p> <p>Change in status of threatened species</p>	<p>Living Planet Index (incorporated in BIP indicator)</p> <p>Global Wild Bird Indicator (incorporated in BIP indicator)</p> <p>Red List Index (incorporated in Ramsar and BIP indicators)</p>
Sub-target 2.2 The world’s known threatened inland water ecosystem dependent species of plants and animals conserved, with particular attention to migratory, transboundary and endemic species and populations.	<p>Indicator I (under development): “coverage of wetland-dependent bird populations by designated Ramsar sites” should provide a partial contribution to this [Question 2.5.2 in COP10 national report pro-forma is also relevant]</p>	<p>(Coverage of protected areas)</p>	<p>(At a regional scale, “coverage of protected areas” is an indicator in Europe under the SEBI-2010 process; but it has not disaggregated ecosystem types or species groups)</p>
Goal 3. Promote the conservation of genetic diversity			
Sub-target 3.1 Known genetic diversity of crops, livestock, and of harvested		<p>Ex situ crop collections</p>	

CBD inland waters biodiversity sub-targets, for achievement by 2010 (from CBD Decision VIII/15 Annex IV)	Ramsar ecological outcome indicators of effectiveness (from Ramsar Resolution X.1 Annex D)	Biodiversity Indicators Partnership - headline indicators (see www.twentyten.net)	Others
species of trees, fish and wildlife and other valuable species dependent upon inland water ecosystems is conserved, and associated indigenous and local knowledge is maintained.	-	Genetic diversity of terrestrial domesticated animals	
Focal Area 2: Promote sustainable use			
Goal 4. Promote sustainable use and consumption			
Sub-target 4.1.1: Products from inland water ecosystem biological diversity derived from sustainable sources.	-	Wild Commodities Index	
Sub-target 4.1.2: Aquaculture areas in inland water ecosystems managed consistent with the conservation of inland water biological diversity.	-	Area of agricultural ecosystems under sustainable management	
Sub-target 4.3 No species of wild flora or fauna dependent upon inland water ecosystems endangered by international trade.	-	Status of species in trade	Red List Index for internationally traded species (incorporated in BIP indicator)
Focal area 3: Address threats to biodiversity			
Goal 5. Pressures from habitat loss, land-use change and degradation, and unsustainable water use, reduced			
Sub-target 5.1 Rate of loss and degradation of inland water ecosystem biological diversity, especially through unsustainable water use, are decreased.	Indicator A(i): “status and trends in wetland ecosystem extent” addresses the “loss” component Indicator A(ii): “trends in conservation status of wetlands - qualitative	Trends in extent of selected biomes, ecosystems and habitats (mangroves, seagrass beds and coral reefs are the relevant examples examined) Connectivity/fragmenta	FAO Forest Resource Assessments (for mangroves) (incorporated in BIP ecosystem extent indicator) (At a regional scale,

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	<p>assessment” addresses the “degradation” component</p> <p>Indicator B: “trends in the status of Ramsar site ecological character - qualitative assessment” addresses the “degradation” component for designated wetlands of international importance</p> <p>Indicator C: “trends in water quality” and Indicator K (under development): “trends in water quantity” could also be relevant</p> <p>Indicator D: “the frequency of threats affecting Ramsar sites” should shed some light on the “unsustainable water use” component, for designated wetlands of international importance, depending on what degree of disaggregation of individual threat types is achieved</p> <p>[Questions 1.1.3, 1.1.4 and 2.4.3 in COP10 national report pro-forma are also relevant]</p>	<p>tion of ecosystems: river fragmentation and flow regulation</p> <p>Water quality of freshwater ecosystems</p> <p>(Nitrogen Deposition)</p> <p>(Invasive Species) Alien</p>	<p>the European Environment Agency/European Commission produce periodic analyses of changes in land-cover types)</p> <p>Water Quality Index for Biodiversity (incorporated in BIP water quality indicator) (At a regional scale, “Water quality in aquatic ecosystems” is an indicator in Europe under the SEBI2010 process)</p> <p>Red List Index for impacts of invasive alien species (incorporated in BIP IAS indicator)</p> <p>Global indicator of biological invasion (is part of BIP indicator on IAS)</p>
Goal 6. Control threats from invasive alien species			
Sub-target 6.1 Pathways for major potential invasive alien species in inland water ecosystems controlled.	[No effectiveness indicator, but question 1.6.1 in COP10 national report pro-forma is relevant]	Invasive Alien Species	Global Invasive Species Programme/Centre for Invasion Biology IAS indicator(s) (incorporated in BIP indicator)

CBD inland waters biodiversity sub-targets, for achievement by 2010 <i>(from CBD Decision VIII/15 Annex IV)</i>	Ramsar ecological outcome indicators of effectiveness <i>(from Ramsar Resolution X.1 Annex D)</i>	Biodiversity Indicators Partnership - headline indicators <i>(see www.twentyten.net)</i>	Others
Sub-target 6.2 Management plans in place and implemented for invasive alien species that are considered to present the greatest threat to inland water ecosystems, habitats or species.	[No effectiveness indicator, but question 1.6.1 in COP10 national report pro-forma is relevant]	-	(Initial GISP/CIB indicator concept on this substituted by a policy indicator instead, and incorporated in the one above)
Goal 7. Address challenges to biodiversity from climate change, and pollution			
Sub-target 7.1 Maintain and enhance resilience of the components of inland water ecosystem biodiversity to adapt to climate change.	[No effectiveness indicator, but questions 1.5.1 and 1.5.2 in COP10 national report pro-forma are relevant]	-	
Sub-target 7.2 Substantially reduce pollution and its impacts on inland water ecosystem biodiversity.	Indicator C: “trends in water quality” Indicator D: “the frequency of threats affecting Ramsar sites” may also shed some light, for designated wetlands of international importance, depending on what degree of disaggregation of individual threat types is achieved [Questions 1.4.1 and 2.3.1 in COP10 national report pro-forma are also relevant]	Water Quality (Nitrogen Deposition) (Invasive Alien Species)	Water Quality Index for Biodiversity (incorporated in BIP water quality indicator) (At a regional scale, “Water quality in aquatic ecosystems” is an indicator in Europe under the SEBI2010 process)
Focal area 4: Maintain goods and services from biodiversity to support human well-being			
Goal 8. Maintain capacity of ecosystems to deliver goods and services and support livelihoods			

CBD inland waters biodiversity sub-targets, for achievement by 2010 (from CBD Decision VIII/15 Annex IV)	Ramsar ecological outcome indicators of effectiveness (from Ramsar Resolution X.1 Annex D)	Biodiversity Indicators Partnership - headline indicators (see www.twentyten.net)	Others
Sub-target 8.1 Capacity of inland water ecosystems to deliver goods and services maintained or enhanced.	[No effectiveness indicator, but questions 1.3.1, 1.5.1, 1.5.2 and 2.3.1 in COP10 national report pro-forma are relevant]	(Health and well being of communities directly dependent on ecosystem goods and services)	
Sub-target 8.2 Inland water biological resources that support sustainable livelihoods, local food security and health care, especially of poor people, maintained and, where depleted, restored.	[No effectiveness indicator, but question 1.3.2 in COP10 national report pro-forma is relevant]	Biodiversity for food and medicine (Health and well being of communities directly dependent on ecosystem goods and services)	Red List Index (RLI) for birds, mammals and amphibians used for food and medicine (= the BIP indicator on Biodiversity for food and medicine)
Focal area 5: Protect traditional knowledge, innovations and practices			
Goal 9. Maintain socio-cultural diversity of indigenous and local communities	-		
Sub-target 9.1 Measures to protect traditional knowledge, innovations and practices associated with the biological diversity of inland water ecosystems implemented, and the participation of indigenous and local communities in activities aimed at this promoted and facilitated.	[No effectiveness indicator, but questions 1.3.4, 4.1.2 and 4.1.5 in COP10 national report pro-forma are relevant]	(Status and trends of linguistic diversity and numbers of speakers of indigenous languages)	(UNESCO Linguistic Vitality Index (= the BIP indicator on Status and trends of linguistic diversity and numbers of speakers of indigenous languages)) CBD AHOWG on Article 8(j) and International Indigenous Forum on Biodiversity Working Group on Indicators has proposed 4 indicators in this area
Sub-target 9.2 Traditional knowledge, innovations and practices regarding biological diversity of inland water ecosystems	[No effectiveness indicator, but questions 1.3.4, 4.1.2 and 4.1.5 in COP10 national report pro-forma are relevant]	Status and trends of linguistic diversity and numbers of speakers of indigenous languages	UNESCO Linguistic Vitality Index (= the BIP indicator on Status and trends of linguistic diversity

CBD inland waters biodiversity sub-targets, for achievement by 2010 (from CBD Decision VIII/15 Annex IV)	Ramsar ecological outcome indicators of effectiveness (from Ramsar Resolution X.1 Annex D)	Biodiversity Indicators Partnership - headline indicators (see www.twentyten.net)	Others
<p>respected, preserved and maintained, the wider application of such knowledge, innovations and practices promoted with the prior informed consent and involvement of the indigenous and local communities providing such traditional knowledge, innovations and practices, and the benefits arising from such knowledge, innovations and practices equitably shared.</p>			<p>and numbers of speakers of indigenous languages) CBD AHOWG on Article 8(j) and International Indigenous Forum on Biodiversity Working Group on Indicators has proposed 4 indicators in this area</p>
Focal area 6: Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources			
Goal 10. Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources			
Sub-target 10.1 All access to genetic resources derived from inland water ecosystems is in line with the Convention on Biological Diversity.	-	-	
Sub-target 10.2 Benefits arising from the commercial and other utilization of genetic resources derived from inland water ecosystems shared with the countries providing such resources.	-	-	
Focal area 7: Ensure provision of adequate resources			
Goal 11. Parties have improved financial, human, scientific, technical			

CBD inland waters biodiversity sub-targets, for achievement by 2010 (from CBD Decision VIII/15 Annex IV)	Ramsar ecological outcome indicators of effectiveness (from Ramsar Resolution X.1 Annex D)	Biodiversity Indicators Partnership - headline indicators (see www.twentyten.net)	Others
and technological capacity to implement the Convention			
Sub-target 11.1 New and additional financial resources are transferred to developing country Parties, to allow for the effective implementation of their commitments for the programme of work on the biological diversity of inland water ecosystems under the Convention, in accordance with Article 20.	[No effectiveness indicator, but questions 4.5.1 and 4.5.2 in COP10 national report pro-forma are relevant]	Official development assistance provided in support of the Convention	
Sub-target 11.2 Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments for the programme of work on the biological diversity of inland water ecosystems under the Convention, in accordance with its Article 20, paragraph 4.	-	(Official development assistance provided in support of the Convention)	

(For a more detailed table of cross-matches, including the “Activities for Parties” listed in the in the Inland Waters Programme of Work, see document UNEP/CBD/SBSTTA/14/INF/3).

4. SUMMARY ASSESSMENT OF THE MOST RELEVANT OF THE LISTED INDICATORS

14. A commentary on the effectiveness of the most relevant indicators available for assessing progress in relation to the sub-targets in the inland waters Programme of Work is provided in Table 2.

Table 2: Comments evaluating the effectiveness of the most relevant indicators available for assessing progress in relation to the sub-targets in the inland waters Programme of Work. (Where an indicator mentioned in the “others” column of Table 1 above is described there as incorporated in a corresponding Ramsar or BIP indicator, comments in Table 2 are given only on these latter measures).

Indicator	Relevant PoW sub-target(s)	Comments
Ramsar Indicator H: “The proportion of candidate Ramsar sites designated so far for wetland types/features”	1.2	<ul style="list-style-type: none"> • This indicator is still under development. Once operational, it will assist with the part of sub-target 1.2 which concerns representation of different wetland types, at least in relation to one especially relevant sub-set of protected areas, namely Ramsar sites. (This assumes that Ramsar designation is regarded as a type of protection status, which is a proposition that has excited some debate in the past, but which may now be more widely agreed). • Concerning the “equitable distribution” part of the sub-target, disaggregation of global datasets by geopolitical regions should be immediately possible: doing so by biogeographic zones may need some further work. • Ramsar has an adopted classification system of wetland types, and for this indicator to serve a CBD target it would be helpful for the same system to be recognised for use in CBD contexts. It should be noted however that some of the listed wetland types are not specific only to “inland” or “marine/coastal” ecosystems.
Ramsar Indicator E: “Wetland sites with successfully implemented conservation or wise use management plans”	1.2	<ul style="list-style-type: none"> • This indicator is designed to draw primarily on an extracted sub-set of data from the protected areas Management Effectiveness Tracking Tool (METT) operated by the World Wide Fund for Nature, and devised with a range of other partners based on well-developed global methodologies. The subset concerns (i) wetland sites and (ii) the assessment question about site ecological condition (most of the rest of METT concerns process measures).
BIP indicator: “Management effectiveness of protected areas”	1.2	<ul style="list-style-type: none"> • Over 40 protected area management effectiveness evaluation methodologies have been developed at different levels. In order to create a global indicator, a mechanism has been created through BIP to establish a “translation” process so that the different scoring systems are incorporated in a consistent way. Fourteen summary indicators have been created: they can be interpreted individually or in a globally combined form.
BIP indicator: “Coverage of protected areas”	1.2, (2.2)	<ul style="list-style-type: none"> • Data for this indicator are available from UNEP-WCMC’s World Database on Protected Areas. It can be separately expressed for marine and terrestrial areas, and at national, regional and global scales. To date

Indicator	Relevant PoW sub-target(s)	Comments
		<p>however it has not been able to report specifically on coverage of inland waters or of wetlands. A method for reporting specifically on forests has been developed, and there is interest in doing the same for wetlands in future.</p> <ul style="list-style-type: none"> • There may be some utility also in respect of sub-target 2.2, to the extent that potential future reporting of protective coverage of wetland biomes may be a valid surrogate for the conservation status of relevant species.
CIESIN Ecoregion protection indicator	1.2	<ul style="list-style-type: none"> • Again using WDPA data, this presents protected percentages of the extent of certain global biomes (so far for one snapshot assessment, but potentially repeatable). The only wetland examples included are “mangroves” and “flooded grasslands & savannas”. • Use of this indicator would be limited to those very few wetland types for which good extent data exist. Even then, there would be some strong caveats to work out concerning the precision and consistency of the extent data used; and also some debate probably to be had on how to deal with shifting baselines.
Ramsar Indicator F: “Trends in the status of waterbird biogeographic populations”	2.1	<ul style="list-style-type: none"> • This is one of the indicators that is not a surrogate for what the corresponding sub-target needs to measure, but rather reflects the specified ecological outcome directly. • In addition however, waterbirds are widely regarded as useful indicators of wetland ecological status. Migratory species in particular can be a basis for measures that offer integrated indicators of ecosystems along a flyway; and the congregatory habits of many species make their population numbers particularly responsive to land management and other influences. • Aspects of the interpretation of this indicator can be complex; but the datasets on which it is based are some of the richest in existence, and with careful analysis they are proving illuminating not only as to status and trends but also as to probable patterns in drivers of change. • Pilot analyses to date have concentrated on the shorebird subset, but should be expanded to cover waterbirds more generally in due course. • It is also linked to institutionalised regular assessment programmes (viz Wetlands International’s waterbird monitoring and population estimates work): there is thus a strong prospect of its being able to function

Indicator	Relevant PoW sub-target(s)	Comments
		<p>properly as a regularly-reported measure.</p> <ul style="list-style-type: none"> Analyses to date have not attempted to separate “inland waters”-related taxa from others; and in many cases this would not be a scientifically meaningful thing to attempt to do.
BIP indicator: “Trends in abundance and distribution of selected species”	2.1	<ul style="list-style-type: none"> The BIP project has adopted two sub-indicators for this: the Living Planet Index and the Global Wild Bird Index. An advantage of these indicators is that they produce a simple, clear picture of changes in biodiversity over time which can be easily communicated to a range of audiences. The Living Planet Index can be disaggregated for different taxonomic groups (vertebrate animals only) and different geographical areas, including individual countries. The LPI however aggregates a wide and disparate variety of data sources, which are not necessarily the same between reporting periods: precision and consistency can therefore be variable. Reporting processes however are well developed and reliable, with the results of the LPI having been published biennially since 2000, in the Living Planet Reports. The Wild Bird Index only incorporates trend data from formally designed monitoring schemes, and can thus be more scientifically robust than some other indicators. This however means that the WBI can only operate well where such systematic schemes exist: at present therefore it operates only at regional level; in the European Union, In the United States and (soon) in Australia. The WBI is also so far reporting only on groups of birds associated with forests, grasslands, arid lands and farmland. Coverage of wetland birds is not expected in the immediate future.
Ramsar Indicator G: “Changes in threat status of wetland taxa”	2.1	<ul style="list-style-type: none"> This is a robust indicator, with data contributed directly from the Red List Index, showing changes in the overall extinction risk of selected sets of species (applicable to any set that has been assessed at least twice for the IUCN Red List). It does not however have very fine-grained sensitivity to change; i.e. species have to undergo a relatively major population change for the index numbers to

Indicator	Relevant PoW sub-target(s)	Comments
		<p>change (and there is a time-lag in picking up the change).</p> <ul style="list-style-type: none"> • The RLI can be disaggregated to explore trends in different biogeographic realms, ecosystems, habitats and geopolitical regions, and for suites of species relevant to particular policy mechanisms. Disaggregations for wetland-dependent species and Ramsar regions form the basis of Ramsar Indicator G. • Results are computable at present (ie two assessments are available) for birds, mammals and corals (the latter being relevant to Ramsar although not to the CBD inland waters programme); and a second assessment for amphibians is expected in 2010-11. Single assessments only, so far, exist for freshwater fish and for dragonflies (although back-casting to derive indices from historical data is possible). • As well as calculating a “wetland cut” of the bird and mammal data, it will be possible also to produce an aggregated index for all wetland groups combined. • Future assessments are planned for birds at four-yearly intervals; and plans for other groups are under discussion. A “sample Red List Index” could be produced more frequently if required.
BIP indicator: “Change in status of threatened species”	2.1	<ul style="list-style-type: none"> • The ingredients of this are the same (namely the Red List Index) as for Ramsar Indicator G described above. The same comments therefore apply, though with the “wetland cut” aspects being specific to the use of the Index in the Ramsar context.
Ramsar Indicator I: “Coverage of wetland-dependent bird populations by designated Ramsar sites”	2.2	<ul style="list-style-type: none"> • This indicator is still under development. Once operational, it should provide a partial contribution to sub-target 2.2, bearing in mind that protective designation is merely a surrogate for the actual “plants and animals conserved” outcome specified in the target. It is complementary to Ramsar Indicator H, referred to separately above. • No particular emphasis on “migratory, transboundary and endemic species and populations” (as per the CBD sub-target) currently features in this Ramsar indicator; although it would be possible to address at least some of these aspects.
BIP indicator: “Ex	3.1	<ul style="list-style-type: none"> • This indicator is still under development. No particular

Indicator	Relevant PoW sub-target(s)	Comments
situ crop collections”		<p>inland waters or wetlands subset of the picture has so far been proposed.</p> <ul style="list-style-type: none"> • The indicator is unlikely to illuminate the “indigenous and local knowledge” aspect of the sub-target.
BIP indicator: “Genetic diversity of terrestrial domesticated animals”	3.1	<ul style="list-style-type: none"> • This indicator tracks changes in the percentage of relevant breeds in different extinction risk categories, and uses data on the size and structure of breed populations from the Domestic Animal Diversity Information System (DAD-IS) maintained by FAO, covering more than 30 species used for food and agriculture. • No particular inland waters or wetlands subset of the picture has so far been proposed, and with categories of “cattle, chickens, goats, pigs and sheep” it is hard to see how this might meaningfully be done. • The indicator is unlikely to illuminate the “indigenous and local knowledge” aspect of the sub-target.
BIP indicator: “Wild commodities index”	4.1.1	<ul style="list-style-type: none"> • This indicator tracks changes in the sustainability of use of a selection of wild animals and plants, based on a combination of (i) their LPI status (see above) compared with that of non-exploited species, (ii) changes in how sustainable the harvest of these species (initially marine fish and a limited number of terrestrial species) has been over time, and (iii) a price-based index tracking changes in the price of commodities from the selected wild species versus other commodity types. The second and third elements of this are still at a pilot stage. • No particular inland waters or wetland “cut” has so far been suggested; but in principle there should be no obstacle to doing one.
BIP indicator: “Area of agricultural ecosystems under sustainable management”	4.1.2	<ul style="list-style-type: none"> • This indicator aims to present the area of national territories that is under management practices “which support agro-ecosystem sustainability”. Data are currently available only for six countries involved in a pilot project. • The indicator relies heavily on some assumptions about the relationship between the defined practices and the status of related biodiversity. • Water conservation practices are included, but are not reported separately.

Indicator	Relevant PoW sub-target(s)	Comments
		<ul style="list-style-type: none"> The aim in future is to extend the scope of the indicator to cover “practices related to fishery within agro-ecosystems”, but at present these are not covered.
BIP indicator: “Status of species in trade”	4.3	<ul style="list-style-type: none"> This indicator is mostly still in development. It has two parts: the first focuses on CITES, including elements such as the number of Parties to CITES and the number and volume of CITES species in trade. The second is a cut of the Red List Index for species where international trade is the primary driver behind their observed threat status changes, and which can be compared to species where other factors are more important. Birds, mammals and amphibians are being addressed in the first instance (see general comments on the RLI above). In principle, in future, wetland-based cuts of the traded species Red List datasets should be possible, in the same way as with the application of the RLI to sub-target 2.1, referred to above.
Ramsar Indicator A(i): “Status and trends in wetland ecosystem extent”	5.1	<ul style="list-style-type: none"> First analyses for this indicator (which speaks only to the “loss” part of sub-target 5.1) are underway at the time of writing. It is likely to focus on a small number of wetland ecosystem types (both inland and coastal) for which some reasonable extent data exist (eg mangroves, seagrass beds, coral reefs, and perhaps river fragmentation; with mangroves being probably the most robust dataset). Data on other systems is very fragmentary, and it has been an issue of concern for many years that only the most crude and approximate international figures exist for the extent of wetlands (ie baselines are weak and there is low confidence in measuring change). Changes in extent intuitively appear to communicate a clear story; but in fact attention to this may often mask the real issue of changes in quality; ie for many systems, degradation is a more serious cause of loss of biodiversity and ecosystem services than are gross reductions in area (degradation is the second part of sub-target 5.1, dealt with separately under Ramsar Indicator A(ii) below). That said, wider audiences will find it hard to understand the absence of findings on changes in area from any set of headline indicators on wetland ecosystems. The indicator, as it is currently constructed, is unlikely to shed much specific additional light on the element of

Indicator	Relevant PoW sub-target(s)	Comments
		sub-target 5.1 which highlights “unsustainable water use” as a cause of observed changes.
BIP indicator: “Trends in extent of selected biomes, ecosystems and habitats”	5.1	<ul style="list-style-type: none"> • In relation to wetlands, most of the comments made above in relation to Ramsar Indicator A(i) apply here too. • There is an aspiration in future to cover systems including peatlands and other inland wetlands with this indicator. In the first instance however, the wetland habitats being addressed at global level are mangroves, seagrass beds and coral reefs, ie systems outside the scope of the inland waters Programme.
Ramsar Indicator A(ii): “Trends in conservation status of wetlands - qualitative assessment”	5.1	<ul style="list-style-type: none"> • This indicator complements Ramsar Indicator A(i) (referred to above), in addressing the “degradation” component of sub-target 5.1 (although loss of within-site diversity may be part of this too, so the two concepts are not entirely distinct). As mentioned above, this is often a more important story (ie a more genuine reflection of the issues at stake) than simple measures of habitat extent would be. • “Wetland status” may be interpreted as referring to the ecological condition of a wetland, or perhaps to the degree of intactness of its ecological character. The broader concept of “conservation status” is a combination of the state of the ecosystem, the pressures affecting (or threatening) it and the actions taken (responses) to conserve it. • A draft of a first provisional report on Indicator A(ii) has been drawn up, and findings have been incorporated in the separate status & trends component of the main review paper on the inland waters Programme of Work (CBD Secretariat, <i>in prep</i>, b). • Several data sources are relevant to the picture which can be currently presented on this; but the primary one which is likely to be used on a repeating basis in future by Ramsar is qualitative information from the triennial national implementation reports submitted by Contracting Party governments to the Convention COP. • This indicator demonstrates that qualitative information can be very valuable for indicator purposes such as these, and for strategic decision-making, in circumstances where there is a good prospect of systematic comparisons being made over a time-series and between consistently reported situations (eg

Indicator	Relevant PoW sub-target(s)	Comments
		<p>between geographical regions etc). Qualitative assessments also tend to be simpler, quicker and less costly to undertake.</p> <ul style="list-style-type: none"> • Reports based on this indicator should also have the advantage of strong political resonance, given that they are a reflection back to Parties of information which they themselves have provided.
BIP indicator: “Connectivity/fragmentation of ecosystems: river fragmentation and flow regulation”	5.1	<ul style="list-style-type: none"> • This indicator aims to provide a measure of the degree to which the connectivity and flow regimes of rivers have been altered by dams and reservoirs. Assessments have been made of around 300 large river systems with drainage basins representing around half of the world’s land area. Fragmentation rankings (highly affected, moderately affected, unaffected) are given, based on the number, location and storage capacity of dams and the free-flowing miles of rivers as a proportion of their total length, and the proportion of annual runoff stored behind dams. • It is important to have indicators such as this which present landscape-scale changes affecting wetlands and the water cycle, since this is the domain in which some of the most critical response options lie. • There are good links with the loss and degradation issues addressed by sub-target 5.1, and the sub-target’s element of “unsustainable water use” also features in this indicator. • Although the methodology is in place, no regime for repeated assessments to track changes on a regular basis has been fixed.
BIP indicator: “Water quality of freshwater ecosystems”	5.1. 7.2	<ul style="list-style-type: none"> • Water quality indicates both major direct threats to the sustainability of inland waters and the effects of unsustainable activities from beyond these ecosystems. It is another facet of the fact that the functioning and integrity of inland waters is an excellent indicator of the status of terrestrial ecosystems more broadly. In addition, water quality in general is directly correlated to inland waters biological diversity. • Water quality indicators for various purposes have been in fairly long-established use in relation to parameters such as Biochemical Oxygen Demand, nitrate concentration, suspended sediments, pH and temperature. The BIP approach concentrates on a composite Water Quality Index of Biodiversity

Indicator	Relevant PoW sub-target(s)	Comments
		<p>developed by UNEP-GEMS/Water, incorporating water temperature, dissolved oxygen, pH, electrical conductivity (salinity), and levels of nitrogen and phosphorus. It is compiled with data from several thousand sampling stations around the world.</p> <ul style="list-style-type: none"> • Presentation/interpretation of the index, and of differences between areas and time-periods, can be complex. The sampling stations from which data are reported in different time-periods, and are used for different assessments and analyses, have not been constant. • This is undoubtedly an important indicator for both sub-targets 5.1 and 7.2, and it is more specific to inland waters than some of the other indicators here. Further work could be done on the link between water quality and biodiversity, e.g. by exploring threshold analyses that demonstrate expected impacts, and by relating indicator scores to biodiversity datasets on groups such as freshwater fish.
Ramsar Indicator C: "Trends in water quality"	5.1, 7.2	<ul style="list-style-type: none"> • Several options for reporting on this indicator have been mooted in Ramsar, but pragmatically in the meantime the Convention's relevant working group has recognised that the information generated by BIP and UNEP-GEMS/Water (see above) is addressing the issue, and could probably form the content of a Ramsar indicator without anything additional (apart from appropriate "front-ends" to reports) having to be separately constructed through the Convention.
BIP indicator: "Nitrogen deposition"	(5.1), (7.2)	<ul style="list-style-type: none"> • This indicator provides a story that is relatively straightforward to communicate, although it is a measure of drivers rather than outcomes (noting however that sub-target 7.2 encompasses both aspects). The larger the deposition of atmospheric nitrogen into ecosystems, the greater the potential for negative impacts, including biodiversity losses. Results can be presented as maps, related to critical thresholds. • While there is good knowledge, based on hundreds of sampling stations, about "wet" deposition of nitrogen in some regions of the world (Europe, North America), the data are poorer elsewhere. Mapped data for calculating critical loads and exceedances exist on an ecosystem scale at present only for Europe. Knowledge about thresholds for ecosystem protection is currently not well

Indicator	Relevant PoW sub-target(s)	Comments
		developed.
Ramsar Indicator K: “Trends in water quantity”	5.1	<ul style="list-style-type: none"> • This indicator remains to be developed, but doing so is seen as a priority: it would add significant value to the tracking of both of the elements of sub-target 5.1, and the realisation is growing more widely of the critical nature of this parameter not only for delivery of the inland waters Programme of Work, but for most other subjects across all three objectives of the CBD, as well as other linked agendas (including the Millennium Development Goals, climate change adaptation etc). • There are appreciable technical challenges in designing a workable indicator, but techniques are in operation in some places (Canada, the USA) which may provide a foundation for an appropriate approach, and any advance on this under Ramsar is likely to draw heavily on approaches used in the UN World Water Assessment Programme (WWAP) and World Water Development Reports (WWDRs).
BIP indicator: “Invasive alien species”	(5.1), 6.1, (7.2)	<ul style="list-style-type: none"> • The introduction of non-native invasive species is the second most important cause of decline of freshwater species, after habitat loss (Millennium Ecosystem Assessment - Finlayson and D’Cruz, 2005; and Finlayson et al., 2005). • There are four component parts of the BIP indicator on IAS, covering the number of IAS per country, trends in national and international IAS policy, and a cut of the Red List Index for impacts of IAS. A composite “Global indicator of biological invasion” then incorporates the first three of these (i.e. excluding the RLI one). • The sources of data populating this, and the scope of coverage of the component parts of the indicator are at different stages of development, but at least some aspects of it should be feasible to report on in a systematic way at regular intervals. • In terms of addressing the relevant sub-targets, the Red List Index-based element does so directly (for sub-target 5.1, and for 7.2 if IAS are regarded as a form of “pollution”), while the other elements provide surrogates or predictors of the outcome (sub-target 6.1 is anyway itself a process indicator rather than an outcome indicator). • In principle, in future, wetland-based cuts of the RLI-

Indicator	Relevant PoW sub-target(s)	Comments
		based component should be possible, in the same way as with the application of the RLI to sub-target 2.1, referred to above.
Ramsar Indicator B: "Trends in the status of Ramsar site ecological character - qualitative assessment"	5.1	<ul style="list-style-type: none"> • This addresses the "degradation" component of sub-target 5.1 (although loss of within-site diversity may be part of this too, so the two concepts are not entirely distinct). It tackles the same question as Ramsar Indicator A(ii), referred to earlier in this table above (and is similarly based on information from Party national reports - a two-part question in the report format addresses Indicators A(ii) and B in turn); but Indicator B is focused specifically on the sub-set of wetlands that are designated as wetlands of international importance (Ramsar sites). • The same comments as given above for Indicator A(ii) therefore apply here too. • This indicator should have good communications resonance with wider audiences (using Ramsar sites as a high-profile encapsulation of broader stories); and it will in any event be a primary expectation among the Ramsar constituency itself that some status & trends storylines are available concerning the Convention's totemic site network. • Analyses have been developed, but report material only partly constructed so far at the time of writing. • Analyses have been undertaken for Ramsar sites as a whole, although an "inland waters" cut should in principle be possible at least in an approximate way (and more easily than for Indicator A(ii), which covers wetlands in general).
Ramsar Indicator D: "The frequency of threats affecting Ramsar sites"	5.1, 7.2	<ul style="list-style-type: none"> • This indicator also focuses on Ramsar sites; so the considerations applying to this focus of scope, referred to above in respect of Ramsar Indicator B, also apply here. • Indicator D tracks information about a range of types of pressures on wetlands; but from the perspective of their effect (or threatened effect) on specific receiving environments, ie on the listed sites. Hence it is an indicator of the status and trends of the wetlands concerned (they are more or less threatened, threatened by different things etc); but is also capable of illuminating the status and trends of the drivers of change themselves.

Indicator	Relevant PoW sub-target(s)	Comments
		<ul style="list-style-type: none"> • In this respect it may be capable of shedding some light on the “unsustainable water use” component of sub-target 5.1, and the “reduce pollution” component of sub-target 7.2 (at least for designated Ramsar sites), depending on what degree of disaggregation of individual threat types is achieved. • Several potential sources of information (site monitoring schemes etc) are capable of contributing to this, where overlap with Ramsar sites can be established (dependent to some extent on the development of suitable data coding conversion methods). • In the meantime, the initial operation of this indicator to date is drawing on two main sources: (i) data held in the Ramsar Sites Information Service (database) and provided by Ramsar Contracting Parties by means of the Information Sheet they submit for each Ramsar site, and (ii) data from BirdLife International’s Important Bird Areas (IBAs) monitoring system, in relation to those IBAs which are also Ramsar sites. • The BirdLife system is not yet in full global operation, but some initial results have been compiled (BirdLife International, 2008) for a sample of 167 IBAs which are also Ramsar sites (at present both inland and coastal wetlands are included in these analyses). • Some work is still required to reconcile the different threat categorisation frameworks used in different monitoring and assessment systems.
BIP indicator: “Health and well being of communities directly dependent on ecosystem goods and services”	(8.1), (8.2)	<ul style="list-style-type: none"> • This indicator aims to encompass a range of socio-economic issues that help to demonstrate the link between poverty and vulnerability to biodiversity loss. • Global datasets are available for various facets relating to health, well-being and components of ecosystem integrity. However, extrapolating such information to reflect the situation of “directly dependent” communities is not straightforward. Data are available for certain communities (e.g. fishing communities and forest dwellers), but such information is highly localised and not sufficiently spatially comprehensive to develop a global indicator. The indicator is therefore still in development.
BIP indicator: “Biodiversity for food and medicine”	8.2	<ul style="list-style-type: none"> • This indicator aims to track change in the conservation status of animals used for food and medicine, and to provide a baseline for the conservation status of

Indicator	Relevant PoW sub-target(s)	Comments
		<p>medicinal plants. It is once again based on a cut of the Red List Index, in the form of an RLI for birds, mammals and amphibians that are used for food and medicine.</p> <ul style="list-style-type: none"> • The amphibian index will already serve the purpose of relating to the inland waters target; while in principle, in future, wetland-based cuts of the other datasets should be possible, in the same way as with the application of the RLI to sub-target 2.1, referred to above. • Plants harvested for food have not been included. Apart from medicinal use, collection of data on harvest for other purposes is not as advanced as for terrestrial animals. • Further development of this indicator will explore the relationship between trends in conservation status of selected species, commodity prices and people's ability to access wild animal and plant products in a selection of countries where these contribute substantially to food and medicine.
BIP indicator: "Status and trends of linguistic diversity and numbers of speakers of indigenous languages"	(9.1), 9.2	<ul style="list-style-type: none"> • Linguistic diversity and traditional ecological knowledge are intimately linked. This indicator is based on the assumption that biodiversity conservation benefits from traditional knowledge about management of natural resources, which in turn depends to a large degree on safeguarding the languages that are vehicles of that knowledge. • Data is being collected for this indicator using two parallel methods: (i) a standardised UNESCO survey of survey of language vitality and endangerment and (ii) a UNESCO desk study using data from national censuses, published sources, and data provided by linguistic institutions and individual experts. • At present this indicator only provides baseline against which future trends can be measured. The indicator will initially be applicable only at the national level; but global applications should be developed later.
BIP indicator: "Official development assistance provided in support of the Convention"	11.1, (11.2)	<ul style="list-style-type: none"> • This indicator is still in development, and no information is yet available.

5. SUMMARY ASSESSMENT OF THE LISTED INDICATORS AS A WHOLE

The basis for this assessment

15. The brief selection of comments which follow is intended to complement those in the above section, by distilling here some observations at an overview level concerning the indicators listed in Table 2, with a view to informing the discussion in the following section on options for a future targets and indicators regime.

16. These points are drawn from experiences accumulated to date in constructing and beginning to operate the Ramsar Convention's effectiveness indicators, experiences in the context of the Biodiversity Indicators Partnership (BIP) project, and perspectives brought out through meetings during 2009 on the 2010 and post-2010 targets and indicators regime, in particular an international expert workshop which took place in Reading, UK, in July 2009. Further background can be found in Ramsar Secretariat (2009b), UNEP-WCMC (2009 a, b, c) and Pritchard (2009 a, b).

The nature of indicators

17. It is axiomatic, though often needs re-stating, that indicators provide an indication, not a full assessment, and hence aim only to illuminate some particularly useful examples of implementation issues. They generate "headlines" about a sample of the stories that make up an overall picture; but cannot themselves purport to be that overall picture, nor to be a comprehensive conclusion about (for example) inland waters biodiversity status and trends, or effectiveness of Convention-based actions, as a whole.

18. Whether indicators give a true insight into the extent of progress in achieving objectives partly lies with constructing them so as to test hypotheses about the causes of the observed results. Attributing cause generally relies on a range of assumptions, which need to be stated. Evidence to substantiate the type of assumptions required is often not available; so deductions about drivers and responses are often weakly-based. Future systems need to be honest about this.

19. Precision and scientific rigour may be one aim, but there is always a trade-off against ease of use. For the most part, the Ramsar indicators system has tended to err in favour of pragmatism, aiming to stimulate ready flows of information rather than constructing models of perfection that end up being only a long-term pipedream. In fact the Ramsar experience has demonstrated, among other things, that qualitative information can be very valuable for indicator purposes such as these, and for strategic decision-making, in circumstances where there is a good prospect of systematic comparisons being made over a time-series and between consistently reported situations (e.g., between geographical regions etc). Qualitative assessments also tend to be simpler, quicker and less costly to undertake.

20. Communicating results easily is another element of the trade-off. Some indicators, even though there may need to be caveats on the quality or variability of data, have special importance because they produce a simple, clear picture of changes in biodiversity over time which can be easily communicated to a range of audiences. Among those listed above, for example, the Living Planet Index and the indicator on threats to Ramsar sites may be thought to score well in this regard. Sometimes this trade-off can be handled by taking a different approach to a "headline indicator" compared with the approach to more detailed "sub-indicators" on the same issue. (Communication is discussed further under a separate sub-heading below).

Coverage of issues

21. In some cases, for example with indices relating to amphibians, or quality of fresh water, an indicator clearly matches the scope of the inland waters Programme of Work. In many cases however, inland waters interests are not separated out from wetlands as a whole, or from some wider definition of interests. In some cases (e.g., migratory shorebirds) it would not be ecologically meaningful to do so. There are several cases where a key future developmental need can be identified for doing a “wetland cut” of a given indicator; but it is harder to see how an “inland waters cut” of it would be achieved. This perhaps argues for a more integrated approach to wetland-related indicators (and reporting) across relevant CBD Programmes of Work/thematic areas (see section 7 of the present document below).

22. Of the 21 sub-targets for the Programme of Work given in Table 1 above, there is some relevance from a measure in the Ramsar or BIP indicator sets to 16 of them, or to 18 of them if Ramsar national report questions (in the format used for Ramsar COP10 in 2008) are included. The three sub-targets for which there is no corresponding indicator or report question are those relating to the extent of ecosystem areas under integrated basin management, access to genetic resources, and benefit-sharing. The sub-targets on genetic diversity of cropped/harvested species, and on sustainable use, consumption and trade are addressed by BIP indicators but not directly by any of the Ramsar indicators.

23. Reviews conducted before and during the July 2009 Reading meeting (referred to above) identified key gaps or weaknesses in the overall list of biodiversity indicators as relating to access and benefit sharing, technology transfer, wild genetic resources, sustainable use, drivers/threats, responses, links to human wellbeing, quality of ecosystems/biomes, indigenous and local knowledge, and ecosystem services.

24. The indicator list is weak in measures which present landscape-scale changes affecting wetlands and the water cycle. This is crucial, since it is the domain in which some of the most critical response options lie. Initial work on river fragmentation and flow regulation is one promising exception. Ideas for indicators addressing water quantity would be another: such an indicator is in the Ramsar list, but it remains to be developed. Doing so is seen as a priority: it would add significant value to the tracking of both of the two elements of sub-target 5.1; and the realisation is growing more widely of the critical nature of this parameter not only for delivery of the inland waters Programme of Work, but for most other subjects across all three objectives of the CBD, as well as other linked agendas (including the Millennium Development Goals, climate change adaptation etc).

25. There have also been requests for indicators of biodiversity aspects of climate change, ecosystem services, loss of ecosystem services, habitat restoration, aspects of the marine environment, hazardous substances, and various others.

26. Some of the issues on which the global list is deficient are nonetheless reportedly represented in indicators being operated at national level in some parts of the world; for example on access and benefit sharing.

27. Where an indicator does exist, there may of course still be gaps in its taxonomic, ecosystem or geographic coverage, and these will also need to be considered.

28. Some of the indicators are designed to operate at supranational level and to be coordinated internationally, and others are designed for use at site, basin/catchment or national scale. Broad-scale measures may of course rely on local information; and some small-scale measures can be aggregated for analysis at larger scales.

29. There is a need in general for “process” indicators, so that they can be correlated with the “ecological outcome” indicators, in order to shed light on causative factors (as mentioned earlier), and to enable

judgements about Convention implementation effectiveness. This is central to the process in Ramsar's case, where Parties are asked to report on processes through the questionnaire-style (and hence systematically analysable) national reports to COP (though the central analyses are still developing and have not yet been officially published). In the case of the CBD, the equivalent national report sources (4th national reports) have concentrated on outcomes, so process co-variables in the CBD's case are not so readily available.

30. Characterisation of indicators according to categories of drivers, pressures, threats, status, condition, trends, actions and responses is a popular approach. The Ramsar experience however has been that some phenomena combine elements of more than one of these (see for example comments on Indicators A(ii), B and D in Table 2 above); and the Convention's Scientific & Technical Review Panel ultimately found it unhelpful to try to classify indicators according to the DPSIR or similar frameworks.

31. Despite the need to make priority selections, some audiences/Convention constituencies will have a justifiably high expectation of certain issues being reported in any headline indicator set - such as (in the case of the Ramsar Convention) the status of Ramsar sites, progress with designations, etc. (using Ramsar sites as a high-profile encapsulation of broader stories). Hence whatever the scientific strengths or weaknesses of such measures may be, they will probably end up automatically needing to feature in any shortlist.

32. Finally, indicators measuring issues such as changes in wetland ecosystem area extent intuitively appear to communicate a clear story, but in fact attention to this may often mask the real issue of changes in quality of the habitat. For many systems, degradation is a more serious cause of loss of biodiversity and ecosystem services than is gross reduction in area. (The care in approach required to this is exemplified by the difference between stories about coverage achieved by protected areas and stories about management effectiveness).

Measurement, analysis and interpretation

33. Some datasets, such as those used to assess waterbird population trends, are among the richest biodiversity datasets in existence, and with careful analysis they are proving illuminating not only as to status and trends but also as to probable patterns in drivers of change. Many other indicators however are limited by the extent, availability, precision and consistency of the data upon which they are based. Most of the indicators developed within the 2010 framework are being compiled from existing datasets which may not have been collected or compiled for tracking biodiversity change, and which are therefore imperfect proxies. Concerns have been raised over the lack of clear time-defined baselines and therefore over criteria for "success".

34. There is an enduring need for capacity, including both resources and training, and perhaps also for imaginative thinking about potential enrichments of information from sources such as "citizen science".

35. Whatever the target at issue, significant efforts need to be allocated to interpreting the meaning of indicator results. At the same time, indicators should be designed as far as possible to "communicate themselves", by having "intuitive immediacy".

36. Being able to disaggregate indicators by geographical area, taxonomic group, thematic issue area and so on is very useful. While sometimes indexing or aggregating measures can make the story simpler, sometimes it is made more complicated. Again there is a trade-off: this time between simple measures that serve a public advocacy purpose and others that are able to help with fine-tuned adaptive decision-making.

37. Yet another trade-off arises from the fact that robust datasets and analysis methods may not admit fine-grained responsive sensitivity to small increments of change, and/or may create a time-lag in picking them up (examples might be the various indicator components cited in the table as deriving from the Red List extinction risk index).

38. Obviously in a number of cases the variable being measured by an indicator is a pragmatic surrogate for the biodiversity outcome expressed by the target, and relies heavily on some assumptions about the relationship between the phenomenon being measured and the status of related biodiversity. In some cases, however, the target itself is a hybrid of outcomes, surrogates and processes. In practice these distinctions are not as clean as may sometimes be implied in theoretical models.

39. As mentioned earlier, most analyses should be subject to significant caveats as to the reliance which has to be placed on assumptions about the relationship between drivers of change and outcomes; and between finding a correlation and being able to substantiate a cause-effect relationship.

40. Preliminary findings collated so far and given in the Programme of Work review background document (CBD Secretariat *in prep*, b) present a picture of inland waters programme performance outcomes that could be characterised as a combination of sub-targets “not being achieved”, “mixed picture” and “not very easy to say”. No indicators are showing outcomes that could be characterised at global level as “clearly being achieved”. The “not easy to say” category illustrates that interpretations are not always straightforward; because of ambiguous indications, the need for longer runs of data, or for other reasons.

41. Those preliminary findings treat a selection of inland waters biodiversity outcomes, but do not generally look at whether these outcomes result from actions by governments in response to the 2010 target, or to the sub-targets, goals and actions in the Programme of Work. Addressing this correlation aspect is nonetheless an integral intention for the future operation of the Ramsar Convention’s indicators of effectiveness.

42. That correlation work will inevitably show that a constant or worsening rate of biodiversity decline is occurring even in some cases where diligent implementation of agreed actions is being undertaken by relevant governments. Again, care in interpretation will be required: this does not necessarily mean that the action was misguided or a waste of effort, since the question may be how much worse the situation would have been without it. In general though, baselines, control situations and hypotheses are all relatively weak areas of indicators in this field. In most cases, all that it is possible to do is to compare “with action” and “without action” outcomes in different places as a surrogate for changes over time; or to compare “before action” and “after action” outcomes in the same place but without being able to keep other variables constant. These are important challenges for future analyses.

43. Even where particular outcomes are relatable to inputs, this may still not necessarily illuminate what we need to know about the chain of drivers of change and delivery of ecosystem services. For example, correlating Ramsar indicators of wetland status with Convention implementation activities may provide an assessment of the effectiveness of the goal of maintaining wetlands, but does not of itself illuminate the effectiveness with which those wetlands sustain water security or other services. A bigger context is required to consider this; and again there will be significant reliance on assumptions about cause and effect.

44. Finally, there is scope for looking further at interactions between the indicators, and looking at how they correlate or expand each other’s narratives, e.g., comparing status & trends of wetlands within protected areas against status & trends outside them. As noted already, the thrust of the Ramsar indicators process is to relate outcomes to inputs and draw conclusions about effectiveness of Convention implementation; but the point here is that additional insights can be gained by relating outcomes to other outcomes.

The nature of the targets

45. Reflections on future targets, based on experience with the 2010 target and the linked programme sub-targets, are a matter for section 6 below. Some comments are appropriate here, however, on aspects of that experience.

46. First, it may be noted that the simple fact of having the political and policy-driver device represented by the 2010 target has produced benefits. The institutional infrastructure which has been mobilised around it has been useful in building convergent mandates and consensus messages across a range of stakeholders. The flexibility of the overall framework of targets and indicators, which enables their implementation at a variety of scales, has facilitated political uptake, and this in turn has boosted support for developing the detail of the corresponding indicators. Relevance to other sectors and processes has however received less attention, and this has restricted the extent of good ownership and use beyond the CBD.

47. A somewhat “deconstructive” approach to allocating sub-targets to specific issues or sectors has perhaps been the reason for an under-reflection of more holistic and integrative or landscape-scale measures (although these are probably also the ones which would pose some of the most difficult technical assessment challenges). This is perhaps particularly relevant to the role of the water cycle (also cited as a gap in the regime) in underpinning many of the other processes and value-sets at issue.

48. Another key gap in the 2010 regime concerns the quality/degradation of ecosystem functioning (and the consequences of this for delivery of ecosystem services), since the target, based on biodiversity loss, is about quantity, not quality. The Ramsar Convention’s “ecological character” concept may offer elements of a way forward on this, as would any measures of ecosystem resilience and “imminence of collapse”.

49. A key feature of the way in which the 2010 target is expressed is that its monitoring requires measures and findings which are capable of speaking about a change in the rate of change; and this requires some care in interpretation. The construction of the target has caused communication difficulties, since it is not about negative versus positive trends, but a change in the rate of decline. With datasets on trends, where each point is itself an expression of a rate of change, at least two data-points are required to make the requisite comparison. With datasets on status, a time-series of at least three data-points is required, so that two rates of change (from point 1 to point 2, and from point 2 to point 3) can be compared. The Ramsar Convention’s waterbird population indicator work probably approaches most closely to the kind of metrics required.

50. It is also critical in interpreting 2010 target results to be clear that a “success” in terms of reducing the rate of decline (which, depending on the mode of presentation, may appear as an “improving trend”), will still relate to a continuing absolute loss of biodiversity, unless the trend has improved to the extent of passing the threshold point where it switches from negative to positive. Summary “storylines” need to be very clear about what constitutes “good news” or “bad news” in this context.

51. It may be noted that several of the Programme of Work sub-targets embody a combination of elements, and in some cases the indicators identified in the tables above as corresponding to them may in fact address only a sub-set of those elements. This is perhaps more of a reflection on the construction of the sub-targets than something that can or should be cured by trying to construct different indicators.

An effective indicator process

52. It is striking that even as the year 2010 is ushered in, much of the “biodiversity indicators industry” is still in the throes of working out how to measure many of the things that have been agreed as needing to be measured, and how to operate viable processes for collating and reporting results.

53. Not surprisingly, resort has been had to a number of data-generation opportunities which in truth are more in the nature of “one-off assessment” exercises than genuinely repeatable indicator measures. The experience to date shows an acute need to identify processes which are likely to have (or which would be the priorities for advocating the development of) system-level capacity for delivering regular data collation, analysis and reporting.

54. The key is not just to agree what constitutes the most pertinent measure, but to map out and commit to a realistic plan (and sustainable resourcing) for institutionalised regular programmes for assessing and reporting it, in ways which are capable of being systematically replicable from place to place and from time to time (including those parts of the world which have severe capacity constraints).

55. Indicators based on data drawn from institutionalised sources such as Contracting Party national reports to the Conventions, in particular, should also have the advantage of strong political resonance, given that the resultant findings are a reflection back to Parties of information which they themselves have provided.

56. The Ramsar Convention achieves high levels of triennial reporting by Parties (for example submission by over 90% of Parties for the most recent COP in 2008), and for some core issues the same questions can be tracked over a 15-year period or more. This helps to provide a basis for related indicator information to be statistically meaningful. The Ramsar reports focus mainly on activities and processes (by contrast to the CBD’s 4th national reports, which put emphasis on ecological outcomes); but when analysed in conjunction with the Convention’s ecological outcome indicators, some good illumination of the ultimate effectiveness of achievement of the Convention’s goals can be obtained.

57. There have been a number of comments during the 2009 consultations urging scientific rigour in relation to 2010 target-related indicators, and calls for a greater degree of independent and transparent peer-review of the findings. This is indeed an issue for the future; though at the same time the various trade-offs which attend such things (referred to above) should always be borne in mind.

Communication

58. Some of the trade-offs mentioned above arise in relation to remembering the ultimate communicative purpose of indicators. Communications expertise is every bit as integral to the endeavour as scientific expertise; and some of the most useful indicators have been developed by first defining the communication product and then “working backwards” to scope out the analytical techniques required to serve it. The tendency instead to construct “supply-driven” indicators (i.e., choosing to report what the technicians know most about) should be guarded against: a “demand-driven” approach (what questions do we most need to answer?) is more helpful.

59. In the BIP project, and in the Ramsar process, there has been some concentrated thinking on communications issues, covering for example the types of products required, their destinations and audiences; calendars of opportunities for promoting outputs in the year(s) ahead; reinforcing “technical” opportunities (e.g., SBSTTA meetings) with “outreach” ones (e.g., side-events, press activity); consideration as to the intelligent crafting of “headline stories”, whether these are best couched in positive or negative terms; and so on. These aspects of the indicators process continue to be crucial.

6. A REGIME OF FEASIBLE AND RELEVANT SUB-TARGETS FOR INLAND WATERS/WETLANDS FOR THE CBD IN THE POST-2010 PERIOD

Context: points arising from consultations on the overall regime during 2009

60. The discussion in this section clearly does not begin in a vacuum. As well as the experiences described above which come from the operation to date of the existing regime (the framework of “2010” targets and indicators of relevance to the inland waters Programme of Work), and from the Ramsar Convention’s indicators of effectiveness (which are for the most part scoped in relation to wetlands in general, i.e., including coastal and near-shore marine systems), there has been a flurry of activity throughout 2009 aimed at elaborating proposals for a successor “post-2010” regime of global biodiversity targets and indicators.

61. A general consensus has run through this to the effect that a biodiversity target and indicators regime should be rolled forward in an appropriate way that fosters long-term political continuity of the conservation goal; but with modifications to sharpen the policy-response relevance of the “stories” told about the meaning of indicator results.

62. The present section draws on all of this background, having regard *inter alia* to expert meetings held in 2009 in Reading, UK (July), Nairobi, Kenya (October) and Kobe, Japan (October). Recommendations concerning a post-2010 regime emerged from each of these and other informal discussions (see UNEP-WCMC 2009 b, c; and UNEP, 2009).

63. Some of the key forward-looking points which have been expressed include the following:

- The post-2010 target should reflect the interdependence of biodiversity, ecosystem services and human well-being;
- The target should be formulated in terms of a level or a change, rather than a rate of change;
- The target timeframe should incorporate a long enough period to improve the state of biodiversity as well as interim milestones that satisfy the more rapid reporting required for policy relevance (clear, short statements of a long term vision for 2050 and a short term goal for 2020 are suggested, such as:

(2050 Vision): “Living in harmony with nature: biodiversity is maintained and restored, sustaining a healthy planet and delivering benefits essential for all people”

(2020 Goal - one option): “To have taken by 2020 the necessary urgent and concerted actions to address the threats facing biodiversity so as to stop biodiversity loss, and to have started to restore ecosystems, thus ensuring the continued provision of ecosystem services, and avoiding dangerous or irreversible environmental change”

(2020 Goal - alternative option): “To have initiated by 2015 the necessary urgent and concerted actions required to address the threats facing biodiversity with a view to halting biodiversity loss, and to restoring ecosystems, thus ensuring the continued provision of ecosystem services and avoiding dangerous or irreversible environmental change or change that has dangerous consequences for human well-being, as well as contributing to the achievement of the Millennium Development Goals”.

- A small set of (10-15) broad headline indicators, clearly linked to the main target and sub-targets and underscored by more specific sub-indicators/measures (maintaining a flexible framework to cater for national/regional needs), should be maintained/developed;
- The current framework of global indicators should be modified and simplified into four “focal areas”: threats to biodiversity; state of biodiversity; ecosystem services, and policy responses;
- Some additional measures of direct and indirect drivers (threats to biodiversity), ecosystem extent and condition, ecosystem services and policy responses should be developed;
- Individual indicators should be capable of disaggregation (taxonomically and geographically) in order to allow the identification of trends and priorities for action at meaningful scales;
- National capacity for framework application, indicator development, data collection and information management should be further developed and properly resourced, with good synergies and streamlining across different Conventions and other processes;
- Priority must be given to developing a communication strategy for the post-2010 targets and indicators.

An indicative possible framework of post-2010 objectives and targets, and implications for inland waters sub-targets

64. At the time of writing (November 2009) some preliminary indications are available as to the way this thinking is likely to be taken forward into the consideration within the CBD of a revised and updated Strategic Plan for the Convention in the post-2010 period, through documentation for the 14th meeting of SBSTTA and the 3rd third meeting of the Working Group on Review of Implementation, which are both due to take place in May 2010.

65. Table 3 is an informal synthesis of aspects emerging from this, in the form of a possible revised scheme of strategic objectives and targets. The table presents some comments on these, specifically in relation to recommendations that could flow from them for adopting potential sub-targets and corresponding indicators for inland waters/wetlands.

66. The expression “inland waters/wetlands” is used frequently in this paper, since although the context for this discussion is the in-depth review of the Programme of Work on inland waters biodiversity, the sub-targets and indicators suggested here can/should be considered as applicable to wetland and water-related aspects of other programmes and thematic areas (see section 7 below). Indeed the aim would obviously be for the system to have broader ownership beyond the CBD, i.e., among all relevant biodiversity-related constituencies.

Table 3: Indicative possible framework of post-2010 biodiversity objectives and targets, with comments on implications for setting or revising sub-targets and indicators for inland waters/wetlands.

(References to “Nairobi meeting” refer to the conclusions in UNEP (2009)).

Possible strategic objectives	Possible new targets	Comments in relation to potential post-2010 sub-targets and indicators for inland waters/wetlands
<i>A: Initiate strategic actions to address the indirect drivers of change</i>		

Possible strategic objectives	Possible new targets	Comments in relation to potential post-2010 sub-targets and indicators for inland waters/wetlands
<p>1. Promote communication, education and public awareness</p>	<p>1. Everyone is aware of the value of biodiversity and what steps they can take to protect it</p>	<ul style="list-style-type: none"> • The European Union's SEBI2010 process includes a biodiversity indicator on "public opinion/awareness"; and the experience with this may be worth analysing. • There may be a case for including questions in opinion surveys that feature the cross-cutting importance of water for ecosystems and people; but targets/indicators in this area should not be too sophisticated (one poll (Gallup Organisation, 2007) showed that two-thirds of Europeans do not understand the word "biodiversity"). • The Ramsar Convention has a programme on wetland awareness and communication, and has some Strategic Plan Key Result Areas linked to it (these are process-oriented in nature, but something more outcome-oriented could conceivably be developed).
<p>2. Mainstream biodiversity across government and society</p>	<p>2. The value of biodiversity, and the opportunities derived from its conservation and sustainable use, and the fair and equitable sharing of benefits from the use of genetic resources, are recognised and reflected in all countries, in national development policies and strategies, national accounts, economic sectors and spatial planning processes at all levels of government, and by the private sector, applying the ecosystem approach</p>	<ul style="list-style-type: none"> • The Ramsar Strategic Plan has a strategy (target) defined as "Cross-sectoral recognition of wetland services" with some associated Key Result Areas (indicators), which might be adapted to cover objective 2; plus further ones on strategic environmental assessment and integration of wetland policy with other national policies. • The Ramsar Strategic Plan has a further strategy and associated KRAs on "Integrated Water Resources Management" which could also play a part here. • The Nairobi meeting recommendation which relates to suggested target 2 included the additional element of its being "in a manner that defines roles and responsibilities", and referred also to horizontal cooperation mechanisms being established between all relevant sectors.
<p>3. Realign economic incentive measures to support the conservation and sustainable use of biodiversity</p>	<p>3. Subsidies harmful to biodiversity are eliminated</p>	<ul style="list-style-type: none"> • The Ramsar Strategic Plan has a strategy and associated KRA on incentives relating to wetlands. • Independent measures may be possible of the value of subsidies in particular sectors, such as fisheries; but some challenges could arise at national level in assigning specific incentives

Possible strategic objectives	Possible new targets	Comments in relation to potential post-2010 sub-targets and indicators for inland waters/wetlands
		<p>clearly to “positive” or “negative” categories.</p> <ul style="list-style-type: none"> Alternatively the presence/absence of policy or legislative instruments regulating the negative effect of subsidies might be tracked, and this might conceivably be addressed on a wetland-specific sector basis.
<p>4. Reduce unsustainable production and consumption that impacts biodiversity upon</p>	<p>4. Governments and stakeholders at all levels and businesses and civil society have formulated and begun to implement sustainability plans to increase efficiency, reduce waste and limit the consumption of resources within ecological limits</p>	<ul style="list-style-type: none"> It would theoretically be possible to construct “ecological footprint” targets/indicators for consumption of specific wetland-based resources; but these would need some work to develop. A sub-target and related indicator(s) for water use is a critical requirement here.
<i>B: Addressing the direct drivers of biodiversity loss, in order to reduce pressures on biodiversity</i>		
<p>5. Reduce the loss and degradation of natural habitats</p>	<p>5. [The rate of loss and degradation of natural habitats is halved] [Zero net deforestation and loss of wetlands, and a halving of the rate of loss of other natural habitats have been achieved].</p>	<ul style="list-style-type: none"> Ramsar indicators A(i), A(ii), B, C, D and K would all be relevant. “Wetland cuts” of BIP indicators on trends in extent of selected biomes, ecosystems and habitats, connectivity/fragmentation of ecosystems, water quality and nitrogen deposition would all be relevant. The Nairobi meeting recommendation which relates to suggested target 5 included the specific element of “prevent[ing] erosion of ecosystem integrity and functions by maintaining the distribution and abundance of a full complement of their characteristic species”, which overlaps with suggested target 12 below but is relevant here too.
<p>6. Promote the sustainable use of wild living resources</p>	<p>6. [Pressure on marine ecosystems through overfishing halved, and destructive fishing practices are eliminated] or [Exploitation of all fisheries, and of other wild living resources, is sustainable]</p>	<ul style="list-style-type: none"> The suggested target here interprets objective 6 in the context of marine fisheries, which may go beyond the scope of the present report; although similar ideas could in principle be developed for other types of exploited wild living resources related to wetlands (but see also comments on suggested objectives 4 and 7, which conceptually overlap with this). (The proposals from the Nairobi meeting

Possible strategic objectives	Possible new targets	Comments in relation to potential post-2010 sub-targets and indicators for inland waters/wetlands
		included generic text on the sustainability of all harvest of living resources - in the scheme presented in the present table, this idea has been split into the specific areas of fishing, forestry, agriculture and population endangerment instead).
7. Ensure that agriculture, aquaculture and forestry are managed in a manner consistent with the conservation and sustainable use of biodiversity	7. [All] areas under agriculture, aquaculture and forestry are managed according to sustainability criteria	<ul style="list-style-type: none"> • A “wetland cut” of the BIP indicator on “area of agricultural ecosystems under sustainable management” would be relevant. • Indicators for aquaculture would be largely applicable to inland waters/wetlands, since the bulk of production systems occur in these biomes and usually production systems are disaggregated by freshwater v. brackishwater.
8. Reduce pollution and its impacts on biodiversity	8. Pollution from excess nutrients (N and P) has been brought below critical ecosystem loads	<ul style="list-style-type: none"> • Ramsar indicator C would be relevant. • The BIP indicator on water quality and a “wetland cut” of the indicator on nitrogen deposition would both be relevant. • It is essential that this indicator applies to both surface and groundwater resources.
9. Control pathways for potential alien invasive species and emerging infectious diseases of wildlife	9. The introduction and establishment of invasive species has been prevented and emerging infectious diseases of wildlife controlled	<ul style="list-style-type: none"> • A “wetland cut” of the BIP indicator on invasive alien species would be relevant. • Something might be developed from the relevant question (1.6.1) in the Ramsar COP10 national report pro-forma. • (These do not address the “emerging infectious diseases of wildlife” aspect of suggested objective 9). • The proposals from the Nairobi meeting included reference to the important additional element of needing to ensure that existing invasive alien species are eradicated or brought under control.
10. Reduce the impacts of climate change and ocean acidification on ecosystems and ensure that responses to climate change are	10. The impacts of climate change and of ocean acidification on ecosystems have been reduced and responses to climate change that are not detrimental to	<ul style="list-style-type: none"> • (The element of ocean acidification is beyond the scope of the present report). • Ramsar indicators A(ii) and D may be relevant (to the impacts aspect of the suggested objective, rather than the responses aspect), but they would probably need modifications to the way they are currently envisaged as operating;

Possible strategic objectives	Possible new targets	Comments in relation to potential post-2010 sub-targets and indicators for inland waters/wetlands
not detrimental to biodiversity	biodiversity have been agreed	and these modifications would be potentially controversial and certainly technically challenging to develop.
<i>C: Promoting direct action to safeguard and restore biodiversity and related ecosystem services, and contribute to climate change mitigation and adaptation</i>		
11. Protect critical [and representative]habitats and ecosystems	11. By 2020, at least 15% of [land and sea] [marine] areas, including the most critical terrestrial, freshwater and marine habitats, have been protected through effectively managed protected areas and/or other means, and integrated into the wider land- and seascape	<ul style="list-style-type: none"> • A sub-target couched in terms of Ramsar sites would be one way of framing this objective for application to wetlands; and the Ramsar Strategic Plan has several relevant strategies and Key Result Areas that could be taken into account in doing so. • Ramsar indicators B, D, E and H (dealing separately with coverage and management effectiveness) would be relevant. Ramsar Indicator I (under development) takes a species-representation approach rather than a habitat/ecosystem-based approach; but it too might be considered in conjunction with these others. • A “wetland cut” of the BIP indicators on coverage of protected areas and management effectiveness of protected areas would be relevant. • The Nairobi meeting distinguished “key biodiversity areas”, “critical natural habitats”, “areas representative of a given ecosystem type” and “ecological connections such as migratory corridors and stepping stones” as sub-elements of what this objective should address. • The “other means” element of suggested target 11 makes the question considerably more complex, since many of the other outcome targets/indicators could have relevance to the target in that respect, and moreover, measurement of surface area impacts would be very problematic for a number of them. • The Nairobi meeting however interpreted the “other means” element in a more manageably restricted way, effectively by defining it in terms of protected area analogues (“other conserved areas include indigenous reserves, community conserved areas, locally managed marine areas, and other types of areas maintained by indigenous and local communities”).

Possible strategic objectives	Possible new targets	Comments in relation to potential post-2010 sub-targets and indicators for inland waters/wetlands
<p>12. Improve the status of threatened species and restore, maintain, or reduce the decline of populations of more common species</p>	<p>12. The extinction of known threatened species (vertebrates and higher plants) has been prevented by ensuring that all such threatened species are protected in at least one site</p>	<ul style="list-style-type: none"> • The suggested target here is site-based, which seems perhaps inadequate; although at the same time the suggested objective is population-based. This may need more thought. • The suggestion from the Nairobi meeting was also population-based (“... prevent further deterioration of the conservation status of threatened species and improv[e] the conservation status (e.g. Red List status) of at least 20% of assessed threatened species, including through <i>ex situ</i> conservation, sustainable international trade and other means”). • Ramsar indicators F and G would be relevant. • A “wetland cut” of the BIP indicators on trends in abundance and distribution of selected species and change in status of threatened species would be relevant.
<p>13. Improve the conservation of genetic diversity, including varieties and breeds of crops, livestock, and of harvested species of trees, fish and wildlife</p>	<p>13. The status of crop and livestock genetic diversity in agricultural ecosystems and of wild relatives has been improved</p>	<ul style="list-style-type: none"> • If feasible, a cut of the BIP indicator on genetic diversity of terrestrial domesticated animals could be relevant, if it related specifically to fish species of major socio-economic importance. [It is assumed that the term “fish” includes other fishery resources such as crustaceans, molluscs etc.] • Note that the Nairobi meeting recommendation on this issue included additional elements that specified “inside and outside protected areas”, as well as “through <i>ex situ</i> conservation”.
<p>14. Manage biodiversity and ecosystems to contribute to climate change mitigation</p>	<p>14. The contribution of biodiversity and terrestrial, freshwater and coastal ecosystems to sequestering and retaining greenhouse gases has been enhanced</p>	<ul style="list-style-type: none"> • This may be where construction of a sub-target/indicator on wetland ecosystem restoration would be appropriate. It could be disaggregated according to certain particular wetland types. The Ramsar Scientific & Technical Review Panel has been undertaking work that could contribute to the definition of necessary baselines. Some further developmental effort would be required, but modelling restored wetland (type) area as a proxy for sequestration/retention performance may be possible.

Possible strategic objectives	Possible new targets	Comments in relation to potential post-2010 sub-targets and indicators for inland waters/wetlands
15. Manage and restore biodiversity and ecosystems so as to ensure the provision of ecosystem goods and services and contribute to climate change adaptation	15. Terrestrial, freshwater and marine ecosystems that provide critical services, especially for the poor and vulnerable, that build ecological resilience or that contribute to local livelihoods and climate change adaptation have been safeguarded or restored	<ul style="list-style-type: none"> Wetlands, and their role in the water cycle across the landscape more generally, may be the most important aspect of climate adaptation storylines. Here also (as with comments on suggested target 14 above) construction of a sub-target/indicator on wetland ecosystem restoration could be appropriate; and again it could be disaggregated according to certain particular wetland types. While not the whole of the story encompassed by suggested target 15, this may be the most value-added aspect to focus on (and it would relate not only to the climate adaptation aspect but to a “wetland cut” of the broader ecosystem services aspect). The conclusions of the Nairobi meeting referred to the additional idea of a target/indicator for the inclusion of ecosystems in national poverty reduction strategies and in national climate change adaptation strategies. A wetland-specific sub-target/indicator along those lines may also be useful. A useful indicator, with a high political presence, would relate to trends in water-related disasters.
16. Protect traditional knowledge, innovations and practices and support benefits for indigenous and local communities, especially the poor and vulnerable	16. Traditional knowledge, innovations and practices and the rights of indigenous and local communities over these are protected and adequate and equitable access to essential ecosystem services on the part of indigenous and local communities, especially the poor and vulnerable, is guaranteed	<ul style="list-style-type: none"> (No case is made here for a specific wetland-related sub-target/indicator on this).
<i>D: Enhancing implementation through planning, continuous learning and effective review at national and global levels</i>		
17. Develop and implement national biodiversity strategies	17. Each CBD Party has an appropriate, up-to-date, effective and operational national	<ul style="list-style-type: none"> The Ramsar Convention has a good dataset in relation to Ramsar Parties (nowadays not a radically different list from the list of CBD Parties), going back in one form or another to

Possible strategic objectives	Possible new targets	Comments in relation to potential post-2010 sub-targets and indicators for inland waters/wetlands
	<p>biodiversity strategy, consistent with the CBD Strategic Plan, based on adequate assessment of biodiversity, its value and threats, with responsibilities allocated among sectors, levels of government, and other stakeholders, and coordination mechanisms are in place to ensure implementation of the actions needed</p>	<p>1987, concerning the Ramsar Convention's analogous construct of "National Wetland Policies"/"National Ramsar Policies". In the Ramsar indicators process these data are used as a process indicator to correlate with ecological outcome indicators and this to illuminate the question of Convention "effectiveness". There is also a related Key Result Area in the Strategic Plan. This could be the basis of a wetland-related analogue of suggested target 17.</p> <ul style="list-style-type: none"> • There would then be further analyses which could be done of the relationship between NBSAP performance and NWP performance (and indeed between each of these and all of the other indicators). • This target should mean, and explicitly state, that relevant strategies for relevant sub-components of biodiversity (e.g., wetlands) are an integral part of such "biodiversity strategies". This would require integration of Ramsar and CBD considerations at national level (as well as for other sub-topics such as migratory species etc.).
<p>18. Ensure the fair and equitable sharing of benefits arising from the use of genetic resources, and that access to genetic resources is facilitated</p>	<p>18. Access to genetic resources is enhanced, and substantial benefits are shared, consistent with the international regime on access and benefit sharing</p>	<ul style="list-style-type: none"> • (No case is made here for a specific wetland-related sub-target/indicator on this).
<p>19. Promote identification and monitoring of biodiversity, scientific and technical cooperation and technology transfer</p>	<p>19. Knowledge and technologies relating to biodiversity, its value and functioning, its status and trends, and the consequences of its loss, are improved and widely shared</p>	<ul style="list-style-type: none"> • No case is made here for a specific wetland-related sub-target/indicator on this. The suggested objective is worded ambiguously, but it is assumed here that "monitoring of biodiversity-related cooperation etc" is what is intended, rather than monitoring of biodiversity <i>per se</i>. • Note that the Nairobi meeting conclusions included the additional element of reference to "through a fully functional intergovernmental platform".
<p>20. Ensure the</p>	<p>20. Capacity (human</p>	<ul style="list-style-type: none"> • The Ramsar Convention has some equivalent

Possible strategic objectives	Possible new targets	Comments in relation to potential post-2010 sub-targets and indicators for inland waters/wetlands
necessary capacities and resources to achieve the three objectives of the CBD	resources and financing) for implementing the CBD has been increased tenfold	<p>objectives for Ramsar implementation in its own Strategic Plan; but given the Ramsar Convention's role as lead partner of the CBD on wetland issues, these could be regarded as a sub-set of the "necessary capacities and resources to achieve the three objectives of the CBD".</p> <ul style="list-style-type: none"> • "Effective implementation of the Ramsar Convention" could be a capacity-related sub-target/indicator for the CBD. • Note that the conclusions of the Nairobi meeting made explicit reference to the idea that financing needs to be sustainable. • Additionally, note is made in document UNEP/CBD/SBSTTA/14/3 regarding inland waters/wetlands that the key financing opportunity is to mobilise other sources of funding towards sustaining or rehabilitating wetland services (e.g., ongoing major investments in water security) and it provides clear examples of how such approaches can result in cost-savings. There is no particular reason to assume that biodiversity conservation has to cost more money – it can indeed help reduce costs. It would be useful to capture this aspect by reflecting the ability of biodiversity/natural ecosystem infrastructure to reduce economic costs.

Factors underpinning the design of future inland waters/wetlands sub-targets

67. The aim here is, from the indicative framework and comments in Table 3, and taking account of the analysis of lessons learned from the existing frameworks as described above, to consider options for a post-2010 framework of sub-targets and indicators for inland waters/wetlands.

68. Based on the proposals already taking shape for the broader post-2010 agenda, the expected overall timeframe to which these would relate is that they would serve a biodiversity "vision" for the year 2050, as referred to in paragraph 6.4 above. Under this there would be a progress deadline of 2020: recognising that halting loss by 2020 may not be possible universally. The alternative approach to the progress goal which has been mooted would be to relate it to the year 2015, which would offer resonance with the Millennium Development Goals. (The current Ramsar Convention Strategic Plan also runs until 2015).

69. One general message which has come from the debates so far is that it would be desirable to look for ways of framing more of the targets in a positive way, bringing out the benefits of biodiversity as well as the negative consequences of biodiversity loss.

70. Another general issue is an underlying desire to seek simplification of specific targets/indicators and of the scheme overall. There is a good case for this, but also a balance to strike (as discussed above) in not losing meaningfulness by over-consolidating component measures that can individually reveal the causes of change and the required response actions. A hierarchical approach may work best.

71. Several approaches could be taken to proposing an inland waters/wetlands scheme of sub-targets. One would be to take the existing list of 21 sub-targets and suggest modifications to these, aiming to minimise unnecessary changes and thus to preserve a good level of continuity. An alternative would be to generate a new list of the sub-targets that appear from first principles to deliver best the most important wetland-related aspects of the possible global framework taking shape as indicated in Table 3 above (and if necessary adding any further priority issues that appear to be conspicuously absent from that framework).

72. While bearing in mind the continuity point, for present purposes it is perhaps most instructive to take the second of these approaches. To help in relating this to the existing framework however, cross-references are included; and then a table based on the list of 21 is also provided.

73. Concerning issues which may be important priorities from the point of view of inland waters and wetlands (and of the relationship of these to other biodiversity topics) yet which are currently not reflected in the possible post-2010 strategic objectives given in Table 3, there are probably two of these. The first is the (positive) strategic objective of habitat restoration for purposes beyond climate change adaptation. (Species population restoration, and ecosystem restoration for climate change adaptation purposes, are already covered in the possibilities listed in Table 3). The second would be a strategic objective based on water quantity, or more specifically water availability and use. This is an important topic elaborated further in the section below.

74. “Effective implementation of the Ramsar Convention” as a target (appropriately worded to cater for non-Parties to this convention) would automatically incorporate goals and objectives (and indicators) already in place and adopted in that Convention, such as “stem[ming] the progressive encroachment on and loss of wetlands now and in the future”, “maintaining the ecological character” of wetlands and “promoting the wise use” of wetlands. The Convention’s Mission (current version in Resolution X.1, 2008) is “the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world”. The current Ramsar Strategic Plan (2009-2015) expresses 5 goals, 28 strategies and 50 key result areas; and in addition there is the set of 8 agreed indicators of ecological outcomes, with a further 5 also agreed but awaiting development (see tables above). While this model is logical as far as it goes, at the same time it must be remembered that a variety of other factors and activities of other sectors impact (positively or negatively) on the ability of Ramsar Parties and the Convention’s institutions to achieve their goals. While there is every reason to reinforce further the leadership and partnership role of Ramsar where it can be exerted as such, there also remains an acute need to “mainstream” relevant responsibilities properly into the work of other players: those responsibilities cannot simply be seen as having been “delegated” to one Convention.

Suggestions for potential future inland waters/wetlands sub-targets and indicators

75. Building on all of the issues reviewed above, suggestions for a potential future set of 9 inland waters/wetlands sub-targets and corresponding indicators are given in Table 4, cross-referred to other targets/sub-targets in the preceding tables. These suggestions represent just one way of satisfying the various imperatives and reconciling the different trade-offs which have been discussed above; but they take into account the lessons learned from experience to date, and the other developmental work which has taken place thus far in relation to the post-2010 period.

76. It is important to emphasise that any set of “headline” measures such as these will only be a selected sample of the issues, and they will not be designed to function in isolation. The cross-cutting nature of water and wetlands has been stressed above; and in one sense, given that fact, it might be reasonable to expect that many of the issues should be addressed elsewhere in the more cross-cutting and generic targets and indicators included in other parts of any future regime (sustainable land use, governance etc). On this basis one could expect a relatively short list of targets that are specific to inland waters/wetlands, with an acknowledgement that “implementation of the Ramsar Convention” potentially constitutes a portmanteau expression of what is required in that regard.

77. The suggestions offered below, to an extent, embody a hybrid of both approaches: i.e., streamlining the list of things that are specifically attributed to the wetland sector, while at the same time including some wetland-based issues that have wider significance.

Table 4: Suggested post-2010 inland waters/wetlands sub-targets, and likely main indicators.

Suggested post-2010 inland waters/wetlands sub-targets	Linked general targets in the indicative possible future framework (Table 3)	Linked sub-targets in the existing scheme (i.e., in Decision VIII/15 Annex IV)	Likely main indicators
1. The Ramsar Convention is implemented effectively	(In principle almost all; except perhaps 13 and 18, and except perhaps 6 if the intention is that it apply only to deep-water/offshore marine fisheries)	(In principle almost all; except perhaps 3.1, 4.3, 10.1, 10.2 and 11.2)	<ul style="list-style-type: none"> • No one specific indicator; but periodic overview reports on Convention implementation (against the Strategic Plan, including its capacity, resourcing and awareness sections) and effectiveness (against its ecological effectiveness indicator set) would serve. • Ramsar national reports will be among the key data sources for the above: note also that the report pro-forma asks questions of Parties (= questions 2G and 2H in the COP10 version) about synergy at national level with other MEAs and about linkages across sectors.
2. Natural functioning of the water cycle is maintained, at the landscape scale	(7), 10, 15	(1.1), (5.1)	<ul style="list-style-type: none"> • Could be the development of Ramsar Indicator K (yet to be developed), potentially subdivided into parameters for (a) storage, (b) availability and (c) use. • The Ramsar national report

Suggested post-2010 inland waters/wetlands sub-targets	Linked general targets in the indicative possible future framework (Table 3)	Linked sub-targets in the existing scheme (i.e., in Decision VIII/15 Annex IV)	Likely main indicators
			pro-forma includes a question on assessments of the quantity of water available to wetlands (= question 1.2.4 in the COP10 version) - it does not ask about the results of such assessments, but this might nevertheless be used as an entry-point for further inquiry.
3. The extent of wetlands: (a) is maintained; and (b) losses are restored	5, 15	5.1	<ul style="list-style-type: none"> For (a), use Ramsar Indicator A(i). For (b), could construct a new indicator on extent and/or success of wetland ecosystem restoration, which could be disaggregated according to wetland types. The Ramsar national report pro-forma includes a question on implementation of wetland restoration projects (= question 1.5.1 in the COP10 version); and Key Result Area 1.8.i in the Strategic Plan could also be used.
4. The [conservation status] [ecological character] of wetlands is maintained: (a) overall; (b) in respect of water quality and quantity; (c) in respect of invasive species; (d) in respect of carbon storage	5, 8, 9, 10, 15	(1.1), 4.1.2, 5.1, 6.1, 6.2, 7.1, 7.2, 8.1, 8.2	<ul style="list-style-type: none"> For (a), use Ramsar Indicator A(ii), supplemented as appropriate by the BIP indicator on river fragmentation, and perhaps also Indicator B in relation to the Ramsar site sub-set. For (b), use Ramsar Indicator C, linked with the BIP indicator on water quality, and perhaps with a “wetland cut” of the BIP indicator on nitrogen deposition. For (c), use a “wetland cut” of the BIP indicator on invasive

Suggested post-2010 inland waters/wetlands sub-targets	Linked general targets in the indicative possible future framework (Table 3)	Linked sub-targets in the existing scheme (i.e., in Decision VIII/15 Annex IV)	Likely main indicators
			<p>alien species, perhaps linked with the relevant question in the Ramsar national report pro-forma (= question 1.6.1 in the COP10 version) and the several Key Result Areas for Strategy 1.9 in the Convention's Strategic Plan.</p> <ul style="list-style-type: none"> For (d), an indicator would need to be constructed, drawing on Ramsar STRP's 2009 baseline carbon storage work and linked with the indicators for suggested target (3) above, by means of models for wetland (type) area to be used, if possible, as a proxy for carbon sequestration/retention performance.
<p>5. Agriculture, forestry, aquaculture and fisheries affecting wetlands are managed according to sustainability criteria</p>	<p>2, 4, (6), 7, (8)</p>	<p>4.1.1, 4.1.2, (5.1), (7.2), (8.2)</p>	<ul style="list-style-type: none"> A "wetland cut" of the BIP indicator on "area of agricultural ecosystems under sustainable management" would be relevant. Process indicators focused on a wetland dimension of national sustainability plans, certification schemes and/or ecological footprint reduction plans could be considered.
<p>6. Wetlands of international importance are protected:</p> <p>(a) with adequate coverage;</p> <p>(b) with effective management</p>	<p>11, (12), (15)</p>	<p>(1.1), 1.2</p>	<ul style="list-style-type: none"> For (a), use Ramsar Indicators H and I, supplemented as appropriate by the BIP indicator on "Coverage of protected areas" (depending on what future wetland specific development of it proves possible). For (b), use Ramsar Indicators E, D and B.

Suggested post-2010 inland waters/wetlands sub-targets	Linked general targets in the indicative possible future framework (Table 3)	Linked sub-targets in the existing scheme (i.e., in Decision VIII/15 Annex IV)	Likely main indicators
<p>7. The conservation status of wetland-dependent taxa is maintained, and declines are halted or reversed</p>	(6), 12	2.1, 2.2, 4.3, 5.1, 8.2	<ul style="list-style-type: none"> • Use Ramsar Indicator F for population trends of well-studied taxa, integrating wetland cuts of the BIP indicator on trends in abundance and distribution as appropriate. • Use Ramsar Indicator G for threat status, which already integrates wetland cuts of the BIP/RLI indicator on change in status of threatened species.
<p>8. Known genetic diversity of wetland-dependent species or varieties that are of major socio-economic importance is conserved</p>	13	3.1	<ul style="list-style-type: none"> • New indicators would need to be developed. • The BIP indicator on genetic diversity of terrestrial domesticated animals may cover some relevant species/breeds, and might be a starting point for developing an indicator relating to harvested fish. • A wetland-related cut of the BIP indicator on <i>ex situ</i> crop collections might be conceivable (this indicator is still under development).
<p>9. National policies are in place:</p> <p>(a) for wetlands, and/or for Ramsar implementation;</p> <p>(b) promoting IWRM/IRBM/ICZM*;</p> <p>(c) integrating wetlands into water resources management and water efficiency plans;</p>	1, 2, 4, (7), 17	(1.1), (9.1)	<ul style="list-style-type: none"> • The Ramsar national report pro-forma has relevant questions which could be used as a basis for indicators on most of the elements of this suggested sub-target (= questions 1.2.1, 1.2.3 and 1.4.3 in the COP10 version). • Issues concerning incentives (not otherwise listed separately here) could also conceivably be

Suggested post-2010 inland waters/wetlands sub-targets	Linked general targets in the indicative possible future framework (Table 3)	Linked sub-targets in the existing scheme (i.e., in Decision VIII/15 Annex IV)	Likely main indicators
(d) integrating wetlands into PRSPs** *(Integrated Water Resources Management, Integrated River Basin/Catchment Management, Integrated Coastal Zone Management) **(Poverty Reduction Strategy Papers)			incorporated in indicators for this suggested sub-target. <ul style="list-style-type: none"> The Ramsar Strategic Plan has several relevant Key Result Areas which might also be adapted to provide the basis of relevant indicators.

78. The third column of Table 4 provides cross-references to the existing inland waters sub-targets for 2010 (i.e., those from CBD Decision VIII/15 Annex IV); but for convenience, in addition, Table 5 presents these links in the complementary direction, i.e., by listing the existing sub-targets and indicating where the issues they cover (or at least where some degree of correspondence) may be found among the 9 suggested post-2010 sub-targets listed above. (Suggested sub-target 1 is for the most part not specifically referred to, since it pervades most of the list in a cross-cutting way).

Table 5: Relationship between the existing 2010 inland waters sub-targets and the suggested post-2010 inland waters/wetlands sub-targets.

Existing inland waters sub-targets (in Decision VIII/15 Annex IV)	Coverage of the issues in the suggested post-2010 inland waters/wetlands sub-targets (in Table 4 above)
1.1 At least 10% of known inland water ecosystem area effectively conserved and under integrated river or lake basin management.	<ul style="list-style-type: none"> The element of effective conservation by integrated management is an implied outcome of suggested sub-target 2. Conservation status of wetland ecosystems overall is covered in suggested sub-target 4, and for particularly important areas in suggested sub-target 6. Integrated basin management features in suggested sub-target 9. The “at least 10%” element is not taken forward (setting baselines for this is problematic).
1.2 275 million hectares of wetlands of particular importance to biodiversity protected, including representation and equitable distribution of areas of different	<ul style="list-style-type: none"> Covered by suggested sub-target 6, though without the numerical benchmark.

Existing inland waters sub-targets (in Decision VIII/15 Annex IV)	Coverage of the issues in the suggested post-2010 inland waters/wetlands sub-targets (in Table 4 above)
wetland types across the range of biogeographic zones.	
2.1 Reduce the decline of, maintain or restore populations of species of selected taxonomic groups dependent upon inland water ecosystems.	<ul style="list-style-type: none"> • Covered by suggested sub-target 7.
2.2 The world's known threatened inland water ecosystem dependent species of plants and animals conserved, with particular attention to migratory, transboundary and endemic species and populations.	<ul style="list-style-type: none"> • Covered by suggested sub-target 7, though without the specific reference at sub-target level to migrants, endemics and transboundary species. (Aspects of this kind of disaggregation however will be possible in analyses of the corresponding indicators).
3.1 Known genetic diversity of crops, livestock, and of harvested species of trees, fish and wildlife and other valuable species dependent upon inland water ecosystems is conserved, and associated indigenous and local knowledge is maintained.	<ul style="list-style-type: none"> • Covered by suggested sub-target 8, though without the element of indigenous and local knowledge (which may be covered in a more general way under suggested sub-target 9).
4.1.1 Products from inland water ecosystem biological diversity derived from sustainable sources.	<ul style="list-style-type: none"> • Addressed at the level of the system management, rather than the products, in suggested sub-target 5.
4.1.2 Aquaculture areas in inland water ecosystems managed consistent with the conservation of inland water biological diversity.	<ul style="list-style-type: none"> • Covered by suggested sub-target 5, assuming that the sustainability criteria in any given instance are adequate for delivering the requisite conservation outcome. • In relevant areas, achievement of suggested sub-target 4 will also help to deliver this.
4.3 No species of wild flora or fauna dependent upon inland water ecosystems endangered by international trade.	<ul style="list-style-type: none"> • While trade impacts are not singled out in suggested sub-target 7, it covers the outcome that is sought here; and there are possibilities to disaggregate at least one of the relevant indicators to illuminate the trade dimension specifically if required.
5.1 Rate of loss and degradation of inland water ecosystem biological diversity, especially through unsustainable water use, are decreased.	<ul style="list-style-type: none"> • Loss of ecosystems/habitats is covered under suggested sub-target 3, loss of taxa under suggested sub-target 7, and degradation of of ecosystems/habitats under suggested sub-target 4. • Suggested sub-targets 2 and 5 are also relevant, especially to the element of the existing sub-target which refers to "unsustainable water use".
6.1 Pathways for major potential invasive alien species in inland water ecosystems controlled.	<ul style="list-style-type: none"> • In principle should be covered by suggested sub-target 4 (c) (assuming detailed indicators are constructed accordingly).
6.2 Management plans in place and implemented for invasive alien species that are considered to present the greatest threat to inland water ecosystems, habitats or	<ul style="list-style-type: none"> • In principle should be covered by suggested sub-target 4 (c) (assuming detailed indicators are constructed accordingly).

Existing inland waters sub-targets (in Decision VIII/15 Annex IV)	Coverage of the issues in the suggested post-2010 inland waters/wetlands sub-targets (in Table 4 above)
species.	
7.1 Maintain and enhance resilience of the components of inland water ecosystem biodiversity to adapt to climate change.	<ul style="list-style-type: none"> • This should in principle be covered by suggested sub-target 4; although there are difficulties in constructing direct measures of resilience.
7.2 Substantially reduce pollution and its impacts on inland water ecosystem biodiversity.	<ul style="list-style-type: none"> • Probably sufficiently covered by suggested sub-target 4 (b). • Suggested sub-target 5 should also at least partly cover this, in respect of the sources of pollution that are related to agriculture, aquaculture and fisheries.
8.1 Capacity of inland water ecosystems to deliver goods and services maintained or enhanced.	<ul style="list-style-type: none"> • Should be covered (by implication, and also more directly in relation to carbon and water-related services) by suggested sub-target 4.
8.2 Inland water biological resources that support sustainable livelihoods, local food security and health care, especially of poor people, maintained and, where depleted, restored.	<ul style="list-style-type: none"> • Covered (by implication) by suggested sub-targets 4 and 7. • Suggested sub-target 5 also reflects aspects of this.
9.1 Measures to protect traditional knowledge, innovations and practices associated with the biological diversity of inland water ecosystems implemented, and the participation of indigenous and local communities in activities aimed at this promoted and facilitated.	<ul style="list-style-type: none"> • No dedicated sub-target specific to inland waters/wetlands is suggested to reflect this issue; although it should probably be covered to some extent by suggested sub-target 9.
9.2 Traditional knowledge, innovations and practices regarding biological diversity of inland water ecosystems respected, preserved and maintained, the wider application of such knowledge, innovations and practices promoted with the prior informed consent and involvement of the indigenous and local communities providing such traditional knowledge, innovations and practices, and the benefits arising from such knowledge, innovations and practices equitably shared.	<ul style="list-style-type: none"> • No dedicated sub-target specific to inland waters/wetlands is suggested in relation to this issue; although it will feature to an extent in Ramsar Convention implementation activities covered by suggested sub-target 1.
10.1 All access to genetic resources derived from inland water ecosystems is in line with the Convention on Biological Diversity.	<ul style="list-style-type: none"> • No dedicated sub-target specific to inland waters/wetlands is suggested in relation to this issue.
10.2 Benefits arising from the commercial and other utilization of genetic resources derived from inland water ecosystems shared with the countries providing such resources.	<ul style="list-style-type: none"> • No dedicated sub-target specific to inland waters/wetlands is suggested in relation to this issue.
11.1 New and additional financial resources are transferred to developing country Parties, to allow for the effective implementation of their commitments for the programme of	<ul style="list-style-type: none"> • No dedicated sub-target specific to inland waters/wetlands is suggested in relation to this issue; although it will feature to an extent in Ramsar Convention implementation activities

Existing inland waters sub-targets (in Decision VIII/15 Annex IV)	Coverage of the issues in the suggested post-2010 inland waters/wetlands sub-targets (in Table 4 above)
work on the biological diversity of inland water ecosystems under the Convention, in accordance with Article 20.	covered by suggested sub-target 1.
11.2 Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments for the programme of work on the biological diversity of inland water ecosystems under the Convention, in accordance with its Article 20, paragraph 4.	<ul style="list-style-type: none"> • No dedicated sub-target specific to inland waters/wetlands is suggested in relation to this issue.

7. INCORPORATING A WATER-CYCLE/SERVICES TARGET AND RELEVANT OBJECTIVES, TARGETS AND INDICATORS

79. The in-depth review of the programme of work on inland waters biodiversity (document UNEP/CBD/SBSTTA/14/3) puts forward a convincing case for the recognition of the role of the water cycle as an over-arching topic across the CBD. There are two primary reason to include water more prominently in the CBD Strategic Plan including relevant targets and indicators: (i) it is essential because water is a key ecosystem service and its unsustainable use a primary driver of ecosystem change and biodiversity loss; and, (ii) it is primary means to make the CBD more relevant to broader political, public, development and economic interests.

80. On the latter point, considering the limited public understanding of what "biodiversity" is, and its role in human welfare, the consideration of targets and indicators in terms of them being relevant to a broader constituency is a weakness of the current Strategic Plan and attention to this an opportunity for the post-2010 Strategic Plan. Recognition of the need to focus better on ecosystem services, using terminology relevant to a broader audience, is one means of addressing such opportunities. Attention to water in the CBD is one of the most promising means to achieve this.

81. Water is a service provided by ecosystems (Millennium Ecosystem Assessment). Water is also a key factor determining how terrestrial ecosystems function (in addition to this being obvious for wetlands). Changes to the water cycle represent both changes to ecosystem service delivery and a driver of ecosystem change. Water is one of the clearest areas of linkage between biodiversity, sustainable development and other macroeconomic agendas. Sustainable water supply is a requirement for the achievement of sustainable growth across most economic sectors. Water as a service provided by ecosystems, and the role of biodiversity/wetlands in underpinning this, is also one of the clearest linkages between the CBD (and Ramsar Convention) at the broader development community (including its linkages to the MDGs and the interests of the Commission on Sustainable Development, etc.). Water is already high on the political agenda. The main impacts of climate change also arise through water. Water is therefore central to the harmonising of approaches across the various Multilateral Environmental Agreements (MEAs). This is perhaps the pre-eminent cross-cutting issue. The functioning of the water cycle is central to environmental security and human well-being on all fronts, and unless water issues are addressed in a stronger and more central way in the post-2010 Strategic Plan than hitherto, it is unlikely that the Plans fundamental aims will be met (UNEP-EMG 2009, CBD Secretariat *in prep*, a, b).

82. Water availability depends of course on the functioning of the "natural infrastructure" of wetland ecosystems. But it also depends on how the terrestrial component of the water cycle and soil moisture and

groundwater are managed. For example: evapo-transpiration through terrestrial vegetation (particularly forests) is a major source of rainfall in many regions; groundwater depletion threatens the sustainability of forest systems, including their carbon storage; storing more moisture in soils is a key requirement to sustain soil functions (including agricultural productivity) and reduce water insecurity.

83. Because of the importance of water on the development agenda considerable effort is already devoted to monitoring its status and trends including quality, quantity, use, benefits and governance. Within the U.N system, the World Water Assessment Programme, responsible for the production of the World Water Development Report, is a major actor in assessing the multitude of water related data and information on a periodic basis. Key partners for assembling water related data include the World Meteorological Organisation (particularly for climate data, including rainfall) and the FAO which maintains the AquaStat database which, *inter alia*, tracks trends in water availability and use. A multitude of other agencies gather and assess water related data and trends in their own areas of interest including for drinking water, sanitation, water quality, water-related disasters, environmental trends, food production etc. (all of which are relevant to biodiversity and the CBD and Ramsar Convention). Most data are available at national level. In short, water-related targets for the CBD Strategic Plan can be monitored through existing indicators reported on a regular basis by other processes. For some indicators care must be taken with interpretation. Some of the indicators capture impacts upon ecosystem services/biodiversity (e.g., trends in water abstraction, water quality) and many in fact measure ecosystem service delivery directly (e.g., hydropower, water use/food production, flood mitigation/droughts). But for some the ecosystem considerations need to be carefully separated. Sanitation is a good example of the latter: trends in access to sanitation can be used to indicate reduced stress on ecosystems (pollution) or the extent to which nutrient recycling services of ecosystems are being used (depending on whether the human waste is treated before discharge and whether wetlands are used to recycle this discharge, either planned or otherwise).

84. The World Water Assessment Programme continues to work on consolidation of water related indicators based on a framework which currently includes over 145 specific parameters (many of which are of direct relevance to biodiversity, and some of which are direct biodiversity indicators). The monitoring and reporting framework being developed attempts to capture various dimensions of water including:

- (a) The socio-economic-environmental system based on a defined territory, entrusted with some capacity to govern itself;
- (b) Achieving sustainable development: optimal path “3E” (Economic development, social Equity, Environmental sustainability);
- (c) Overall value created (social-economic-environment);
- (d) How natural resources, infrastructures, social capital (governance) and other accumulated capital (human, economic, environmental) are mobilized to create additional value. Governance plays a critical role in achieving these objectives; and
- (e) Audit on all aspects and strategies to adjust the course of value creation.

85. The approach addresses the need to assess:

- (a) the sustainability of the water situation in the world including: the situation and changes and trends in water resources; the services provided by water & freshwater ecosystems; drivers of changes, their direct (e.g. impacts on services) and indirect impacts (e.g. pollution, etc.); and progress/performance of water development and management; and

(b) progress of implementation of international commitments and strategies (milestones - 2010, 2015, 2025) including: achieving water related MDGs (Goal 7/target2 -biodiversity-wetlands; Goal 7/target 10 - water stress; target 4-slums /access to water supply and sanitation; Goal 1/target 3 –water related issues), implementation of water aspects of the Johannesburg Plan of Implementation (JPOI), Agenda 21 and the CSD (e.g. IWRM integrated in national policies), regional commitments, the international decade on water 2005-2015; etc.

86. The needs and opportunities for the post-2010 Strategic Plan of the CBD are to capture the water cycle in terms of:

(a) water as a service provided by ecosystems and its ability to contribute to sustainable development; and

(b) threats to the sustainability of the water cycle and changes to it as an environmental stressor and driver of biodiversity loss (and consequently on the delivery of water related ecosystem services).

87. One of the most useful "headline" indicators related to water is *Total Water Withdrawals as a % of Total Available Renewable Water Resources (TWW/TARWR)*¹. This indicator illustrates the human use of water as an ecosystem service. It also illustrates (in cases of high withdrawal percentages) increased environmental stress; the indicator is one basis of calculating relative water stress. The indicator is also in use for human development purposes (e.g., as an indicator for the MDG and CSD processes). It can also be disaggregated by purpose of water withdrawal (at least for agriculture, domestic use, industry and energy).

88. There are two options for how to incorporate water-cycle considerations into the post 2010 Strategic Plan. The first is to have water-related targets (or sub-targets) for most (if not all) of the strategic objectives, or water related indicators for more general targets where feasible. This approach would involve a structure along the lines of Table 6. One serious potential drawback of this approach is that water-related targets might be separated from sector or biome based targets and issues; whereas the need is to have water overarch all the sectors, biomes, and programmes etc. Any meaningful construct would have to capture the need to make the relevant water related targets (or sub-targets) have a bearing across all relevant biomes and programmes of work.

89. The second option is to place sustaining the water cycle (etc.) as a Strategic Objective in itself with relevant targets addressing a number of key themes. Such an approach would involve a structure along the lines of Table 7. The advantages of this approach include placing the water cycle in its rightful place (as an overarching consideration) and having bearing on all CBD programme/activity areas and a strong communication message to the broader constituency that water-cycle/water resources issues have a very strong biodiversity dimension.

90. The most appropriate construct would depend on the final form of the post-2010 Strategic Plan. It would be possible to incorporate most of the elements of Table 6 and Table 7 in any final framework. But it is essential to do this.

91. Additionally, the current constructs of Table 6 and Table 7 are preliminary and where possible time should be taken, where necessary, to re-write the relevant targets/indicators to give a more positive message. One of the key advantages on including water more explicitly in the Strategic Plan is to communicate the case that better biodiversity conservation and sustainable use (sustaining ecosystem

¹ Document UNEP/CBD/SBSTTA/14/3 notes that the sustainable limit for this has in fact already been reached but due to the uneven distribution of water it has been exceeded already in about 36% of the world (on a population basis) and this will likely increase to about 50% by 2030.

services) can provide very attractive and positive benefits, included economic cost savings in many instances.

Table 6: Some possible ways and means to incorporate water related targets into the post-2010 Strategic Plan of the CBD based upon the indicative possible framework presented in Table 3. The column on indicators lists additional indicators to those listed in Table 3 (which already refer largely to indicator work under the Ramsar Convention). Those indicators marked with an * are already in use by other initiatives. Some of these need careful interpretation in relation to biodiversity/ecosystem services. Not all of these need necessarily be used for the post-2010 Strategic Plan but their existence enables relevant considerations under the CBD to be made and forges links to other water related assessments.

Possible strategic objectives	Possible new targets (from Table 3)	Possible Relevant Sub-target for water-related aspects	Indicators (Additional notes to those provided in Table 3)	Comments
<i>A: Initiate strategic actions to address the indirect drivers of change</i>				
1. Promote communication, education and public awareness	1. Everyone is aware of the value of biodiversity and what steps they can take to protect it	1.1 Everyone is aware of the role of biodiversity in relation to sustainable water supplies and water security.		
2. Mainstream biodiversity across government and society	2. The value of biodiversity, and the opportunities derived from its conservation and sustainable use, and the fair and equitable sharing of benefits from the use of genetic resources, are recognised and reflected in all countries, in national development policies and strategies, national accounts, economic sectors and spatial planning processes at all levels of government, and by the	2.1 The value of biodiversity in the delivery of water-related ecosystem services recognised and reflected in all countries, in national development policies and strategies, national accounts, economic sectors and spatial planning processes at all levels of government, and by the private sector, applying the ecosystem approach	<ul style="list-style-type: none"> • *Existence of efficient and flexible management/water governance system (IWRM) [which incorporate the balanced delivery of <i>all</i> relevant services] • *progress in implementing IWRM plans • *existence of national policies: [A list of 130 Means of IWRM implementation could be audited to assess the performance of the 3E management (ongoing projects are at CREPA, UNDESA, UNDP, and 	

Possible strategic objectives	Possible new targets (from Table 3)	Possible Relevant Sub-target for water-related aspects	Indicators (Additional notes to those provided in Table 3)	Comments
	private sector, applying the ecosystem approach		WWAP)] <ul style="list-style-type: none"> *Water allocation rules and regulations exist *Environmental objectives established 	
3. Realign economic incentive measures to support the conservation and sustainable use of biodiversity	3. Subsidies harmful to biodiversity are eliminated	3.1 Subsidies contributing to the unsustainable use of water and distortion of water related ecosystem services eliminated.	<ul style="list-style-type: none"> *Balancing resource allocation with economic, social, environmental criteria *Payment /fee for water resources use exist 	
4. Reduce unsustainable production and consumption that impacts upon biodiversity	4. Governments and stakeholders at all levels and businesses and civil society have formulated and begun to implement sustainability plans to increase efficiency, reduce waste and limit the consumption of resources within ecological limits	4.1 The earth's water cycle and its ability to support related ecosystem services is sustained.	<ul style="list-style-type: none"> *Changing water cycle: <ul style="list-style-type: none"> *Total Water Withdrawals/Total Available Renewable Water Resources [key indicator][can be expressed by area, country or per capita] * Trends of annual total runoff compared with inter-annual average or other relevant periods * Renewable surface water in TARWR (%) *Renewable groundwater in TARWR (%) *Water dependency ratio * Green water flows (evaporation from natural 	

Possible strategic objectives	Possible new targets (from Table 3)	Possible Relevant Sub-target for water-related aspects	Indicators (Additional notes to those provided in Table 3)	Comments
			<p>vegetation, and rainfed crops) (total, per m2) [In particular changes in partitioning between natural vegetation and agricultural crops] [a related indicator is partitioning between green and blue water flows].</p> <ul style="list-style-type: none"> • *Index of non sustainable water use (volume of over-exploitation of groundwater and mining over total water use) • *Trends in water use (withdrawals+ desalination+ waste water reuse + imports) (Total; per capita) • Trends in soil moisture content [this indicator is essential to track services provided by soil; capacity to generate soil moisture content data at the global level has recently been enhanced through earth observation systems – a reliable indicator is anticipated to become available] • *% use for agriculture (irrigation), domestic supply, 	

Possible strategic objectives	Possible new targets (from Table 3)	Possible Relevant Sub-target for water-related aspects	Indicators (Additional notes to those provided in Table 3)	Comments
			<p>industry/energy.</p> <ul style="list-style-type: none"> • *% demands from renewable freshwater sources (surface and groundwater) • *% of demands from waste water (and main sector of use)[this indicates efforts to re-use polluted water and therefore add value to original use and reduce environmental impacts] • *% runoff storage in reservoirs lost by evaporation • *extent of land salinised by irrigation • *% of generated sewage treated • *% of industrial generated sewage treated • *Change in nitrate consumption per area arable land • *Sources of contemporary nitrogen loading (dissolved nitrogen NO₃+ NO₂) • *Quantitative Water footprints (but with caution on interpretation) • *Virtual water balance (import - exports) of commodities 	

Possible strategic objectives	Possible new targets (from Table 3)	Possible Relevant Sub-target for water-related aspects	Indicators (Additional notes to those provided in Table 3)	Comments
			<ul style="list-style-type: none"> * number of food calories produced per cubic meter of water * irrigated land as a % of cultivated land * Basin-wide (transboundary) protocols and agreements signed * trends in number of water related conflicts and number, frequency and magnitude of inter-state conflicts 	
<i>B: Addressing the direct drivers of biodiversity loss, in order to reduce pressures on biodiversity</i>				
5. Reduce the loss and degradation of natural habitats	5. [The rate of loss and degradation of natural habitats is halved] [Zero net deforestation and loss of wetlands, and a halving of the rate of loss of other natural habitats have been achieved].		<ul style="list-style-type: none"> See Table 3 for indicators. 	
6. Promote the sustainable use of wild living resources	6. [Pressure on marine ecosystems through overfishing halved, and destructive fishing practices are eliminated] or [Exploitation of all			

Possible strategic objectives	Possible new targets (from Table 3)	Possible Relevant Sub-target for water-related aspects	Indicators (Additional notes to those provided in Table 3)	Comments
	fisheries, and of other wild living resources, is sustainable]			
7. Ensure that agriculture, aquaculture and forestry are managed in a manner consistent with the conservation and sustainable use of biodiversity	7. [All] areas under agriculture, aquaculture and forestry are managed according to sustainability criteria	7.1 All areas under agriculture and forestry are managed according to sustainability criteria for water resource use and impacts		Aquaculture is excluded as it is not a consumptive user of water – although it remains relevant to other sustainability criteria (as per Table 3).
8. Reduce pollution and its impacts on biodiversity	8. Pollution from excess nutrients (N and P) has been brought below critical ecosystem loads			<p>This is already largely a water-related target in as much as the impacts of N and P are largely on water.</p> <p>A broader suite of water quality targets and indicators needs to be included (see also comments in Table 3).</p> <p>It is essential that this indicator applies to both surface and groundwater resources.</p>
9. Control pathways for potential alien	9. The introduction and establishment of invasive			

Possible strategic objectives	Possible new targets (from Table 3)	Possible Relevant Sub-target for water-related aspects	Indicators (Additional notes to those provided in Table 3)	Comments
invasive species and emerging infectious diseases of wildlife	species has been prevented and emerging infectious diseases of wildlife controlled			
10. Reduce the impacts of climate change and ocean acidification on ecosystems and ensure that responses to climate change are not detrimental to biodiversity	10. The impacts of climate change and of ocean acidification on ecosystems have been reduced and responses to climate change that are not detrimental to biodiversity have been agreed	10.1 The impacts of climate change on the water cycle have been reduced and responses to climate change that are not detrimental to the water cycle have been agreed	<ul style="list-style-type: none"> * Trends of annual precipitation vs. inter-annual average or other relevant periods (eg. 5 year dry period; 10 year dry period); Climate moisture index-CMI (coefficient of variation of CMI); – would enable the climate aspect of water services changes to be identified. * Frequency of floods (standard deviation below the mean) * Frequency of droughts (standard deviation below the mean); • 	Considering the fact that the impacts of climate change on ecosystems are delivered largely through changes in the water cycle – a sub-target reflecting this is essential
C: Promoting direct action to safeguard and restore biodiversity and related ecosystem services, and contribute to climate change mitigation and adaptation				
11. Protect critical [and representative] habitats and ecosystems	11. By 2020, at least 15% of [land and sea] [marine] areas, including the most critical terrestrial, freshwater and marine habitats, have been	11.1 Terrestrial and wetland protected area systems recognise the role of the water cycle in their sustainability and incorporate water cycle		<ul style="list-style-type: none"> UNEP/CBD/SBSTTA/14/3 notes that many current wetland protected areas are in decline due to, <i>inter alia</i>, changing water resources availability (and quality). It

Possible strategic objectives	Possible new targets (from Table 3)	Possible Relevant Sub-target for water-related aspects	Indicators (Additional notes to those provided in Table 3)	Comments
	protected through effectively managed protected areas and/or other means, and integrated into the wider land- and seascape	considerations in their planning, establishment and management.		also notes that terrestrial protect areas are also vulnerable to changes in the water cycle (including surface water/rainfall and groundwater changes). "Effectively managed... and integrated into the wider land- and seascape" must include water cycle considerations.
12. Improve the status of threatened species and restore, maintain, or reduce the decline of populations of more common species	12. The extinction of known threatened species (vertebrates and higher plants) has been prevented by ensuring that all such threatened species are protected in at least one site			
13. Improve the conservation of genetic diversity, including varieties and breeds of crops, livestock, and of harvested species of trees, fish and wildlife	13. The status of crop and livestock genetic diversity in agricultural ecosystems and of wild relatives has been improved			
				UNEP/CBD/SBSTTA/14/3 notes

Possible strategic objectives	Possible new targets (from Table 3)	Possible Relevant Sub-target for water-related aspects	Indicators (Additional notes to those provided in Table 3)	Comments
14. Manage biodiversity and ecosystems to contribute to climate change mitigation	14. The contribution of biodiversity and terrestrial, freshwater and coastal ecosystems to sequestering and retaining greenhouse gases has been enhanced	14.1 The local/regional water cycle is sustained in order to sustain the carbon storage benefits of terrestrial and wetland ecosystems.	<ul style="list-style-type: none"> Number of REDD investments in long-term water secure areas (or number vulnerable to changing water availability) Proportion of terrestrial carbon stores (including soil carbon/peat) in water insecure areas. 	<p>that the carbon and water cycle are inter-linked. Any efforts towards increasing the ability of both terrestrial (including forested) and wetland systems to store carbon must take into account the need to sustain local water cycles.</p> <p>Note: the wording of the current target is technically unsound since these ecosystems do not sequester or retain GHGs – they sequester and retain carbon, which is released or absorbed as various forms of GHG. It is not stored in gaseous form. Also – technically, the primary greenhouse gas is water vapour (not carbon based) – which is another reason to specify carbon in this target – not GHGs.</p>
15. Manage and restore biodiversity and ecosystems so as to ensure the provision of ecosystem goods and services and contribute to climate change adaptation	15. Terrestrial, freshwater and marine ecosystems that provide critical services, especially for the poor and vulnerable, that build ecological resilience or that contribute to local livelihoods and climate change adaptation have	15.1 The services provided by [wetland] ecosystems to sustaining the water cycle and to increased water security for both ecosystems and people in response to climate change have been safeguarded or restored.	<ul style="list-style-type: none"> In addition to comments in Table 3: *Actual hydropower installed capacity/potential capacity [hydropower is an ecosystem service] *agricultural value added/agricultural water use * Frequency of floods 	<p>Note: it is unclear with this objective if the focus is climate change or ecosystem services in general. Currently it is assumed to be both. It may be more logical to split this objective into (i) ecosystem services in general; and (ii) ES and climate change adaptation. This current</p>

Possible strategic objectives	Possible new targets (from Table 3)	Possible Relevant Sub-target for water-related aspects	Indicators (Additional notes to those provided in Table 3)	Comments
	been safeguarded or restored		<p>(standard deviation below the mean)</p> <ul style="list-style-type: none"> * Frequency of droughts (standard deviation below the mean); * Disaster risk index (disaggregated for water-related disasters) [changes in vulnerability to disasters reflect changes in ecosystem service delivery]. * Number of people affected by water related natural disasters per year * Trends in economic costs of water related disasters. * % of people with access to Improved drinking water coverage (total) (rural v. urban) * % of people with improved sanitation coverage (urban v. rural) [to be more easily understood this indicator needs to illuminate the trend in access to sanitation per se, which is an indicator of stress/pollution, and the percentage of sanitation supply which is based on nutrient recycling by 	<p>objective/target is also the only one (out of 20) that deals clearly with benefits of biodiversity for people and therefore should have a more central position in the Strategic Plan.</p> <p>Since the impacts of climate change occur through changes in the water cycle – a more explicit water dimension for this target is absolutely critical</p> <p>Wetlands are critical "natural infrastructure" in this regard – but terrestrial ecosystems also have an important role (e.g., the role of forests in water regulation).</p> <p>A target/indicator for the inclusion of ecosystems in national poverty reduction strategies and in national climate change adaptation strategies could be used. Additionally, a related target/indicator would be the extent to which water-related adaptation measures are included in these – providing a two-tier approach: (i) recognition of the importance of water in adaptation, and (ii) within</p>

Possible strategic objectives	Possible new targets (from Table 3)	Possible Relevant Sub-target for water-related aspects	Indicators (Additional notes to those provided in Table 3)	Comments
			<p>ecosystems, which indicates the provision of an ecosystem service].</p> <ul style="list-style-type: none"> * installed storage capacity per inhabitant [this indicator refers to artificial storage in impoundments – which is the reciprocal of water storage in ecosystems – which is an ecosystem service] * % of water assistance in total ODA to country 	that framework, recognition of the role of ecosystems (wetlands) in addressing the needs.
16. Protect traditional knowledge, innovations and practices and support benefits for indigenous and local communities, especially the poor and vulnerable	16. Traditional knowledge, innovations and practices and the rights of indigenous and local communities over these are protected and adequate and equitable access to essential ecosystem services on the part of indigenous and local communities, especially the poor and vulnerable, is guaranteed		<ul style="list-style-type: none"> *Property rights on water resources (% of TARWR under property rights) [A sub-set of this data would need to disaggregate community v. corporate rights]. 	
<i>D: Enhancing implementation through planning, continuous learning and effective review at national and global levels</i>				
17. Develop and implement national biodiversity strategies	17. Each CBD Party has an appropriate, up-to-date, effective and operational national biodiversity	17.1 The sustained and enhanced delivery of water-related services from ecosystems is reflected in	<ul style="list-style-type: none"> It is essential that biodiversity (in this instance water related services) is reflected in relevant national 	

Possible strategic objectives	Possible new targets (from Table 3)	Possible Relevant Sub-target for water-related aspects	Indicators (Additional notes to those provided in Table 3)	Comments
	strategy, consistent with the CBD Strategic Plan, based on adequate assessment of biodiversity, its value and threats, with responsibilities allocated among sectors, levels of government, and other stakeholders, and coordination mechanisms are in place to ensure implementation of the actions needed	national biodiversity strategies and is reflected in relevant national development plans including water resources plans, PRSPs and national economic development plans.	development plans. Containing these considerations within national biodiversity strategies will be ineffective without this link.	
18. Ensure the fair and equitable sharing of benefits arising from the use of genetic resources, and that access to genetic resources is facilitated	18. Access to genetic resources is enhanced, and substantial benefits are shared, consistent with the international regime on access and benefit sharing			
19. Promote identification and monitoring of biodiversity, scientific and technical cooperation and technology transfer	19. Knowledge and technologies relating to biodiversity, its value and functioning, its status and trends, and the consequences of its loss, are improved and widely shared, and uncertainties	19.1 Knowledge and technologies relating to biodiversity, its value and functioning, its status and trends, and the consequences of its loss, in relation to water-related ecosystem services, are improved and		

Possible strategic objectives	Possible new targets (from Table 3)	Possible Relevant Sub-target for water-related aspects	Indicators (Additional notes to those provided in Table 3)	Comments
	concerning biodiversity change, ecosystem services and impacts on human well-being are reduced	widely shared, and uncertainties concerning biodiversity change, ecosystem services and impacts on human well-being are reduced		
20. Ensure the necessary capacities and resources to achieve the three objectives of the CBD	20. Capacity (human resources and financing) for implementing the CBD has been increased tenfold	20.1 The contribution of ecosystem infrastructure to achieving cost effective and sustainable water security is being met.	<ul style="list-style-type: none"> Note is made in document UNEP/CBD/SBSTTA/14/3 regarding inland waters/wetlands that the key financing opportunity is to mobilise other sources of funding towards sustaining or rehabilitating wetland services (e.g., ongoing major investments in water security) and it provides clear examples of how such approaches can result in cost-savings. There is no particular reason to assume that biodiversity conservation has to cost more money – it can indeed help reduce costs. It would be useful to capture this aspect by reflecting the ability of biodiversity/natural ecosystem infrastructure to reduce economic costs. 	

Possible strategic objectives	Possible new targets (from Table 3)	Possible Relevant Sub-target for water-related aspects	Indicators (Additional notes to those provided in Table 3)	Comments
			<ul style="list-style-type: none"> • An indicator for this might be the extent to which water-related investments using sustaining or restoring ecosystem infrastructure to meet water security objectives. • *Payment /fee for water resources use exist • *% drinking water produced and paid for [useful to also know extent of PES involvement in financial accounting] • * index of performance of water utilities (affordability, quality, accessibility, quantity, performance) [disaggregate the relationship between the cost of environmental degradation/ecosystem service loss and costs of water to the consumer]. • *water sector share in total public spending [and element of share invested in ecosystem services] • *official development assistance (ODA) to the water sector [[and element of 	

Possible strategic objectives	Possible new targets (from Table 3)	Possible Relevant Sub-target for water-related aspects	Indicators (Additional notes to those provided in Table 3)	Comments
			<p>share invested in ecosystem services]</p> <ul style="list-style-type: none"> • * Overall national budget for water resources management institutions and activities • *Women represented in water management 	

Table 7: Draft and preliminary option 2 for integrating the water cycle into the post-2010 Strategic Plan. In addition to the new strategic objective (and targets) suggested many of the targets and indicators in Table 6 should be maintained, in particular those for targets 4, 10, 14 and 15. Should the latter be removed they would need to be incorporated into this table.

New possible strategic objectives	Possible new targets	Some key indicators (From those provided in Table 6)	Comments
X. The earth's water cycle and its ability to support related ecosystem services is sustained	X.1 Total water withdrawals for direct human use (including agriculture) maintained within sustainable limits	<ul style="list-style-type: none"> • *Total Water Withdrawals/Total Available Renewable Water Resources [key indicator][can be expressed by area, country or per capita] 	
	X.2 Green water and blue water flows managed in order to sustain ecosystem service delivery	<ul style="list-style-type: none"> • *Green water flows (evaporation from natural vegetation, and rainfed crops) (total, per m2) [In particular changes in partitioning between natural vegetation and agricultural crops] • *Partitioning of water between green and blue water flows 	
	X. 3 Soil moisture content maintained or restored to sustainable limits	<ul style="list-style-type: none"> • Trends in soil moisture content [a reliable indicator based on EOS is anticipated to become available] 	<p>This target is essential to track ecosystem services provided by soil.</p> <p>It is also the key target required to combat desertification [which is caused largely by loss of soil moisture].</p>

	X. 4 All economic activities (including land use practices) managed according to sustainability criteria for water resource use and its impacts on ecosystem services	<ul style="list-style-type: none"> • All relevant indicators for trends in water quality and quantity, sustainable use, and governance (in particular trends in implementation of IWRM). 	
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8. FURTHER RELEVANT WORK BEING UNDERTAKEN BY RAMSAR; AND SYNERGIES BETWEEN CONVENTIONS

Further Ramsar work on indicators, and links with the CBD

92. The Ramsar indicators work referred to above, plus the Convention's input to the Biodiversity Indicators Partnership, and scientific & technical aspects of collaboration with the CBD and other MEAs, are driven by its subsidiary body, the Scientific & Technical Review Panel (STRP). Continuing and planned STRP activities relating to wetland status & trends assessments and indicators analyses, and of relevance to the CBD inland waters Programme of Work, are set out in CBD Secretariat (*in prep*, b), and the details of those will not be repeated here.

93. In the current work plan of the STRP for 2009-2012, a range of activity (some of it dependent on funding) is identified to make fully operational the full "first tranche" of eight Ramsar effectiveness indicators; and to develop further, test and put forward for use by Parties and others as appropriate the adopted "second tranche" indicators (excepting two of them which are now judged to have limited feasibility for adding good value). A working group is gradually moving these activities forward, and collaboration with the CBD has been a strong feature.

94. A key part of the process for all of the Ramsar indicators is the relating of wetland outcomes to various correlates ("Ramsar inputs", "co-variates" or "process indicators") which may help to shed light on the effectiveness of implementation of the Convention, i.e., going beyond merely assessing the status and trends of the wetlands/wetland biodiversity themselves. This has some relevance to the CBD Programme of Work and implementation of the Strategic Plan, in the context of the Joint Work Plan between the two Conventions and of Ramsar's "lead implementation partner" role on wetlands for the CBD. A further dimension to be explored, as part of this, is the relationship between the issues represented by the different individual outcome indicators themselves: i.e., some of them perform a dual function as both ecological outcome indicators and process correlates.

95. Existing and suggested new inland waters/wetland targets (and existing CBD "activities for Parties") have been cross-matched to the Ramsar national report pro-forma and Strategic Plan, as illustrated in the present paper and set out in more detail in CBD Secretariat (*in prep*, b). There would be some scope for iterative further enhancements of the harmonisation between these schemes, and a sub-group of STRP has already discussed initial suggestions for the reports that will be requested from Parties for Ramsar COP11 (in 2012). In addition, the Ramsar national report format for COP10 (2008) included some questions that bear directly on the issue of synergy between the two Conventions, and an analysis of the responses to those questions would be likely to prove instructive.

Inland waters, wetlands and other thematic areas

96. Obviously much of the work referred to above addresses wetlands in the broad sense as defined under Ramsar. This includes inland waters, although in many cases a specific step would be required in order to calculate and present findings separately for wetlands considered to be “inland waters” and wetlands considered to be of other types, such as those falling within the scope of the CBD’s Programme of Work on marine and coastal biodiversity. This aspect may need to be factored in as an addition to currently-envisaged Ramsar work plans. There may be resourcing implications of this: but the benefit of enabling the needs of both CBD and Ramsar to be met by one process should be worth some investment; and indeed would enhance overall cost-effectiveness. Not all base data-sets will however allow inland wetlands to be distinguished from other wetlands, and in the first instance some examination of this question may be required to establish what might be possible.

97. As mentioned in section 6 above, the expression “inland waters/wetlands” has been used in this paper to reflect the fact that, ecologically speaking, giving separate treatment to inland waters is a somewhat artificial expedient (CBD Secretariat in prep, b; CSAB, 2009).

98. CBD COP Decision VII/4 refers to the presence of inland water ecosystems within ecosystems addressed by the Convention’s other programmes of work, and encourages cross-referencing and coherence among the programmes in this respect; while it has also been observed that “the health and integrity of inland waters is an excellent indicator of the health of terrestrial ecosystems” (CBD Secretariat, 2006). Wetlands occur in all biomes and are potentially influenced by all sectoral activities, and the CBD’s ecosystem approach provides an appropriate paradigm for the cross-cutting approach to land and water that is required. Cooperation between Ramsar and CBD has a corresponding breadth of scope, and so is far from being confined only to the inland waters agenda.

99. As well as the obvious connections with marine and coastal biodiversity (and the potential for integrated “wetland” sub-targets covering both this programme and the programme on inland waters), wetland storylines are also germane to the CBD’s thematic programmes on biological diversity of forests (some forests are also wetlands), islands, agricultural lands and mountains. Given the centrality of water to the picture too, as discussed above, there is also relevance to the programme on dry and sub-humid lands. Ramsar indicator information is also of relevance to cross-cutting issues such as environmental impact assessment, climate change, invasive species, communication and incentives, among others; while aspects relating to Ramsar sites are of importance for the Programme of Work on protected areas.

Linked information management activities

100. Indicator work in the Ramsar Convention sits within a wider STRP thematic area covering a logically linked framework of Ramsar objectives, policies and guidance on the subjects of inventory, assessment, monitoring, indicators and reporting. A convenient exposition of the “architecture” of these issues and their content can be found in Ramsar Convention (2005b) and Ramsar Secretariat (2008), with an expanded treatment of monitoring issues in Ramsar Secretariat (2007). The STRP has been tasked with various further activities on each of these subjects, which can be found in its work programme for the 2009-2012 period (Ramsar Secretariat, 2009a).

101. One such area of current activity concerns partnership work with the earth observation/remote sensing community, including the European Space Agency, Japanese Space Agency and others, to generate relevant data which (among other things) will assist in monitoring and reporting on some of the Ramsar indicators. This includes a second phase of “Globwetland” project activities, coordinated by the European Space Agency and focused at this stage on the Mediterranean Basin. Linked with this is the proposed development of a “Global Wetland Observing System” (G-WOS), which would not necessarily be a physical entity, but would more likely be a set of facilitated connections, to achieve optimal

matching of relevant data sources to defined Ramsar-relevant user needs, and including web-based metadata.

102. Another current STRP activity of relevance is the further development of the Convention's "data and information needs framework", adopted in the form of a "work in progress" by COP10 as Resolution X.14. This is a consolidated route-map to all measurement, monitoring, assessment and information management needs for the Convention. Continuing gap analysis and harmonisation aspects of this work will strongly support the more effective use of such information for shared interests with the CBD.

Reporting results

103. One of the most important dimensions of indicator processes, and in principle the starting-point for designing them, is the thinking about construction and targeted dissemination of reports. Products from Ramsar indicators and related activities are at a range of different (mostly preliminary) stages of development, and updated summaries of the position on this should become more routinely produced from late 2009 onwards.

104. Individual analysis and results reports are expected to be presented at different times to fit with relevant data generation and publication cycles of collaborating organisations, and to respond to topic-specific opportunities that may arise (see below). Outlets are likely to range from the popular media to the peer-reviewed scientific literature. Stand-alone technical methodology papers are also proposed, both for publication in journals and in the form of practitioners' working manuals.

105. Reports giving more of a portmanteau-style overview (including perhaps a "State of the World's Wetlands" review or similar) will be timed for COPs and other key milestones in the calendars of Ramsar, the CBD and others. Requirements in this regard will, in turn, feed into the design of the format for Party national reports to COPs. This is an important component of the response to CBD's Decision VIII/20 and on-going efforts to enhance harmonisation of reporting and information-management among MEAs in general.

Communication and awareness

106. It follows from the above that attention to communication and awareness-raising should be a central part of these endeavours, and the Ramsar indicators work plan incorporates significant input from the Convention's programme on "CEPA" (Communication, Education, Participation and Awareness). Further work is underway to elaborate the specifics of types of products, intended audiences (including new ones), "storyline" narratives, "key message" priorities, language translation issues, training/teaching spin-offs, and calendars of opportunities to support forward planning. As with all of the issues above, there is great scope for collaboration between the Convention and its partners on these matters.

Reviewing experience

107. Capturing lessons learned from the operation of indicator and reporting processes in practice, and feeding these back in to opportunities for making improvements (while balancing this with the need to maintain consistent and comparable data-streams for analysis over time) is another essential part of the picture. The Reading, U.K., meeting in July 2009 (referred to above) recommended that "A wide ranging, but cost-effective process for review, (including independent inputs) of the [post-2010] indicator suite, at appropriate intervals (taking account of the need for stability as far as possible) should be adopted at the outset, to allow adaptation to new needs and lessons learned from experience, in order to keep the indicators fit for purpose".

Cooperation and synergy

108. The whole area of harmonised strategic targets, indicators and reporting is one of the strongest examples of delivery of cooperative methods of working between Ramsar and the CBD, framed by the Joint Work Plan between the two Conventions and by Ramsar's "lead partner" role. This in turn is a major contribution to greater synergy among the biodiversity-related Conventions (CBD, Ramsar, the Convention on International Trade in Endangered Species, the Convention on Migratory Species, the World Heritage Convention and the International Treaty on Plant Genetic Resources) who cooperate in the Biodiversity Liaison Group.

109. The benefits are mutual: where the question being asked in each place is more or less the same, work need only be done once, collaboratively, to serve multiple interests. Moreover, a shared coherence of approach in wider environmental agendas can only help to strengthen the political impetus that is now more essential than ever for achieving the world's ecological security in the future beyond 2010.

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