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ASSESSING THE SUFFICIENCY OF THE INTERNATIONAL NETWORK OF SITES FOR THE PROTECTION OF MIGRATORY WATERBIRDS

Background

Point 5 of AEWA Resolution 4.14 requested "...*the Technical Committee to assess whether the existing international networks of sites are sufficient for the protection of migratory waterbirds, including the projected climate change effects, and if necessary, to propose to the next session of the Meeting of the Parties which additional complementary approaches should be taken*".

Earlier discussions on the AEWA Technical Committee Workspace have identified the following issues to be considered:

a) An assessment of what is the current extent of protected areas for waterbirds in the Agreement area using the Critical Site Network Tool?
b) An assessment of existing protected area coverage for each population;
c) Some assessment is needed on how effectively sites are actually managed;
d) Addressing the issue of dispersed species where the site conservation approach is not highly useful;
e) In all these issues climate change aspect should be taken into account (possible range shifts etc.).

Progress

In December 2010, the Critical Site Network Tool has been finalised by the Wings Over Wetlands Project. The CSN Tool identifies a subset of internationally important sites that hold internationally important populations of globally threatened species (CSN1) or at least 1% of a waterbird population (CSN2). Thus, an important information source became available to produce the required overview.

In September 2010, the AEWA Secretariat has contracted Wetlands International to produce a review of the protection of the internationally important sites in accordance with Point 7.4 of the AEWA Action Plan. This work will produce information required in points a) – d) above.

The AEWA Conservation Guidelines No. 12 on *Measures needed to help waterbirds to adapt to climate change* identifies species, populations and sites being particularly at risk because of climate change using a deductive logic. It suggests that priority sites for climate change adaptation work should meet the following criteria:

(1) the site should be important for waterbirds;
(2) the site should be threatened by climate change because of any of the following reasons:
   (a) it is an *important breeding, stop-over or wintering site for any of the species and populations identified as being particularly threatened by climate change* (as listed in Step 2);
   (b) it is *located at the poleward edge of any land mass* and is an important breeding, stop-over or wintering site for species or populations of waterbird listed on Annex 2 and Table 1 of the Agreement with a restricted range at the poleward edge of that land-masses;
   (c) it is *located at high altitude* relative to the surrounding area and is an important breeding, stop-over or wintering site for species or populations of waterbird listed on Annex 2 and Table 1 of the Agreement with a restricted range confined primarily to that mountain range;
   (d) it is very *vulnerable to sea-level rise* and inundation by the sea would have a direct or indirect detrimental effect on waterbirds associated with the site;
   (e) it is very *vulnerable to changes in water-level* and such changes are expected as a result of *changes in rainfall and evaporation* and would have a detrimental direct or indirect effect on waterbirds associated with the site; and
   (f) it is very *vulnerable to changes in human land-use* and such changes are expected because of climate change and would have a detrimental direct or indirect effect on waterbirds associated with the site.

The Critical Sites define an especially important subset of internationally important sites and thus can be considered as the minimum set of sites contributing to criterion 1 above. However, the identification of sites that fulfill the various conditions under criterion 2, represents a far more complex challenge.

Options for further work

Although individual countries should bear the main responsibility for targeting climate change adaptation work, it is important that the international overview of priority sites for climate change adaptation provides the necessary flyway context because the coherence of the network can only be maintained or increased if countries coordinate their efforts. In addition, many Contracting Parties may lack the capacity to carry out an assessment of the vulnerability of the sites under their jurisdiction.

There are various ways to identifying priority sites for future climate adaptation work at the scale of the Agreement Area. However, the various approaches would use (a combination of) two basic approaches.

A) Using existing knowledge: The simplest approach to identifying priority sites for climate change adaptation work could be using the Critical Site data and using spatial analyses or literature review (Table 1). The advantage of such an approach is that it is relatively simple and builds on available knowledge. However, it also has several disadvantages; one is that it looks at sites in separation. Consequently, its ability to produce results that can inform adaptation work by identifying true priorities based on the risk to populations and on the (forecasted) irreplaceability of the sites will be limited. Nevertheless, highlighting important sites know to be vulnerable to one or more of the risk factors identified in the AEWA Conservation Guidelines No. 12 would help to raise awareness about the challenges climate change present for the site network.

B) Integrated flyway-scale approach: A more strategic approach that could be used to assess various future scenarios, policy and investment options would require an integrated approach involving the modelling of changes in environmental factors, their impacts on habitat availability, future functionality of site networks and through these on population size and distribution (Figure 1). Until now, most models have focused only on predicting future range changes using climate envelop models. However, the main limitation of such models is that they do not consider explicitly the impact of, often long-distance, hydrological changes to wetland habitats despite that they are more important to most waterbird species then local climatic changes, habitat loss due to sea-level rise and land-use changes. Although an integrated approach may appear to be highly complex and expensive, it has been already applied in case of Arctic geese species in the framework of the FRAGILE project. The establishment of the GEO Biodiversity Observation Network (GEO BON) linking *in situ* observation, Earth Observation and modelling approaches offers a good opportunity now to address issues that are of common interest for the AEWA, CMS, the Ramsar Convention and the European Union in relation to key site networks in the context of flyways.

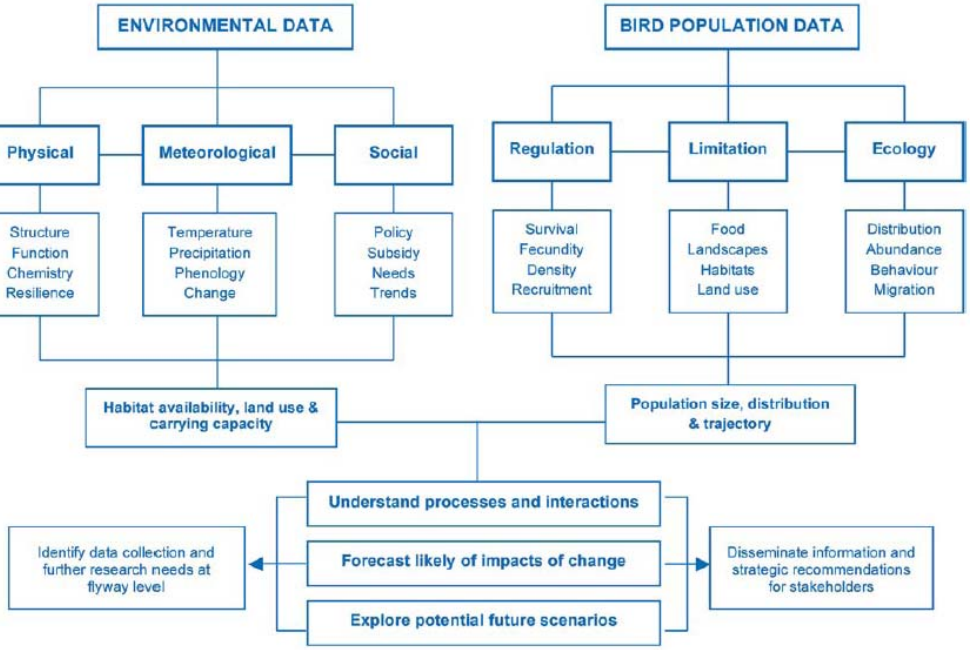

Figure 1 Information needs and analytical outcomes of a flyway-level, integrated research approach[1]

[1] From O'Connell, M.J., Huiskes, A.H.L., Loonen, M.L., Madsen, J., Klaassen, M. & Rounsevell, M. 2006. Developing an integrated approach to understanding the effects of climate change and other environmental alterations at a flyway level. Waterbirds around the world. Eds. G.C. Boere, C.A. Galbraith & D.A. Stroud. The Stationery Office, Edinburgh, UK. pp. 385-397.

Recommendations

A dual approach is recommended to address Options A and B above:

1. Highlight the impact of climate change on the site network by identifying the sites affected by various risk factors sequentially from (a) to (f), starting with the identification of sites meeting criteria (a), (b) or (d). Such work could be produced relatively quickly and would give the opportunity to report some progress before the MOP.

2. If considered to be appropriate, fundraise for work under (c), (e) and (f) intersessionally.

3. If considered appropriate, liaise with relevant research consortiums[2] and support their applications to relevant research funds to develop integrated flyway-scale approaches for assessing the impact of climate and land-use changes.

[2] Wetlands International is currently negotiating its participation in the consortium which tenders for the topic *Assessing Global Biological resources: the European contribution to GEO BON* under EU 7th Research Framework Programme.

Table 1 Potential methods for identifying important sites vulnerable

Risk category	Possibilities to identify important sites vulnerable to climate change	Estimated costs[3] (€)	Notes
(a) Important site for a population considered to be sensitive to climate change	- Querying the CSN Tool data to identify sites which hold important populations of the 'sensitive' populations	500	- Critical Site list might be incomplete in case of populations which were lumped with other populations in the IBA inventories; - The assumptions underlying the listing of 'climate sensitive' populations might be incorrect.
(b) Important sites on the poleward edge of any landmass[4]	- Spatial overlay of important breeding sites with the range change predictions of Zökler & Lysenko (2000)[5] for the Arctic	1,000	- Zökler & Lysenko (2000) only considers impacts on breeding; - Inaccurate vegetation maps; - Reliability/relevance of current and forecasted climate data; - It only considers climatic and vegetation changes; - It uses fairly crude range definitions; - It only covers a subset of the relevant species.
(c) Important sites located at high altitude	- Identifying AEWA populations (e.g. Dotterel) which are dependent on habitat types that might be affected by altitudinal shifts (e.g. mountain tundra) - Model species distribution in relation to climate and elevation	10,000	- Study plan focuses on breeding sites;

[3] Rough estimates assuming an average consultancy rate of € 500 per day.

[4] Poleward edges of landmasses received particular attention because range shift would be limited by the availability of terrestrial habitats. However, many of the seabird species listed on AEWA are also affected by climate change through changes in the availability of fish stocks.

[5] Zöckler, C., & I. Lysenko 2000. Water birds on the edge: first circumpolar assessment of climate change impact on Arctic breeding water birds. WCMC - World Conservation Press, Cambridge.

Risk category	Possibilities to identify important sites vulnerable to climate change	Estimated costs[3] (€)	Notes
	using available occurrence data and predicted climate data - Spatial overlay of important breeding sites with predicted range loss		
(d) Important sites vulnerable to sea-level rise	- Overlay one or more existing sea level-rise models with Critical Site data	2,000	- Reliability of various sea level-rise models require careful assessment
(e) Important sites vulnerable to changes in water-level as a result of changes in rainfall and evaporation	- Review available literature on local and regional wetland change studies; - Identify important sites of which vulnerability has been already assessed and highlight those that have been found to be vulnerable - Highlighting the spatial and thematic gaps	20,000	- Modelling hydrological changes in wetlands is fairly complex and require a lot of data; - No model is available for the entire Agreement Area; - There are various national or site-related models; - Such local models would be of variable quality and would be based on various assumptions
(f) Important sites vulnerable to changes in human land-use induced by climate change	- Reviewing available land-use change studies; - Assess impacts of land-use changes on the of the important sites in the area where such information is available; - Highlighting important sites where studies confirmed their vulnerability; - Highlighting the spatial and thematic gaps	30,000	- There is a highly complex relationship between climate change and land-use including direct habitat change due to locally changing climate, foreign investment to secure food supply (major issue in Africa), increased biofuel production (e.g. Tana River delta) as a result of climate change related policies and indirect impacts of irrigation on wetland ecosystems; - Land-use changes may impact important sites at considerable distances as it was

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			demonstrated by the FRAGILE project which shown that tundra vegetation might be negatively affected at Svalbard as the result of improved survival of geese on farmland at their wintering areas; - Land use change models generally lack sufficient details and use very crude categories (e.g. arable vs. grassland or even agricultural versus forest); - The World Bird Database contains information on threats to IBAs including their timing which allows identifying sites threatened by future land use changes. However, threat data for IBAs were mostly collected at the time of the IBA inventory and somewhat reflect the understanding and perception of threats of the national IBA coordinators and local caretakers.